

BEAVERTAIL STATE PARK MASTER PLAN

2026



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 - Provided inventories of flora and fauna on site to identify areas to be protected when considering future designs.

1 Introduction

1.1 - Project Purpose

Beavertail State Park, encompassing 192 acres by the Rhode Island Department of Environmental Management (RIDEM) and the Town of Jamestown, is a treasured asset along Rhode Island's southern coast. Renowned for its sweeping scenic views, rich history, and opportunities for passive recreation, the Park has long been a popular destination for both residents and visitors. Guided by a Master Plan established in 1980, Beavertail has provided coastal access, walking paths, and historic landmarks that continue to draw admiration. However, after more than four decades, the Park faces growing challenges, including erosion and safety concerns, that threaten its long-term sustainability. RIDEM is re-evaluating the Park's design to enhance its resilience while preserving the character and natural beauty that have made it a beloved destination in the Ocean State.

The beavertail State Park Master Plan is intended to re-imagine the future of Beavertail State Park and addresses the following:

- Climate change impacts.
- Accelerated coastal storm damage & stormwater erosion.
- Physical impacts from increased use by the public.
- Preserve, protect, and enhance the unique ecology and predominantly wild, natural character of the Park.
- Expanded public access to currently inaccessible areas of the Park.
- Improved access to park features & broaden on-site interpretation.
- Improvements to expand accessibility for all users.

1.2 - Project Background

In the early 1940's Fort Burnside was created on the land surrounding the Beavertail Light Station. Made up of over 192 acres of land, the fort was a central component of the Coastal Defenses of Narragansett Bay. Several decades later, in 1980, the U.S. government declared the site federal surplus land and conveyed ownership of the southwest portion of Conanicut Island to the Rhode Island Department of Environmental Management (RIDEM), creating Beavertail State Park.

In January 2024, ownership of that portion of the property was transferred to RIDEM, acknowledging the State's strong partnership elements including Beavertail Lighthouse Museum Association (BLMA) (management and interpretation) and the Town which owns an easterly portion of the Park, and provides emergency response services to the Park.

"Beavertail State Park offers the best of Rhode Island, with panoramic views of Narragansett Bay, grassy fields for picnicking, hiking trails, shoreline access for fishing, and historic buildings with rich histories"
- RIDEM Director Terry Gray

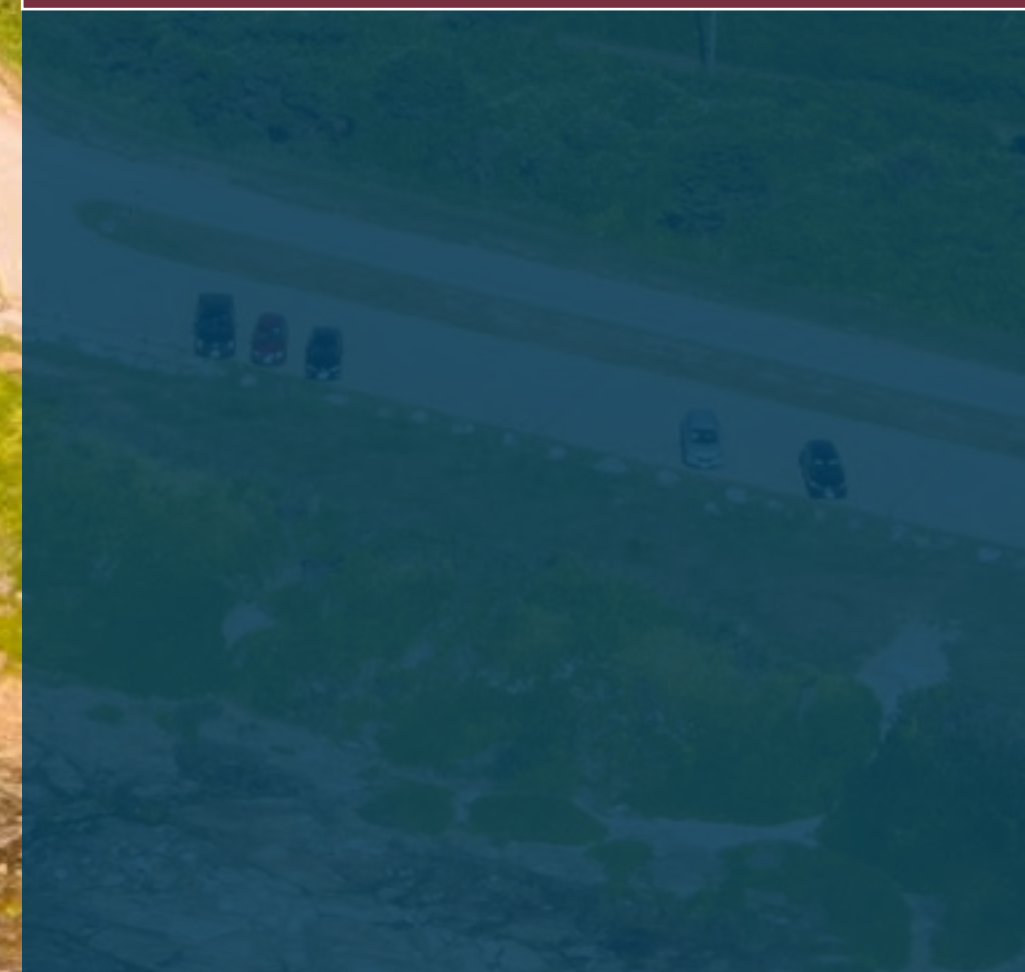
1.3 - Special Thanks

The BETA Team wishes to thank all members of the public that participated in the development of this study through attending meetings, workshops and public presentations. Your passion and interest for this land has made the development of the Beavertail State Master Plan more diverse, informed and meaningful.



2 Executive Summary

- 2.1 - Introduction
- 2.2 - Overview
- 2.3 - Park Purpose
- 2.4 - Foundation Statement
- 2.5 - Stewardship
- 2.6 - Significance
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- 2.8 - Park Visitor Survey
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- 2.10 - Conclusion



2.1 - Introduction

For most people it takes only one visit to Beavertail State Park to understand why people have been drawn to the southernmost tip of the island that indigenous peoples called *Conanicut* for centuries. The breathtaking convergence of land, sea, and sky is without equal in the region, and the scenery and natural habitat present at the tip of this peninsula are uniquely underscored by the rich history of the site.

While much of their history remains unknown, it is understood that native peoples inhabited peninsulas, islands and other areas of the coastline seasonally. The Narragansett people traveled across the bay in ocean-going dug-out canoes, traversing east-west from tip to tip across the islands. Beavertail Point at times may have served as a summer encampment and was certainly an important navigational wayfinding point for the indigenous people.

Rhode Island Historical Society records disclose that in 1705, early settlers declared, “*There shall be a chimney built to the Watch-house of Beavertail,*” making the tip of Conanicut Island one of the oldest navigational lights in America.

In addition to the maritime importance of an illuminated beacon at this site, Beavertail Light Station and the surrounding lands have become a figurative beacon for citizens of the State of Rhode Island (RI). The single location symbolizes the essence of the state, forms an iconic touchstone of the RI psyche, and, for many visitors each year, serves as a destination of vacations and coastal travels in the state.

The nearly 192-acre site features diverse terrain, vegetation, and wildlife communities edged by two miles of shoreline. Within the site are nearly three miles of marked and unmarked paths and trails. Seven striking white and red light station buildings dating back to the 1800’s populate the outermost tip of the Park, surrounding the 85-foot-high granite lighthouse and beacon. Camouflaged within the interior lands of the Park are the complex fortifications of Fort Burnside, constructed during World War II (WWII). The fascinating purpose-built structures set in the predominantly natural character of the Park draw visitors from near and far.

Park-goers gave a wide range of responses when asked their reasoning for visiting the site. From fishing to visiting the lighthouse, to getting married, watching the boats go by, or looking at ducks and listening to the ocean, the diversity in responses underscores the

uniqueness of the site and the broad appeal it holds for the public. Throughout the Master Planning process, many individuals expressed a recurring sentiment to “do not change anything” in the Park. This perspective can be interpreted as a desire to keep Beavertail State Park as is, acknowledging the uniqueness of the site and the fragile equilibrium that exists between the built structures, the natural environment, and visitors to the site.

2.2 - Overview

Conservation and protection require action. It is not enough to identify a place as special and that it should never change. Climate change and intensification of park usage in the last decade have accelerated changes to the site and with the resulting conditions, necessitate action. Natural forces such as sea-level rise, severe coastal storms, and unprecedented heavy and frequent rainfall events have irreversibly shaped and reformed the edges of the peninsula and continue to do so. Nearly 40 years of park visitors have worn paths into the vegetation as people sought to have access to the rocks, tidal pools, and the water.

The goal of the Master Plan is to develop a forward-looking vision and stewardship plan for the Park that keeps pace with the recreational needs and corresponding pressures exerted on the land.

2.3 - Park Purpose

The Park’s purpose is to provide the public with an opportunity for passive recreation in a natural setting. Some of the top reasons for park visits include strolling on the trails, exploring, visiting the lighthouse, and taking in scenic views. The Park provides access to open field areas, forested wetlands, and successional upland scrub forest areas, as well as diverse intertidal areas consisting of raw coastal bluffs, rocky ledges, and cobble/sand beaches.

There are over 60 species of fish in Narragansett Bay, many in the waters just off the edge of the peninsula, making fishing another popular reason for visiting the Park. Visitors can observe an array of birds and waterfowl at the Park, both overhead and on the water. A wide range of mammals can be found in the upland areas above the rocky intertidal zone. The Park presents the opportunity for visitors to explore different eras of American history with the existing Light

Station and WWII fortifications. Beavertail State Park provides visitors with an immersive nature-based passive recreational experience in a predominantly large-scale natural coast-land that is not replicated elsewhere in the state.

2.4 - Foundation Statement

Beavertail Point provides foundational value for humans, birds, animals, and marine life. The diversity of the physical environment, the array of wildlife food sources, vegetation, and edge conditions create a setting that attracts diverse wildlife in the sea, on the land, and in the sky. The historic structures, open meadows, and wooded areas set against the rocky shoreline create visual qualities with equal appeal and draw for humans.

Maintaining these values is at the center of the Master Plan. The Park was conceived as a place for passive recreation, within a natural environment, and that remains the guidepost for the development of the plan. The Beavertail State Park Master Plan is founded on the goals of preservation, protection, and enhancement to the Park.

2.5 - Stewardship

Before 1940, the southern tip of Beavertail consisted of over a dozen privately held parcels. With the onset of WWII, these properties were consolidated by the U.S. Government to become a joint Army-Navy base named Fort Burnside in 1942. At the southernmost tip of the peninsula, the U.S. Coast Guard operated the Beavertail Light Station.

The land was ultimately declared surplus property by the U.S. Government, with ownership of 20 acres conveyed to the Town of Jamestown and the rest of the State Park site conveyed to the State of Rhode Island. While the Town retains ownership of 20 acres, the entire site is operated cooperatively as Beavertail State Park. The Beavertail Lighthouse Museum Association (BLMA) is a nonprofit organization which has been an excellent steward of the lighthouse, spearheading preservation, restoration and public access to the facility. RIDEM operates a naturalist museum and aquarium on the site.



FIGURE 2.1

2.6 - Significance

Natural Environment

The rugged tip of Conanicut Island that Beavertail State Park occupies is significant to humans, birds, and aquatic and terrestrial animals. Protecting these habitats and enhancing them when possible is a key objective of a stewardship plan for the site.

The Park is a well-documented and valuable migratory stop-over for birds and other pollinator species, such as the monarch butterfly. There are few other migratory stop-over sites available, particularly on the outermost landward edges of the bay. This is in part because of the layers and edges of vegetation, wetland complexes, and overall mass of undisturbed, vegetated areas found at Beavertail.

Wildlife surveys conducted as part of the Master Planning process identified over 100 species of birds and mammals at the site. Reference Appendix 12 in the Beavertail State Park Master Plan for more detailed information.

Health & Wellness

The Park has always been a popular place to visit, but the value the site holds for the general public was vividly illustrated during the corona virus (COVID-19) pandemic. In 2019 approximately 156,500 cars entered the Park. By the end of 2020, the number of cars entering Beavertail State Park annually nearly doubled to 285,700. Using the occupancy rate of 2.7 individuals per vehicle suggests park visitation jumped from 422,500 to nearly 787,000 people, an increase of nearly 82% in a single year.

Since 2020, park visitation has remained elevated beyond previous periods with around 200,000 cars coming into the Park each year, leading to overuse and putting stress on park facilities and natural environments. Unlike more developed parks with maintained facilities, Beavertail State Park's fragile coastal bank has struggled to handle the increased number of visitors. This has impacted its natural systems, wildlife, and vegetation. These changes in visitation are discussed in Chapter 4: Constraints and Opportunities.

The desire is studied and described in great detail in the book *The Nature Fix, Why Nature Makes Us Happier, Healthier and more Creative*, by author Florence Williams. In her book, she discusses at length the value of in-depth experiences in nature, and how living and surviving in the hyper-connected digital age increases the need

to retreat from technology and rediscover nature. Her book explores concepts such as silent parks, forest bathing, and other wellness-related research illustrating the vital importance of having immersive experiences in nature. A relevant passage relating to Beavertail State Park is a quote from another author, essayist and environmental activist, Edward Abbey, offering this thought: *"May your trails be crooked, winding, lonesome, and dangerous, leading to the most amazing view"*, a quote that timelessly and aptly captures much of what Beavertail means to visitors.

Historic & Educational

Self-guided outdoor educational opportunities are plentiful at Beavertail. The peninsula offers an array of attractions and opportunities to learn about the natural environment from strolling through wooded trails, bird watching, or exploring tidal pools. The built environment also provides different types of educational opportunities.

The establishment of a light at the Watch House at Beavertail Point in 1705 marked the start of the formalized occupation of the point and built structures. The wooden tower built in 1749 was known as Newport Light and is recognized as the third lighthouse built in the original thirteen colonies. This first foundation remains in place on a ledge outcrop southeast of the present-day granite tower lighthouse which was constructed in 1926.

Although minor fortifications occurred at the point over the years, eight decades later, during WWII, the construction of Fort Burnside marked the next significant era of construction on the peninsula. The fortification of the peninsula took several homes and cottages by eminent domain, razing them or re-appropriating the buildings for military use.

Fort Burnside was conceived as the hub of the Coastal Defenses of Narragansett Bay. While other areas of the coast and even elsewhere on the island had sites appointed with other spotting stations, gun emplacements, batteries, magazines, and outlook posts, many war historians consider the wartime facilities constructed at Beavertail quite unique.

Beavertail State Park is unique due to the existence of 1) The radar research facility, Spraycliff; 2) The Harbor Entrance Command Post

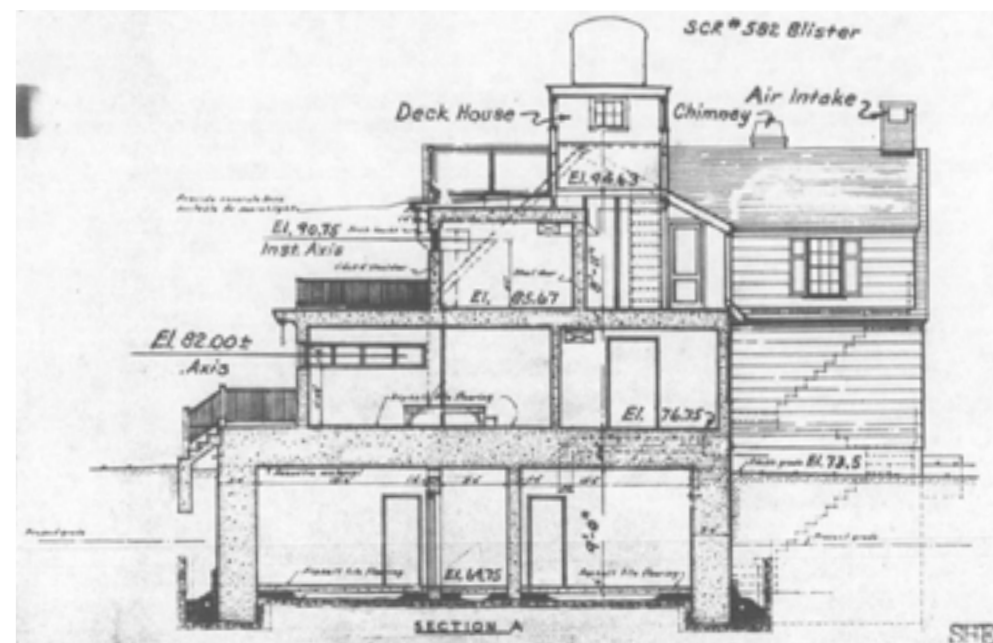
(HECP); and 3) Heavy artillery batteries, all on the same site.

Battery 213 and Battery Whiting, where large concrete gun emplacements, magazines, and spotting stations exist, are the best-known and publicly visible military structures on site. These fortifications comprised an important part of the overall defenses, but represent only a small part of a larger network of forts in the state.

Nationally, Coastal Artillery Districts established and created the organizational structure for Harbor Defense Commands. There are 20 states with such designated districts and fortifications, some of which remain intact. One of the best-known Harbor Entrance Command Posts is located at Fort Sumter/Fort Moultrie in Charlestown, South Carolina. This fort, on Sullivan's Island, is a national park open to the public.

The HECP at Beavertail State Park is noteworthy because it was designed to appear as a summer cottage with a detailed wooden exterior surrounding the concrete command post structure inside. Of the small number of HECP facilities that were camouflaged in such a manner, it is thought that less than five exist today.

The interior conditions of the HECP at Fort Burnside further distinguish the structure from other harbor command post facilities.



Cross section of HECP from US Naval Archives

FIGURE 2.2

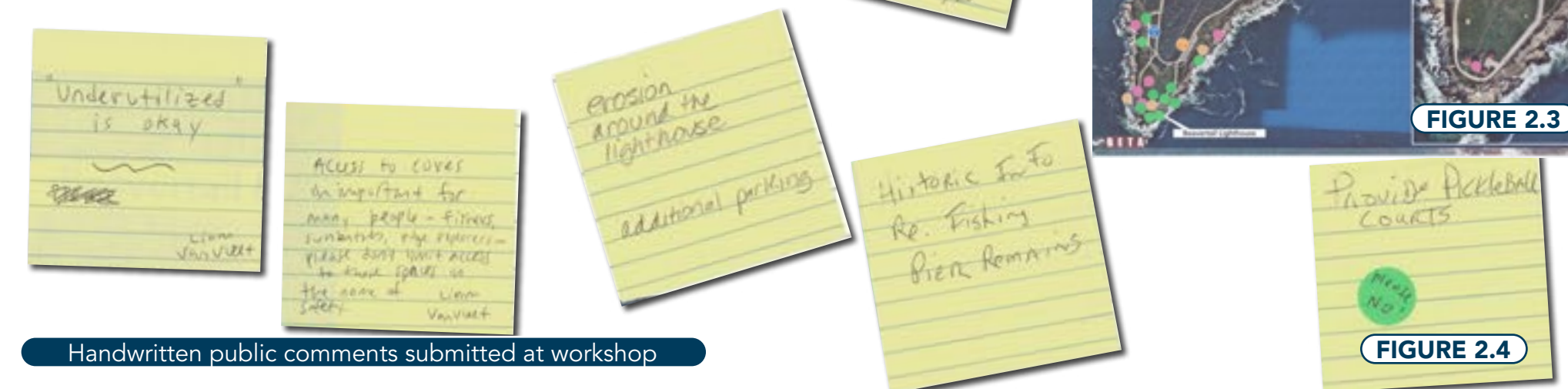
2.7 - Public Engagement

The Master Planning process included multiple internal and external stakeholder meetings to review existing conditions and operations, current and potential programming, challenges and opportunities, and future goals. A public workshop was held in September 2023 at the Community Center in Jamestown. Multiple attendees participated in interactive stations and attended the formal presentation introduced by RIDEM Deputy Director, Jason McNamee. Over 30 members of the public attended and contributed to the development of the plan. The meeting was also a platform to expand awareness and invite the public to participate in the on-line Beavertail State Park user survey, which ran from September 2023 through February 2024.

Conversely, to the northwest of the HECP, there are few visible remains of the research station, Spraycliff. The WWII top secret radar research facility was fully dismantled, except for areas of remnant pavement and a large concrete cistern that is nearly obscured from view. Research work at this site is credited with the creation of the ability to fly planes at night, fostering air superiority and leading to Allies' successes in WWII.

The Saltwater Aquarium, operated and staffed by RIDEM, features rich interpretation. Located in the Fog Signal Building east of the lighthouse, the aquarium operates seasonally and is curated by biologists who collect local marine life that can be found in the waters of Narragansett Bay.

The Beavertail Lighthouse Museum and nearby Aquarium are important park attractions, drawing interest and retaining visitors of all ages. Both attractions expand park-goers' understanding of the ocean, seafaring, navigation, and fortifications of maritime biology. While far less visible, the HECP is considered by many to be one of Beavertail's greatest hidden treasures, which presents a new dimension in regard to interpretive and educational opportunities.



Handwritten public comments submitted at workshop

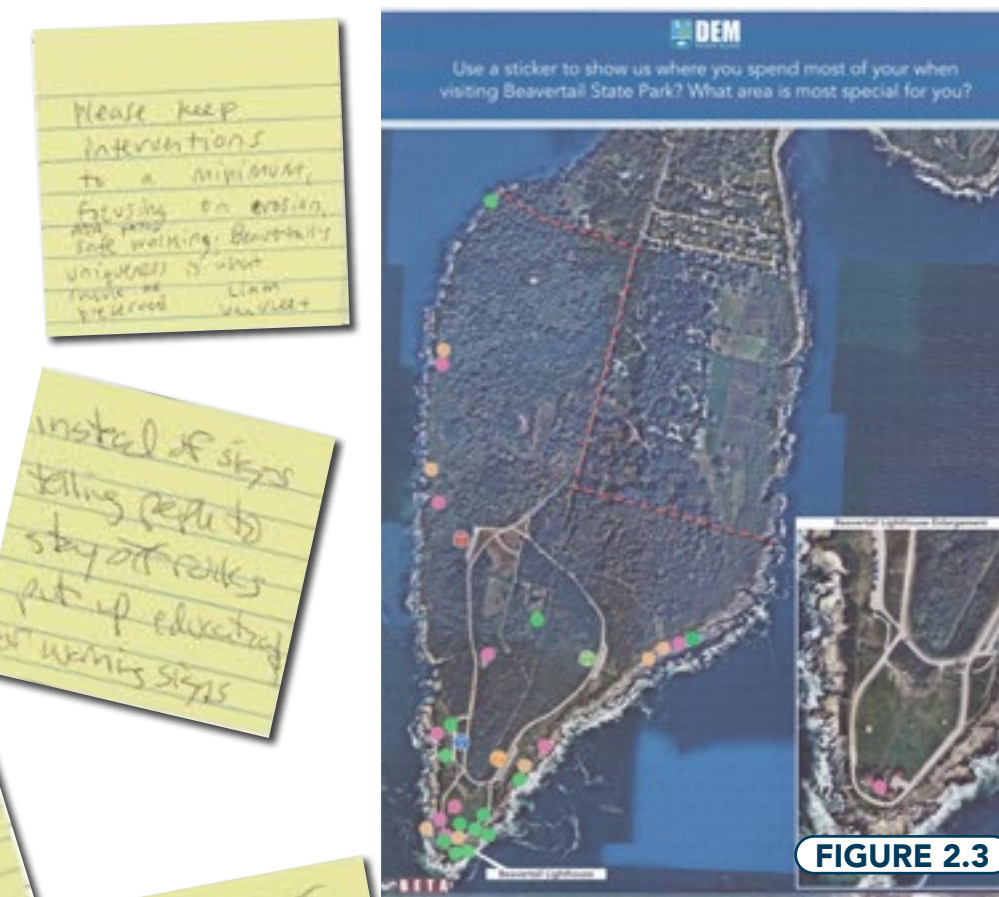


FIGURE 2.3

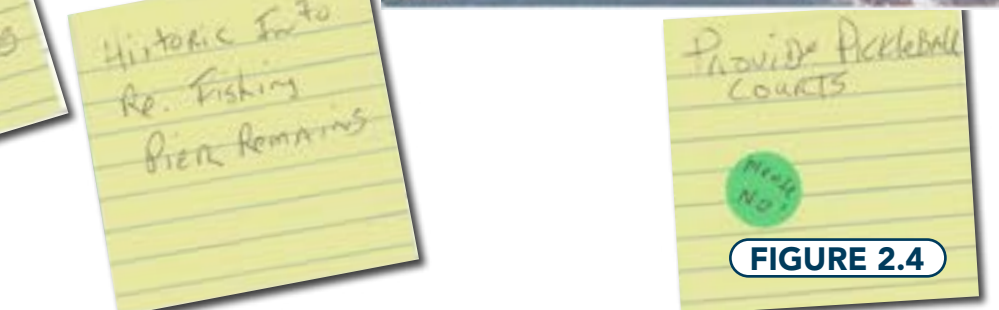


FIGURE 2.4



Public Workshop 2023

FIGURE 2.5



Workshop participant providing input on areas of interest

FIGURE 2.6

2.8 - Park Visitor Survey

As part of the Master Planning process, the project team developed and hosted an online park user survey/questionnaire which ran from August 2023 to February 2024. The Survey identified three primary spheres of interest aligned with reasons why visitors might come to the Park.

Within those areas of interest, sub areas of special focus were identified.

RECREATION

Fishing
Walking on Trails
Picnicking
Hunting

EDUCATION

Lighthouse and Museum
Aquarium
WWII History
Marine Habitats

SCENERY

Scenery / Ocean Views
Ocean / Fresh air
Photography

Tell us your primary reason for visiting Beavertail State Park.

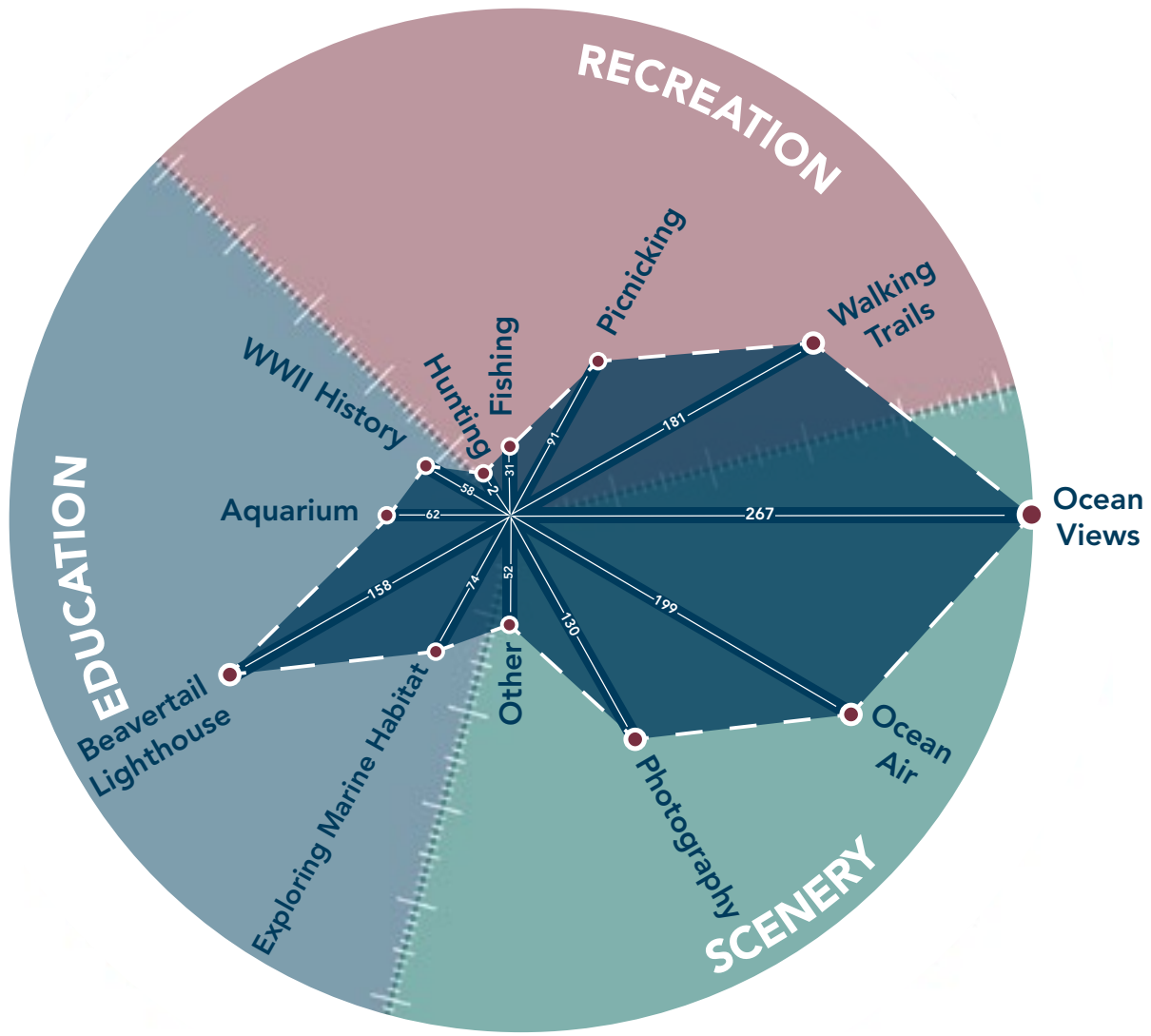
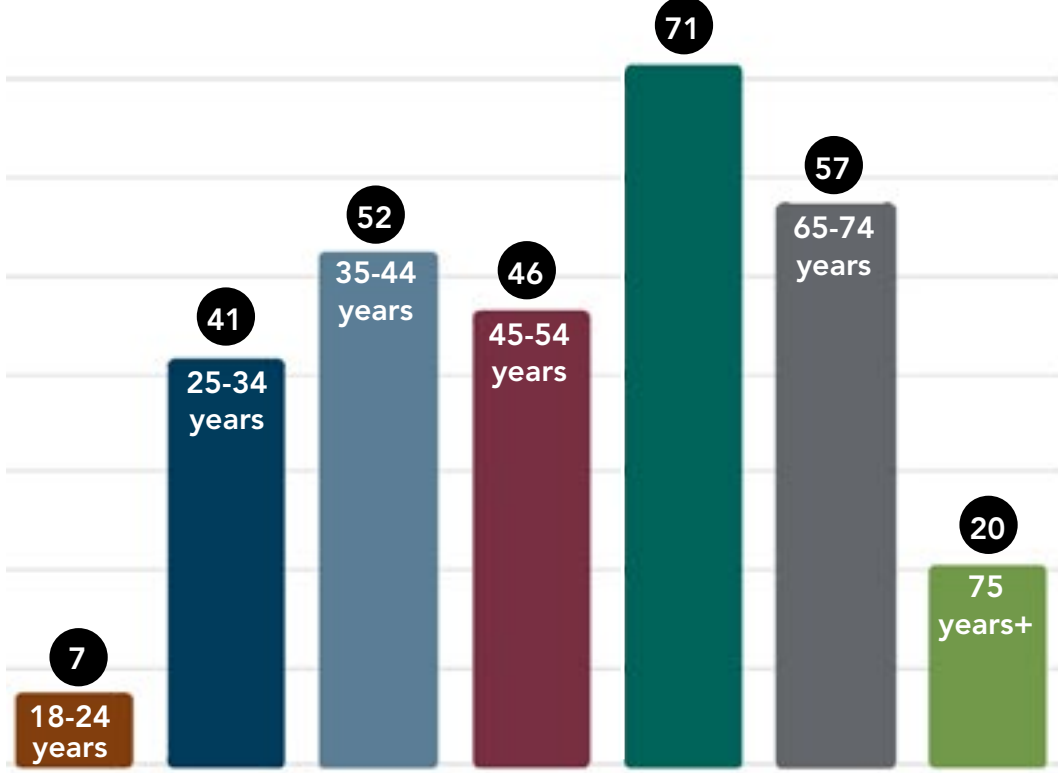
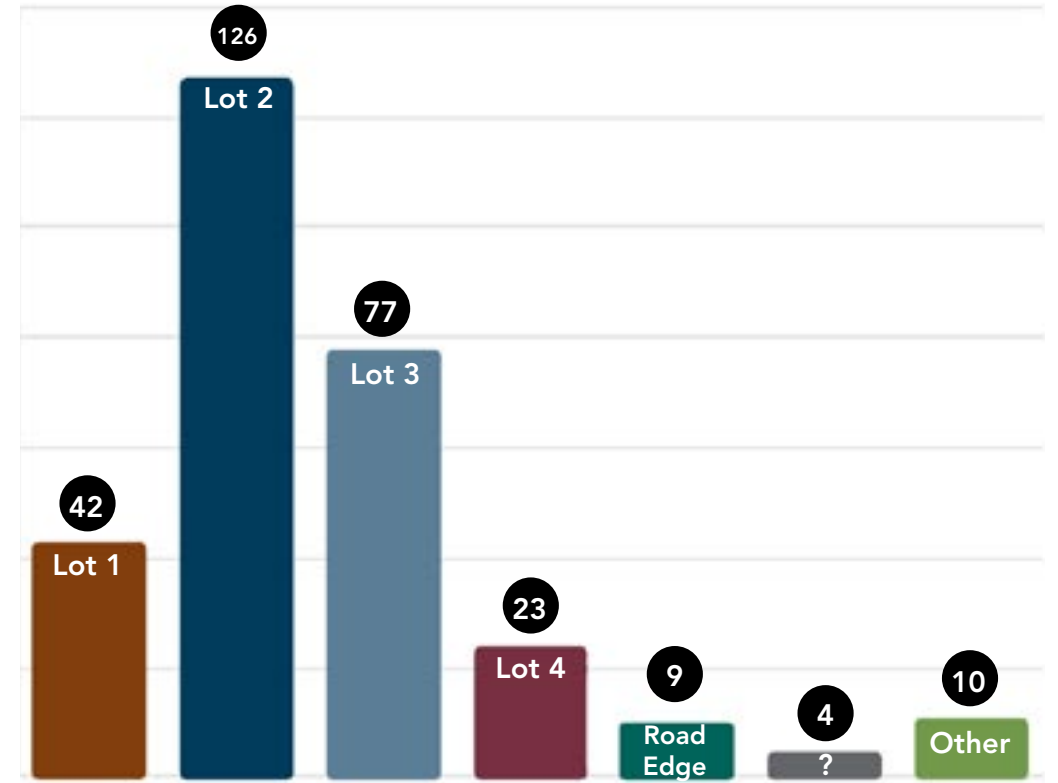


FIGURE 2.7



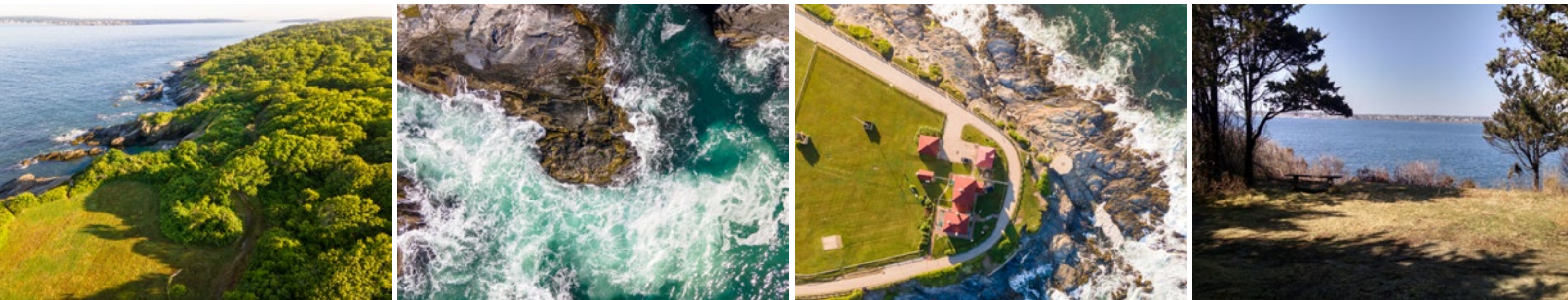
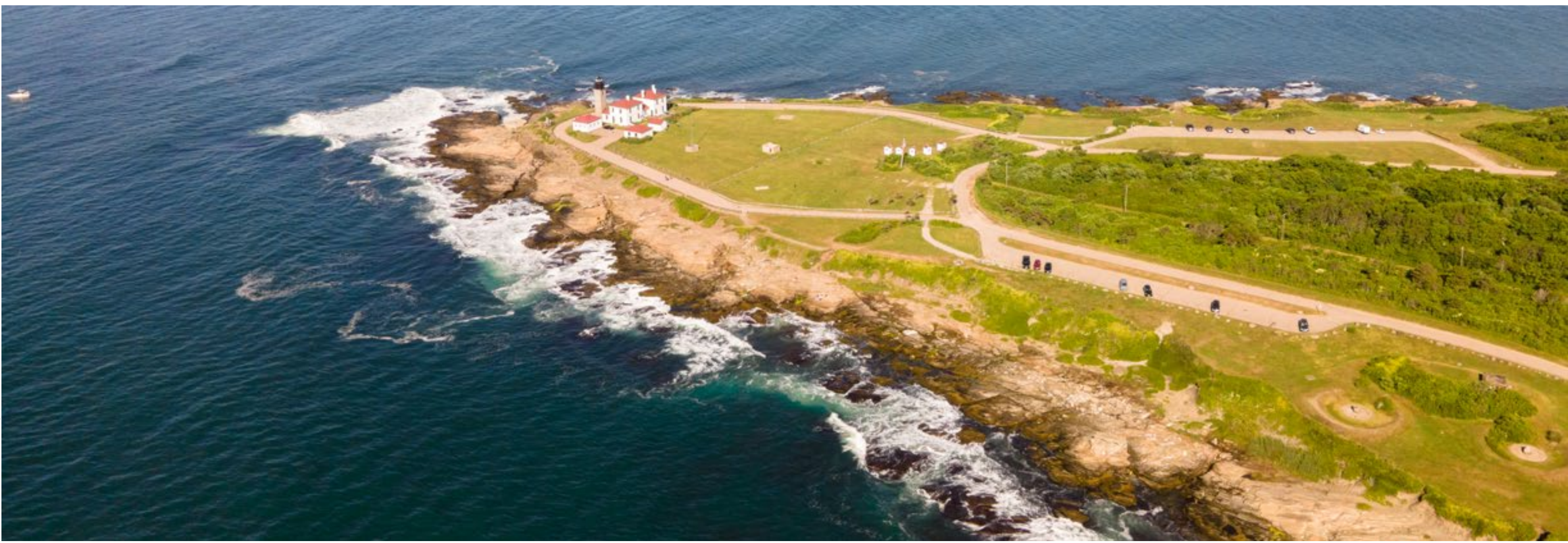
Visitor Age

FIGURE 2.8



Where Visitors Park

FIGURE 2.9



2.9 - Objectives

In 2024 the intrinsic values that Beavertail State Park holds are threatened. Sea level rise, severe and more frequent coastal storms, high-intensity rainfall events, and park-goers are exerting unprecedented pressures on the edges of the peninsula. The Park is experiencing loss of vegetation and habitat, accelerated erosion, and sedimentation at an accelerated rate. Invasive plants are expanding their footprint, in the inland areas of the Park, reducing biodiversity and eliminating habitat. Mown grass walking paths have become pitted and muddy near wetlands, or worn to expose bare soil in

other locations, channelizing water and creating upland erosion issues. Visitors to the Park ignore signage or elect to park on the road shoulders or open grass areas, when faced with the first full parking lot, compacting soils and furthering erosion.

The Beavertail State Park Master Plan is founded on the goals of preservation, protection, and enhancement to the Park.



RI CERl Analysis and Output
URI EDC, RIGIS | USGS | RI CRMC, URI OCE, URI EDC, URI CRC | RI CRMC, URI OCE, URI EDC, URI CRC | Rhode Island Dept. of Transportation, MIS/GIS Section, Two Capital Hill, Providence, R.I. 02908-5872 | Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, University of Rhode Island, MassGIS, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS



2.10 - Conclusion

The twentieth century represented a tremendous period of change at Beavertail Point marked by the hardening of coastal edges, grading and filling for the creation of paved roadways, and the construction of new structures and fortifications. These structures had modern infrastructure and a corresponding supporting utility network. Human occupancy of the Point intensified as the built footprint on the land increased.

Near the end of the century, the establishment of Beavertail State Park allowed nature, to an extent, to reclaim the point, with successional wildlife and vegetation establishment occurring with little human intervention. At the same time, we have observed greater numbers of visitors to the Park.

With increased use and unabated vegetative growth, the decommissioned fortifications have aged to the extent that these built resources require attention for continued public use in the future.

The result of human pressures on the land is clear. Pressures exerted by visitors combined with naturally occurring forces in the form of sea level rise and frequent, intense, and severe rainfall events are irreversibly changing the edges of the Park. To better accommodate park-goers both at the coastal edges, as well as inland, while minimizing human-generated impacts and not further accelerating the coastal attrition already occurring, action is needed.

Modern and sustainable investment in not only the infrastructure but also the physical environment and natural systems is required to ensure the future legacy of the site. This is necessary to keep the Park as an immersive, natural space, steeped in history that the public can experience and enjoy for generations to come.

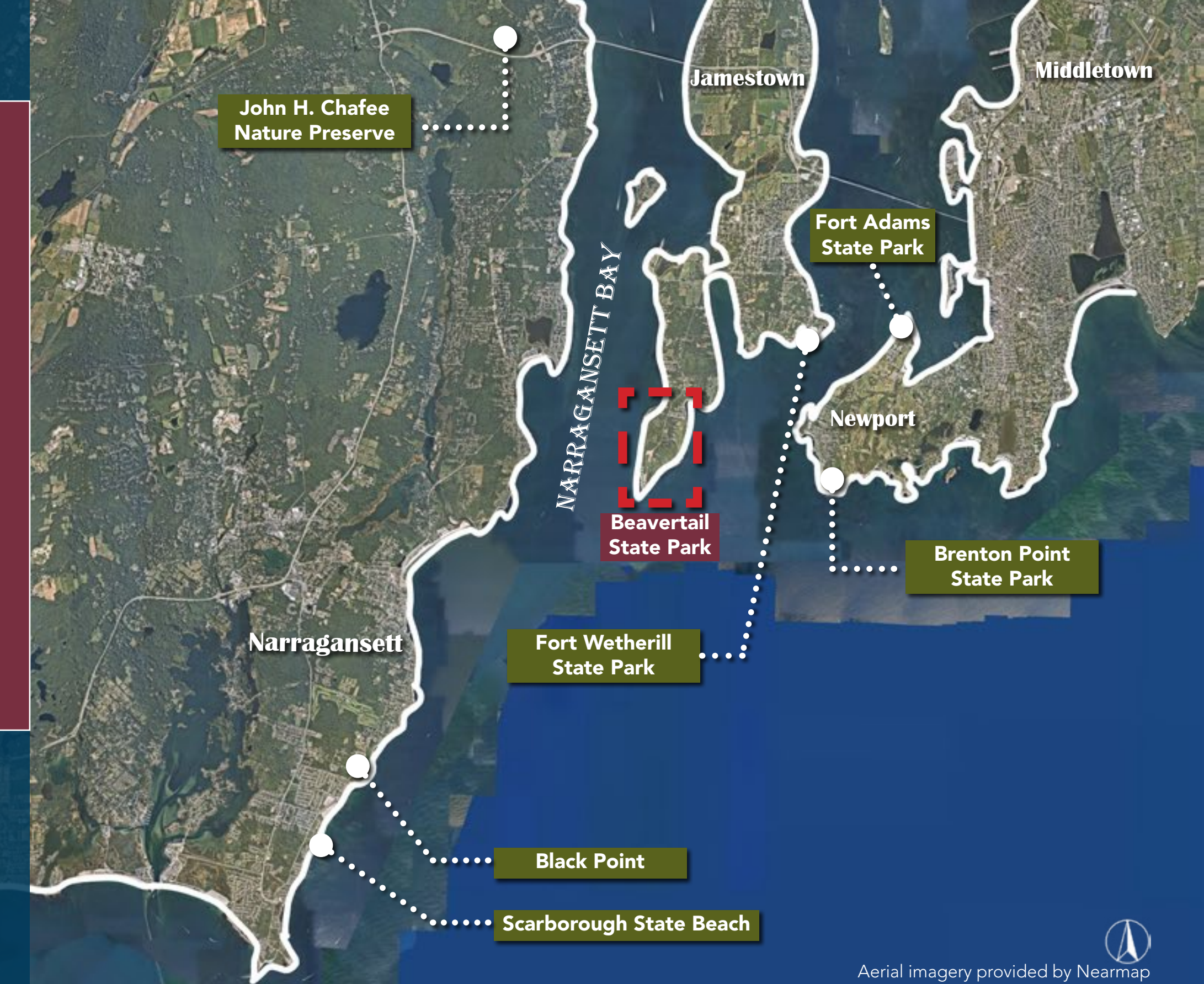
This Beavertail State Park Master Plan provides a framework of preservation, protection, and enhancement strategies that will guide phased investments in the Park. Recommendations may be advanced concurrently or in phases, with different options available regarding site locations and emphasis.





3 Existing Conditions

- 3.1 - Introduction
- 3.2 - The Land
- 3.3 - The Intertidal Zone
- 3.4 - Buildings
- 3.5 - WWII Fortifications
- 3.6 - Roadways and Infrastructure
- 3.7 - Plant & Animal Communities
- 3.8 - Site Amenities
- 3.9 - Park Uses
- 3.10 - Site Assessment
- 3.11 - Existing Conditions Summary



3.1 - Introduction

Beavertail State Park occupies the southwestern tip of Conanicut Island, the second-largest island in Narragansett Bay. The west side of Conanicut Island comprises a distinctly shaped peninsula, thought by mapmakers and settlers to resemble the outline of a beaver. Early maps identify Beaverhead Farm (Ft. Getty area, land just south of present day- Dutch Island) and named the tip of the landmass as “Beavertail.”

Settlers wrote about how the island differed in visual profile and character from the other forested islands in the bay and the mainland due to the grasses visible from Conanicut Island, particularly when viewed from the water. Conanicut Island’s inviting pasturage for domesticated animals and its position at the mouth of the bay was considered highly desirable for maritime activities and trade. Thought to be a defensible location with many sources of freshwater, the island was highly desirable for colonial settlement.

There is still much left to discover and understand regarding the centuries of pre-contact use and encampments on the land now known as Beavertail State Park. Conanicut Island represents a deeply important and spiritual place for the Narragansett Indian Tribe, who traveled from the mainland to summer seasonally on the island. Indigenous peoples managed the vegetation and, by extension, the wildlife, on the island through controlled fires that burned large portions of the island and created large open grass areas.



Example of Native American dwelling and encampment

A prominent Sachem in the Narragansett Indian Tribe, Canonicus, is referenced in historical literature as giving consent to allow European colonial settlement on Dutch Island. Dutch traders first occupied the 85 acre island off Beaverhead in the late 1630’s. In 1657, colonists purchased the larger island to the north and subsequently named it after Canonicus as Conanicut Island. It was later named Jamestown in honor of King James.

By 1705, records indicate plans had been deployed to establish a watch tower at the tip of Conanicut Island, thus formalizing the site as a place for navigational aid and making permanent man’s passage along the ridge of the peninsula to Beavertail Point.

Prior to 1940 the southern tip of the Beavertail peninsula consisted of a dozen privately held smaller lots. These properties were consolidated into one large parcel to become the joint Army-Navy base, Fort Burnside, in 1942. This footprint technically excluded the southernmost tip of land, which consisted of approximately seven acres controlled by the US Coast Guard and occupied by the Beavertail Light Station. The facility includes several buildings, the foghorn and light house as depicted in Figure 3.6 which was conveyed to the State in 2023, completing the disposition of 192 acres of U.S.-owned property which now constitutes Beavertail State Park. Copies of deeds and conveyance materials are included in Appendix 1.

The Beavertail experience itself has not changed significantly in hundreds of years, with the unique convergence of wild land, sea, and sky and the sweeping, open views of Narragansett Bay continuing to draw visitors from across the world.

3.2 - The Land

Prior to 1940, the southern tip of Beavertail consisted of 12 privately owned properties. The formation of a joint Army-Navy base, Fort Burnside, consolidated the properties into one in 1942. This footprint technically excluded the southern-most tip of the island, which consisted of seven acres held by the U.S. Coast Guard and contained the Beavertail Light Station. In 1980 the land transferred through the Federal Lands to Parks Program (FLP) with the State of Rhode Island taking ownership of 158 acres and the Town of Jamestown retaining ownership of 20 acres. The parcel geometry is derived from the straight, original north-south access road, which is no longer in existence. A grassy corridor now containing electric infrastructure

lines marks the alignment of the former road.

Much of the Park is in a late-stage successional meadow transition originating from the open grass lands that once dominated the entire peninsula. The peninsula is presently characterized by small areas of successional grass and shrub meadows framed by larger tracts of 20- to 30-foot-high stands of deciduous shrub and trees. Several invasive plant species such as autumn olive and rosa multiflora are present across Beavertail State Park and in several areas have established dominance over the native vegetation. Stands of larger, deciduous trees and eastern red cedar populate interior side slopes, ridge areas, and wetland portions of Beavertail State Park. RIDEM manages the outermost edges of the peninsula as mown open lawn areas for passive recreation including picnicking, sitting, and strolling. In many areas, native shrub and grass growth exist at the top of the coastal bank.

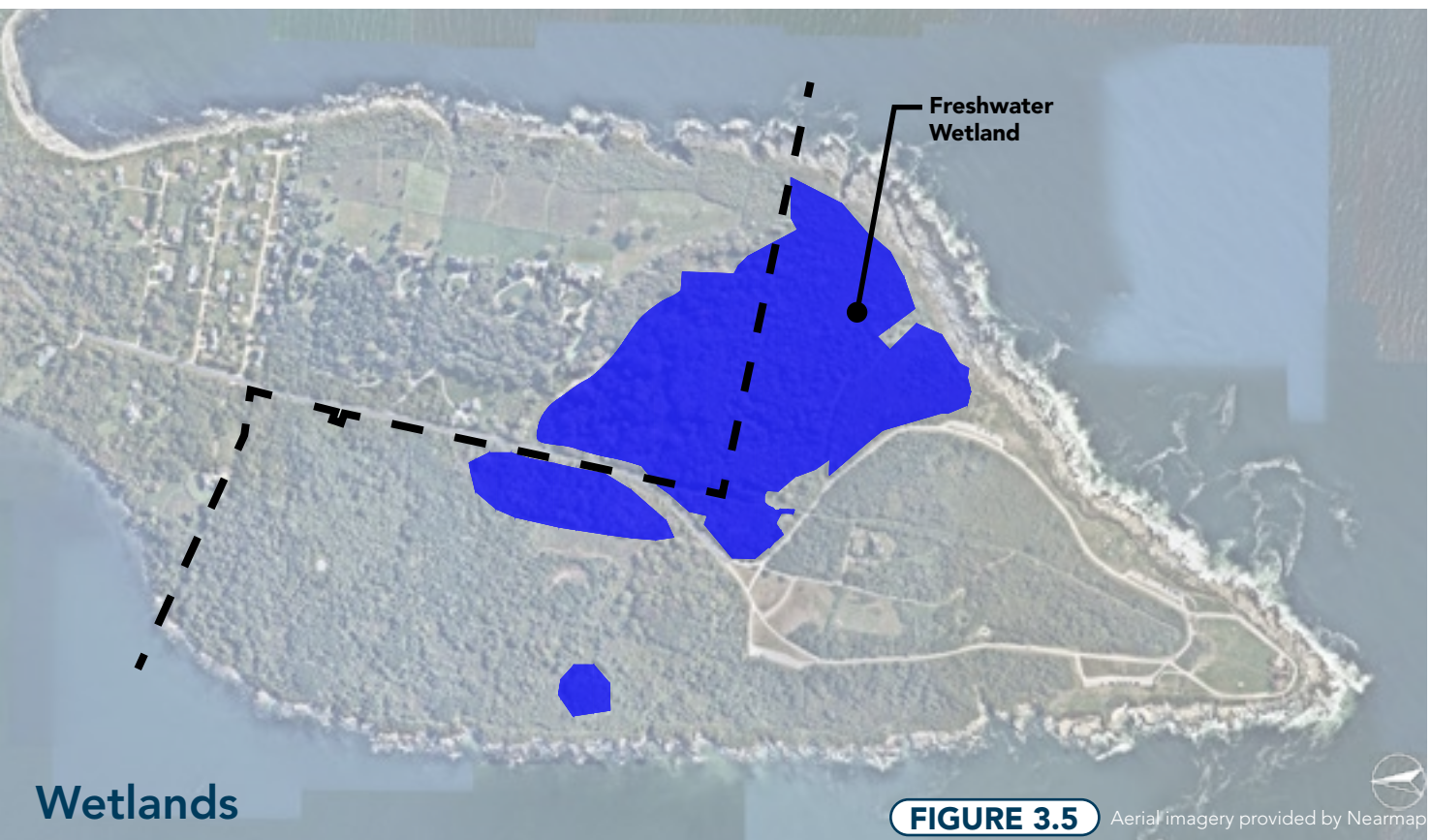
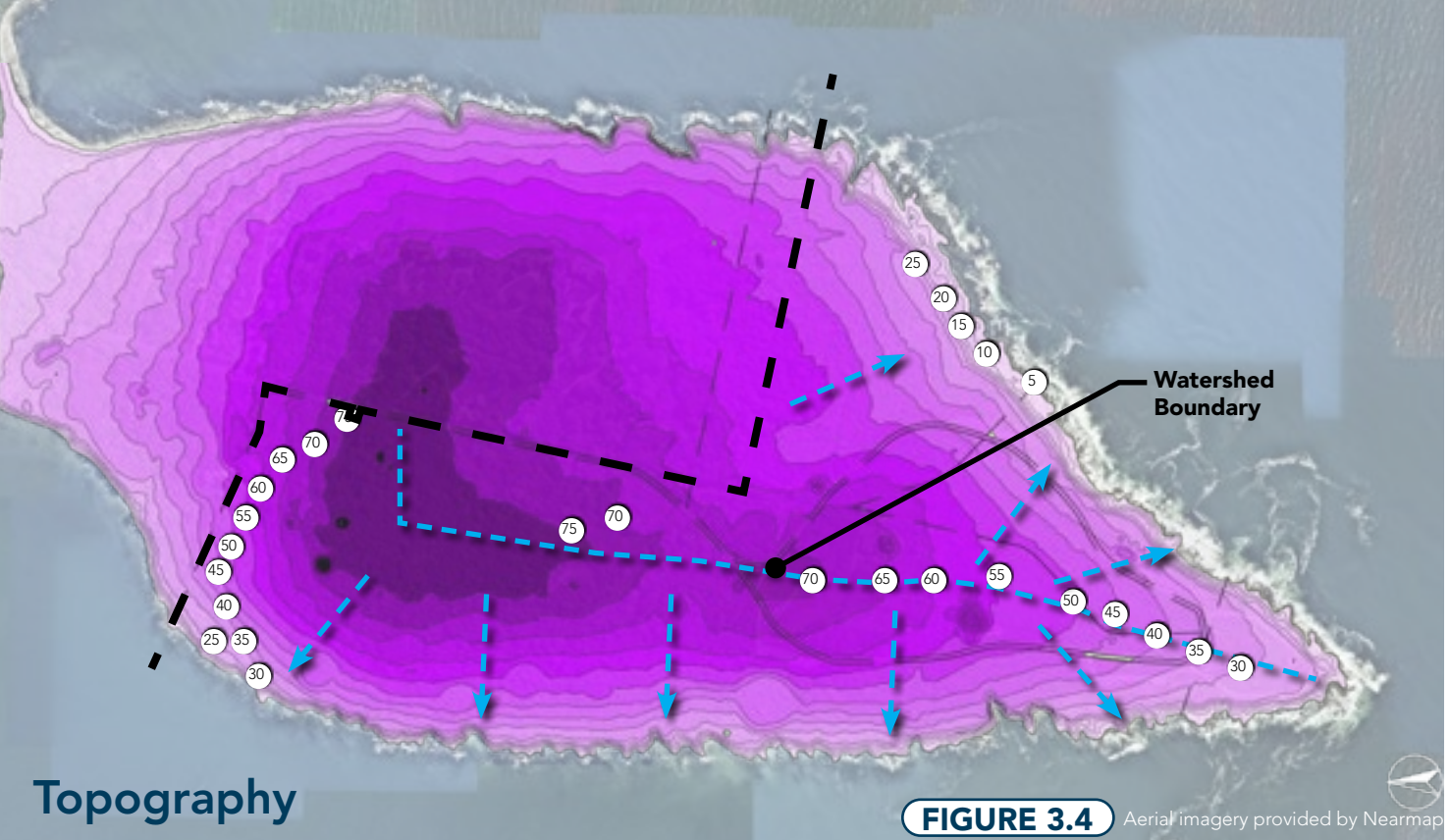
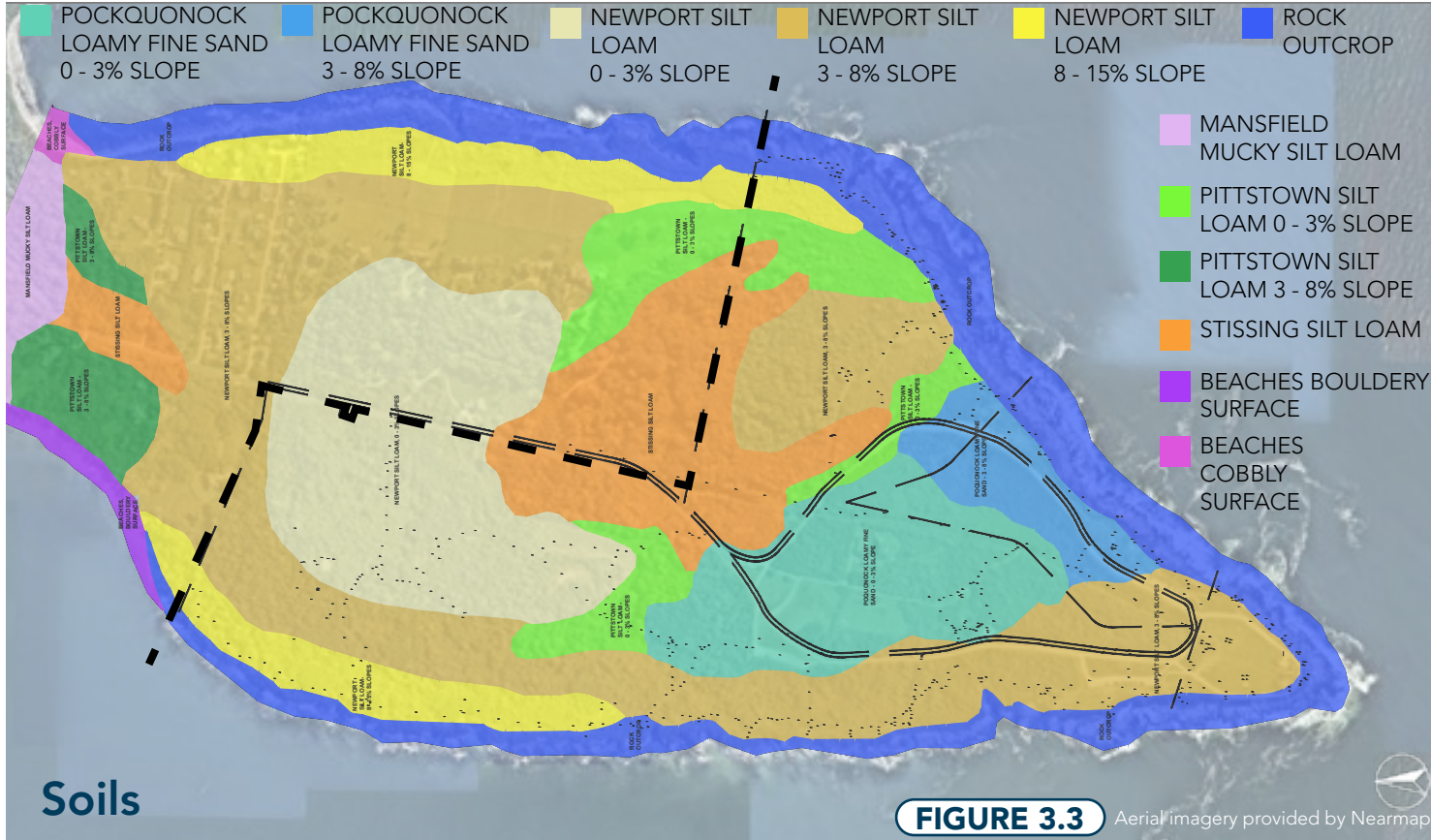
The shoreline is over two miles in length with over 90 documented worn footpaths over the coastal bank into the intertidal zone. Created informally by fishermen and visitors seeking a way to get to the intertidal zone to be close to the water, the paths are a source of pronounced erosion and represent one of the largest challenges to successfully managing the Park. On the interior of the peninsula, four large wetland areas give rise to several intermittent streams in the east and west, which cascade over bare ledge areas and into Narragansett Bay.

Closest to the water, the eastern portions of the land transition to coastal bluffs, down to bare, rocky ledge areas. The steepness and length of the transition varies, in general occurring as 2:1 slopes. The overall height of the eastern bluffs from the top of the vegetated bluff to the exposed ledge varies from less than 10 feet vertically to over 40 feet. The southern and western sides of the peninsula reflect a greater grade change with significantly taller coastal bluffs giving way to exposed rocky cliffs. The vertical drop in areas on the west side of the peninsula is over 70 feet.

3.3 - The Intertidal Zone

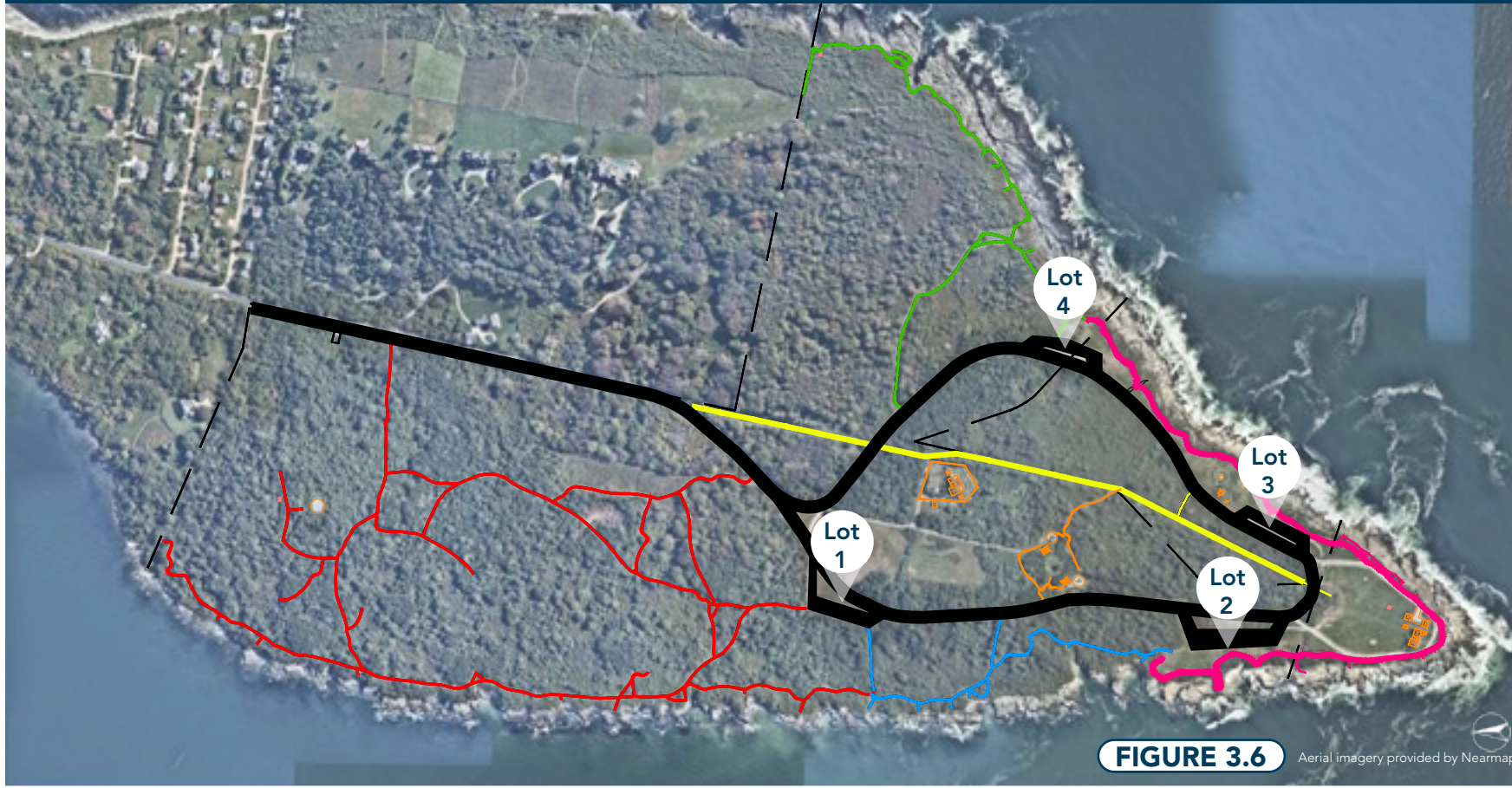
The RI Coastal Resources Management Council (CRMC) water type classification surrounding Beavertail Point is Type 1, characterized as a Conservation Area, protected and valued for marine animals and habitat. The intertidal zones on each side of the peninsula are physically different and unique. The eastern side has expansive ledge outcrop that drops vertically to deep water. These areas are





Roadways, Parking, & Path Networks

- Red Dot Trail - 5,060 LF
 - Blue Dot Trail - 1,710 LF
 - Green Dot Trail - 1,420 LF
 - Waterfront Foot Path - 3,770 LF
 - Utilities Easement - 2,660 LF
 - Paths Around Structures
- | | | | |
|-------|-----------|-------|-----------|
| Lot 1 | 26 Spaces | Lot 3 | 25 Spaces |
| Lot 2 | 28 Spaces | Lot 4 | 25 Spaces |



popular fishing and birdwatching spots. There is a deep, wide cleft in the ledge located on the north-east side of the site named the 'Lions Head' because of the thundering, roaring sounds produced by waves. Some areas of ledge are relatively smooth, with large fractured plates and generally uniform surfaces. Other areas are deeply fissured, irregular and craggy.

The eastern side of the peninsula also has several complexes of tidal pools, particularly in areas where the ledge is more level, with gradual transitions. Tidal pools at Beavertail State Park occur at different elevations, adding interest and habitat value. Some pools at higher elevations retain water through tide cycles, only taking in water at the highest high tides or during storm events. The highest pools and be found at the base of the coastal buffs and are brackish, with freshwater introduced from overland runoff and rainfall. Other pools at lower elevations exchange water every tide cycle. In several locations pools at greater elevations flow into the lower level pools as the tide recedes, creating saltwater streams on the ledge as water drains down from upper level impounded areas. The exposed ledge below Mean-High Water is frequently covered with a thin layer of black and green algae and rockweed.

Tidal Pools can also be found off the southern tip of the peninsula, beyond the lighthouse and along the southwestern portions of the shoreline. Beyond Parking Lot 2 on the west, the intertidal zone typically comprises narrow, cobble, or sand beaches between steep rocky ledge outcrops. The tidal pools and sandy beach areas are visually alluring and draw many visitors. The tidal pools invite exploration and hands-on adventuring, with people searching the pools for impounded fish, small crabs, and other small scale marine life.

Occasionally fishermen place recently caught fish in larger tidal pools as a temporary 'pound' until they are ready to leave, taking the freshly caught fish with them. South of the lighthouse the tidal pools transition to long fingers of ledge radiating out to the south and west. Small linear tidal pools can be found here, but the area is predominately ledge with narrow areas of sand or cobble between.

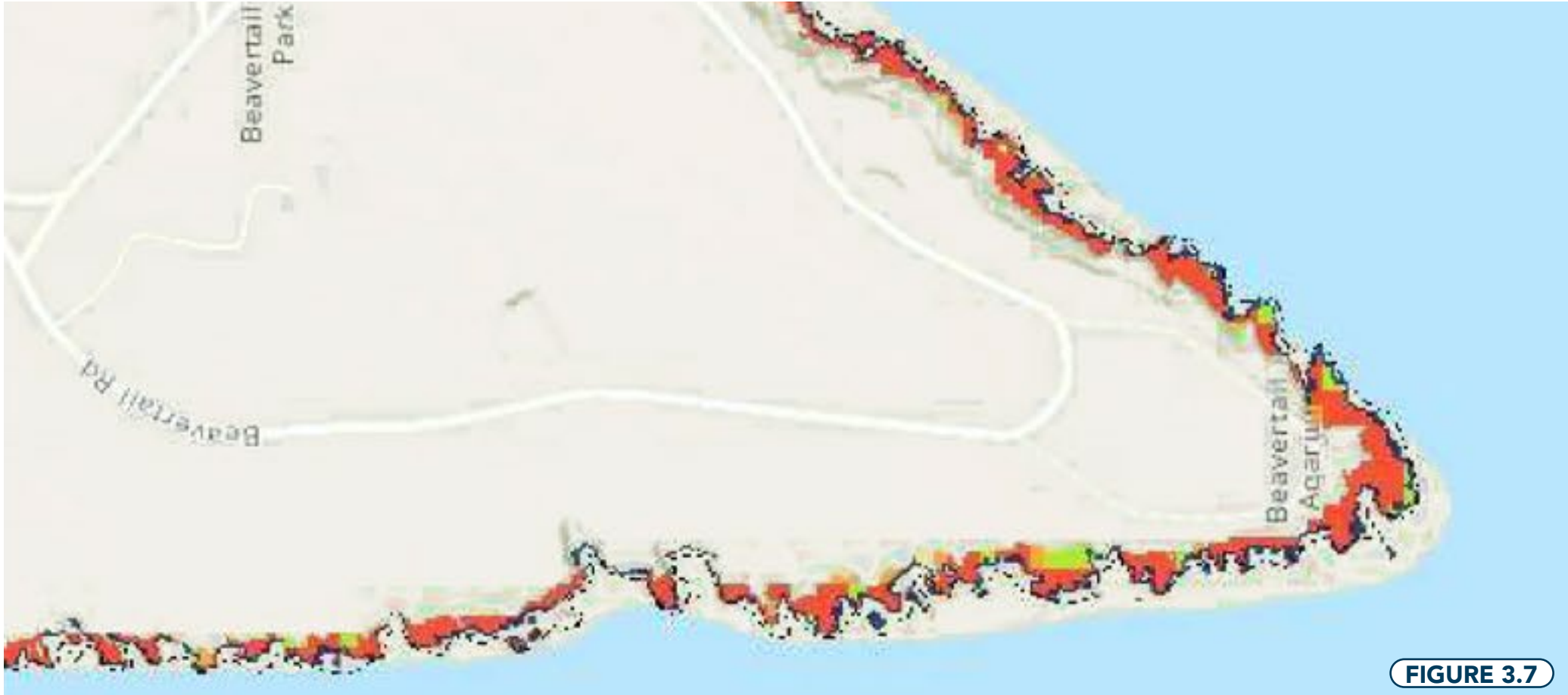
Above the southern intertidal zone ledges is a cast in-place concrete seawall. The wall, configured as a shallow arc, faces southwest, and is constructed to resist southwest storm surges. The wall has been over-topped. Vegetation is displaced and bare, eroding soils exposed in areas above the wall and at the ends of the walls where wave action is magnified.

Farther to the west, the tidal pools diminish, and the intertidal zone contains rocky projections, heading north that give way to narrow compartmentalized beaches. These beaches are chasm-like and interspersed between bare, vertical ledge cliffs. The beaches are relatively small spaces framed by the ledge where some swimming activity and limited sunbathing occurs. The sand or cobble beach areas are fully inundated at high tide, and visitors leave as the tide comes in. These western beach areas are

3. Existing Conditions

The beaches and tidal pools are dynamic areas to observe, and they continue to draw visitors down over the coastal bluff to the water's edge. The intertidal zone is dangerous to even the most experienced fishermen, and park-goers misstep and require rescue personnel to respond to an incident in the Park on a nearly monthly basis. The risk of waves overrunning the rocks and sweeping people off their feet is omnipresent, as is the risk of slipping on algae and falling into the deep water below. While accessing the intertidal zone, people may slip and fall down footpaths or may be unable to ascend steep grades when leaving the water's edge. Accidents such as these may necessitate technical rescues involving ropes and mountaineering equipment.

The dynamic intertidal zone and immediately adjacent upland coastal bank are undergoing an accelerated period of change. The Rhode Island Coastal Resources Management Council (RI CRMC) measures and forecasts coastal erosion within Narragansett Bay, and indicates



RI CERI Analysis and Output

URI EDC, RIGIS | USGS | RI CRMC, URI OCE, URI EDC, URI CRC | RI CRMC, URI OCE, URI EDC, URI CRC | Rhode Island Dept. of Transportation, MIS/GIS Section, Two Capital Hill, Providence, R.I. 02908-5672 | Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, University of Rhode Island, MassGIS, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

that coastal accretion is accelerating, particularly at Beavertail State Park where natural and man-made impacts coincide.

The RI CRMC STORMTOOLS Coastal Environmental Risk Index (CERI) modeling illustrates the current and future challenges facing the Park. This tool forecasts impacts without considering the 'land-side' man-made impacts that are occurring concurrently. The model below looks only at the ocean impacts and uses a projection of two feet of Sea Level Rise (SLR) by 2100. STORMTOOLS forecasts both Severe and Extreme risks to the eastern and southern shorelines of Beavertail Point. The mapped areas of orange and red indicate the loss of coastal banks, vegetation, and habitat. The most significant risk may be the potential loss of Beavertail Light Station itself.

At least three types of erosive patterns are occurring east, south, and west of the Light Station at the upper reaches of the intertidal zone. The first is attributable to natural forces such as SLR and more

frequent and severe coastal storm events with wave run-up onto the coastal bank which erodes and exposes soils, undercuts native plant root mats, and then further accelerates erosion. The second erosive pattern is caused by pedestrian foot traffic over the coastal bluff down into the intertidal zone below. Heavy visitation in this area led to excessive compaction on the mown grass at the top of the coastal bank, and deeply worn and highly eroded footpaths on steep slopes to the intertidal zone.

The third erosion pattern is a combination of man-made and natural conditions. Visual inspection of the seawall reveals the undercutting of sections of the wall, severe abrasion to the face of the southern section of the wall, and evidence of over-wash and erosion above the wall (over-topping), as well as erosion at the ends of the wall. The 65-foot cast-in-place seawall curves outward, deflecting the wave energy. The ends of the wall show erosion patterns typically encountered when shoreline installed to hardening terminate. Both the north and south ends of the wall show signs of scour, due to possible displacement of rip rap at each end. Runoff from the Park loop road above the wall further accelerates erosion on the northwest side of the seawall. While the seawall provides protection for the Light Station as demonstrated by the intact vegetation remaining in-situ above the wall itself, the seawall and the ends of the wall require attention to stabilize and slow the loss of land.

The southwest corner of the Assistant Keeper's Quarters is approximately 35 feet from the top of the coastal bank as of January 1, 2024. Unchecked, the position of the bank in less than 100 years is forecasted to be within a few feet of the foundation while continuing at an erosive loss rate of four inches per year.



FIGURE 3.7

3. Existing Conditions

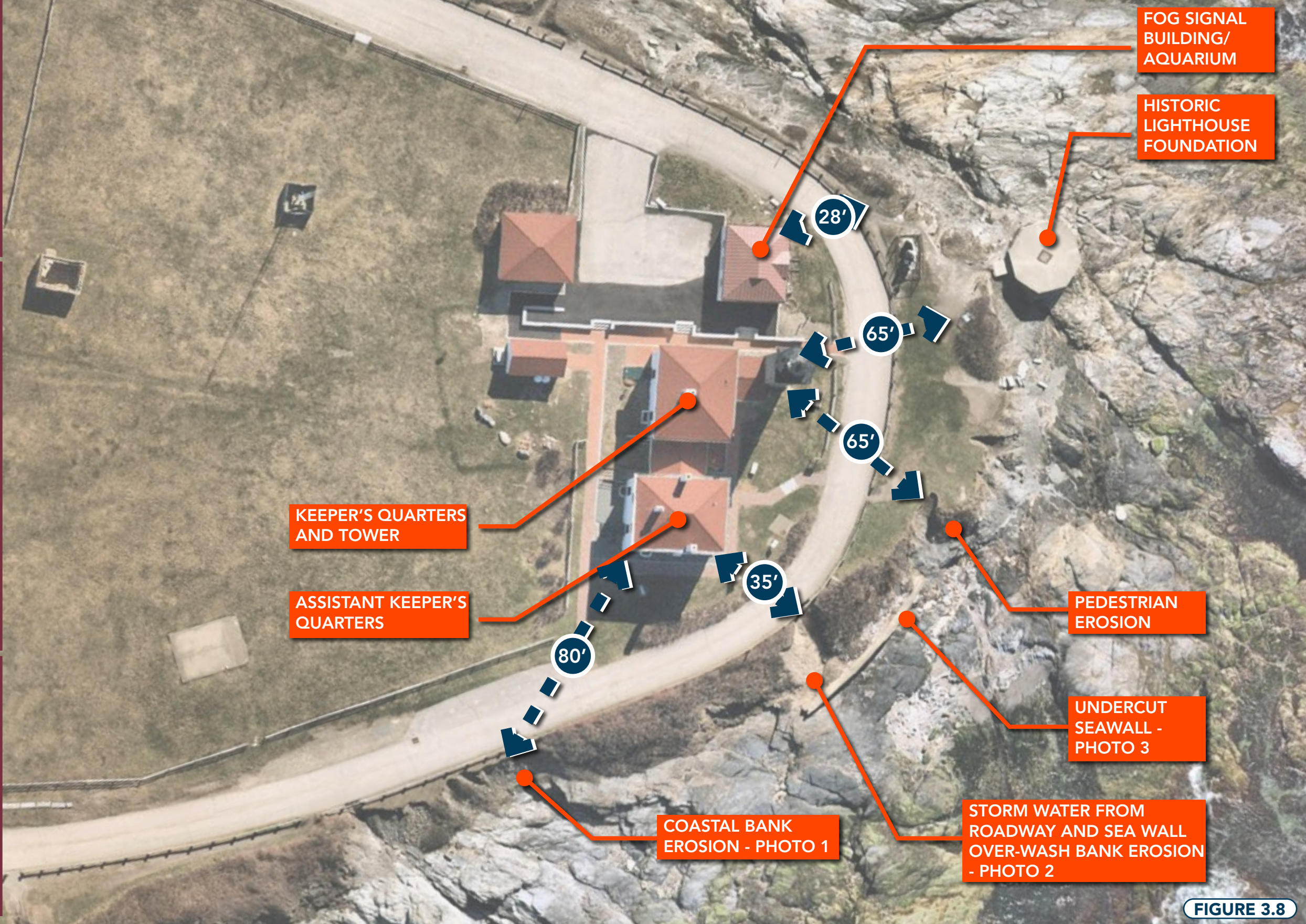


FIGURE 3.8

3.4 - Buildings

The first lighthouse was constructed in 1749. The present-day structure dates to 1920. Seven buildings support the lighthouse itself, each purposefully built, connected, or closely positioned around the base of the 86-foot high granite tower. Maintained by the Beavertail Lighthouse Museum Association (BLMA) for over 30 years, the structures are in good condition, with the first floor of both the Keeper’s Quarters, Tower, and Assistant Keeper’s Quarters operating as a museum and seasonally open to the public. The second floor is occupied by present-day lighthouse keepers, creating a year-round presence at the site.

The fog signal building directly east of the lighthouse tower houses a seasonal aquarium operated by RIDEM. In 2023, the BLMA constructed a series of site improvements consisting of low walls, stairs, and sloped walks to provide more direct and safe access between and around the museum and aquarium.

Centrally located to the Park is the Harbor Entrance Command Post (HECP). Constructed in 1942, it remains largely intact and unchanged, due to the fact that the structure inside the shingled exterior is a concrete bunker. The military purposefully designed and built the structure as a fortification and operations outpost, with secondary consideration given to housing military staff. Limited improvements to kitchen and bath areas have been made over the years by the caretaker, however, interior woodwork, door paint finishes, etc., remain largely intact and appear original to the structure’s military use. The building’s original electrical, plumbing, and heating systems are outdated and have limited functionality. The building offers minimal convenience and comfort as a dwelling but does represent potential as an interpretive center for the public.

To the east and west of the HECP building, large galvanized steel radio and communications towers. Over 80 feet in height, they hold wires, conduit, and antenna arrays. West of the HECP is a wood frame, three car garage that has visible holes in the roof and siding, and appears to be in a state of advanced disrepair.

RIDEM has undertaken a project to weatherize the building and address issues with the roofing and siding in the near term.

3.5 - World War II Fortifications

The Coastal Defenses of Narragansett Bay established Fort Burnside as the central command post during World War II. The fortification has several distinct elements, each purposefully built, with several key fortifications, including gun batteries, located within the Park.

Battery 213 consists of two, rotating gun emplacements within large circular concrete pads and an underground central munition’s magazine between the guns. The magazine is a complex structure with storage, communications, quarters, and a kitchen over 160-feet-long. The walls are over three feet thick and the entire structure is overlaid with several feet of soil. Large openings, secured by locked mesh steel doors, face east or west toward each gun emplacement. The guns installed at this battery were six-inch M1905 batteries, shielded barbette carriages capable of rotating 360 degrees, and were able to fire a 100 pound shell 15 miles.

Located to the southeast, Battery Whiting is similar in make-up to Battery 213, but overall smaller in proportion and layout. A central concrete observation structure with a magazine on a level below is positioned between the two open gun emplacements. The concrete structure is covered with soil, with the exception of the observation post. The guns installed at this location were two three-inch M1903 barbette carriages capable of rotating 360 degrees. The magazine area is filled with soil and boulders to prevent public access.

A large radio tower installation served multiple purposes during the war northeast of Battery Whiting. The 654-foot-high tower was dismantled prior to the creation of the Park; however concrete cable-stay foundations are visible in several areas in a radius around the center point of the Park. At the base of the tower is a two story metal Quonset Hut-style communications outpost, also referred to as the Helix Hut. Set on a concrete foundation, the 80-year-old metal structure is intact, although with visible advanced corrosion of the siding, particularly at the foundation line, and large openings in the exterior shell. Once boarded shut, the structure, now open, has been a target of repeated vandalism.

A large radar research and development facility was located in the northwest portion of the Park. Referred to as Spraycliff, this site was home to the U.S. radar development program, which led to radar systems for planes, making flying at night possible. Many historians credit the development of night-flying capabilities to the Allies’ success in the war. A detailed study documenting the operation

and significance of this facility is included in the Appendices. The Spraycliff facility was a sprawling campus of radio arrays and buildings and supporting structures. Since decommissioning, the site has become thickly overgrown with the Autumn Olive, a shrubby, thorny invasive tree. Today, there are few visible signs of the facility. Areas of remnant paving remain, with few scattered concrete foundations and metal debris. However, a large 55-foot-diameter concrete cistern does remain on the western side of the site. Largely overgrown, the cistern rises nearly 30 feet above the surrounding grade. The central concrete tank is encased in earth and overgrown with small shrubs and vines. The concrete top of the cistern is accessible via a narrow and steep foot path, and the concrete appears to be covered with tar and pea stone. From the top, there are limited views of west passage through the trees. The contents inside the cistern and the condition of the concrete structure are unknown.

Both Battery 213 and Spraycliff are well concealed from view. More deeply concealed underground structures and vaults are known to exist throughout the Park. Likely related to communications and electrical utilities, various manholes and vaults exist in the northeast and northwest areas of the site. Unmarked and in some instances in proximity to walkways, they represent an element of the Park that warrants greater research and protection against public entry. Outside of the physical structures, limited artifacts remain on site. Metal pipes, pieces of metal liquid-holding tanks, radio tower cable-stays, and small structure foundations are located across the Park and remnant pavement exists in wooded areas. A large rotating radar array assembly exists northeast of the HECP.

3.6 - Existing Structures and Fortifications

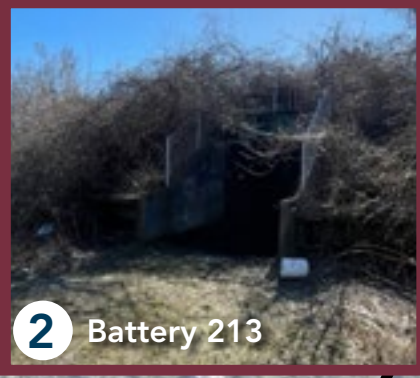


FIGURE 3.9 Aerial imagery provided by Nearmap

① Light Station Buildings

Original Lighthouse Stone Foundation

The foundation of the original lighthouse site, constructed in 1749, is just south of the Lighthouse Tower, Keeper's Quarters and Assistant Keeper's Quarters, and Fog Signal Building. The foundation supported the third ever lighthouse to be built on the Atlantic coast.

Beavertail Lighthouse

The Beavertail Lighthouse is at the southernmost point of Conanicut Island and offers beautiful views of Narragansett Bay. It consists of the Keeper Quarters and Tower, and the Assistant Keeper's Quarters. The bottom floors of the Keeper's Quarters and Tower, and the Assistant Keeper's Quarters are utilized as a museum for the lighthouse and bring in many visitors every year. The light tower itself is also occasionally open to the public, usually on weekends, and enhances the historical experience that the museum offers.

Fog Signal Building

The Fog Signal Building is now home to an aquarium run by RIDEM. There are new species constantly on circulation and it functions as a catch-and-release facility. During peak summer season, the aquarium gets around 100 - 150 visitors per day. The building is roughly 27 feet by 22 feet and houses multiple tanks where the marine life can be observed by all ages. The entrance to the building is not currently Americans with Disabilities Act (ADA) compliant. The aquarium offers the opportunity for visitors of all ages to safely view and interact with the marine life prevalent to the waters of Narragansett Bay.

Garage

The garage is just north of the lighthouse and is approximately 24 feet by 22 feet. It has two stalls, one used by RIDEM and the other is used by the lighthouse staff.

Oil Shed

The oil shed is just west of the garage and is approximately 12 feet by 20 feet. It is used as an interpretive extension of the lighthouse museum and displays the beacon that used to be in the light tower.

Flat Roof Shed

The flat roof shed is located just north of the radio beacon and garage and is approximately 13 feet by 17 feet.

Radio Beacon

The radio beacon is directly north of the garage.



Battery 213 under construction circa. 1942



Western gun mount with entrance beyond



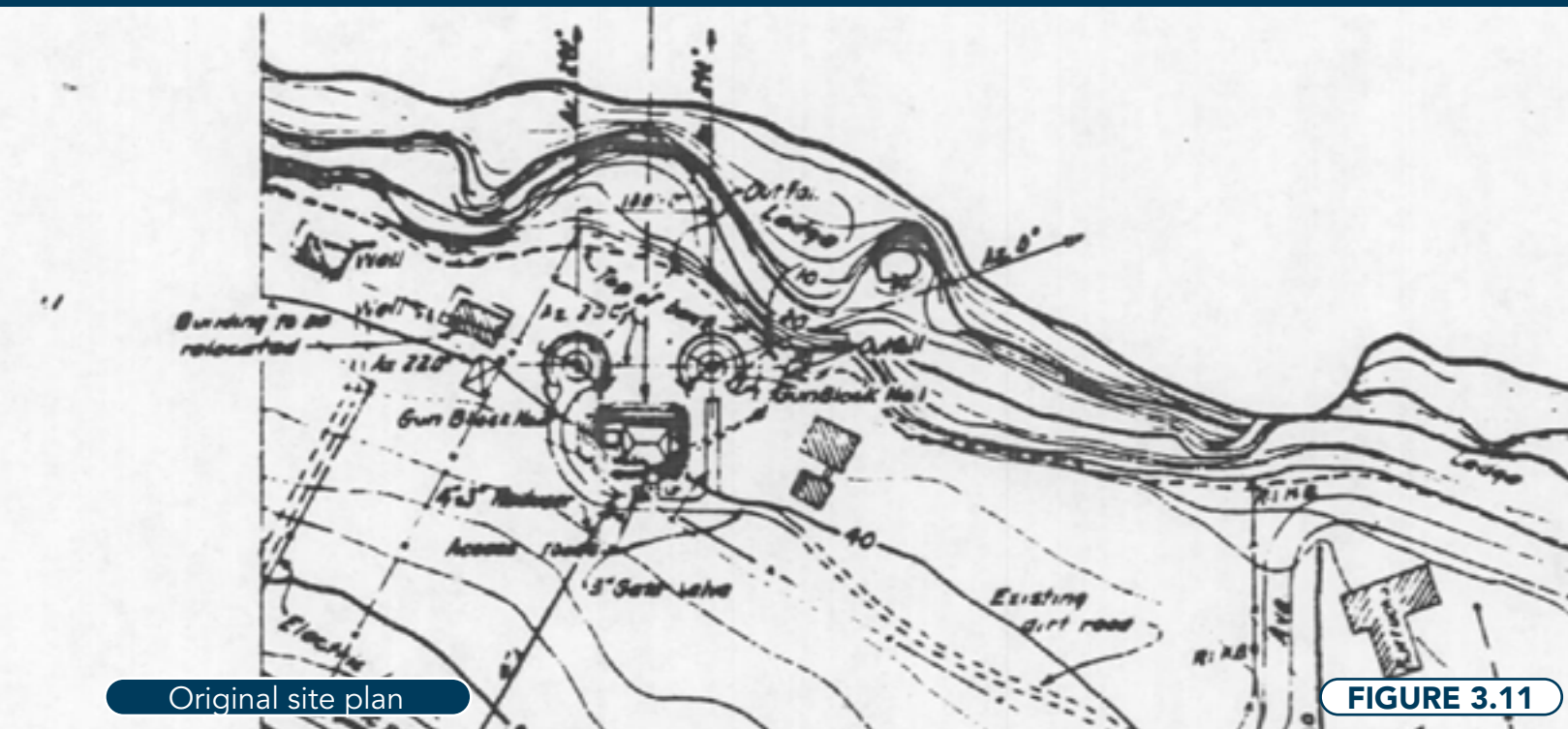
Western entrance



Battery 213 is largely hidden from public view

② Battery 213

Battery 213 is on the east side of the entrance drive between Parking Lots 1 and 2. From the entrance drive, you can see one of the two concrete gun mounts and the entrance to the battery. The other concrete gun mount is to the east of the battery. The doors that lead inside are blocked and gated.



Original site plan

FIGURE 3.11



Northern gun mount with large stone infill at center

③ Battery Whiting

Battery Whiting is located on the eastern side of the Park on the waterfront and adjacent to Parking Lot 3. Access to the inside of the battery is blocked with boulders to prevent the public from entering. Similar to Battery 213, there are two concrete gun mounts.



Western entrances (closed)



Aerial view from the east



④ WWII Spraycliff Cistern

The Spraycliff concrete water cistern is in the northern corner of the west side of the Park. It nearly disappears into the surroundings of the forested area around it and is not accessed by the public often, especially in the growing season when the area is overgrown with brush and invasive species. The cistern is the only standing structure left from Spraycliff other than remnants of a paved roadway that leads out to Beavertail Road. It sits about 10 - 15 feet higher than the surrounding grade, reaching up into the canopy of the surrounding trees. It is approximately 60 feet in diameter.



⑤ Helix Hut

The Helix Hut is northeast of the HECP on the Green Dot Trail. The metal structure is heavily rusted, with openings to the interior. It has been vandalized with litter and debris inside. The Hut sits in an area of wetlands adjacent to the concrete base of the former antenna.



⑥ Composting Toilets

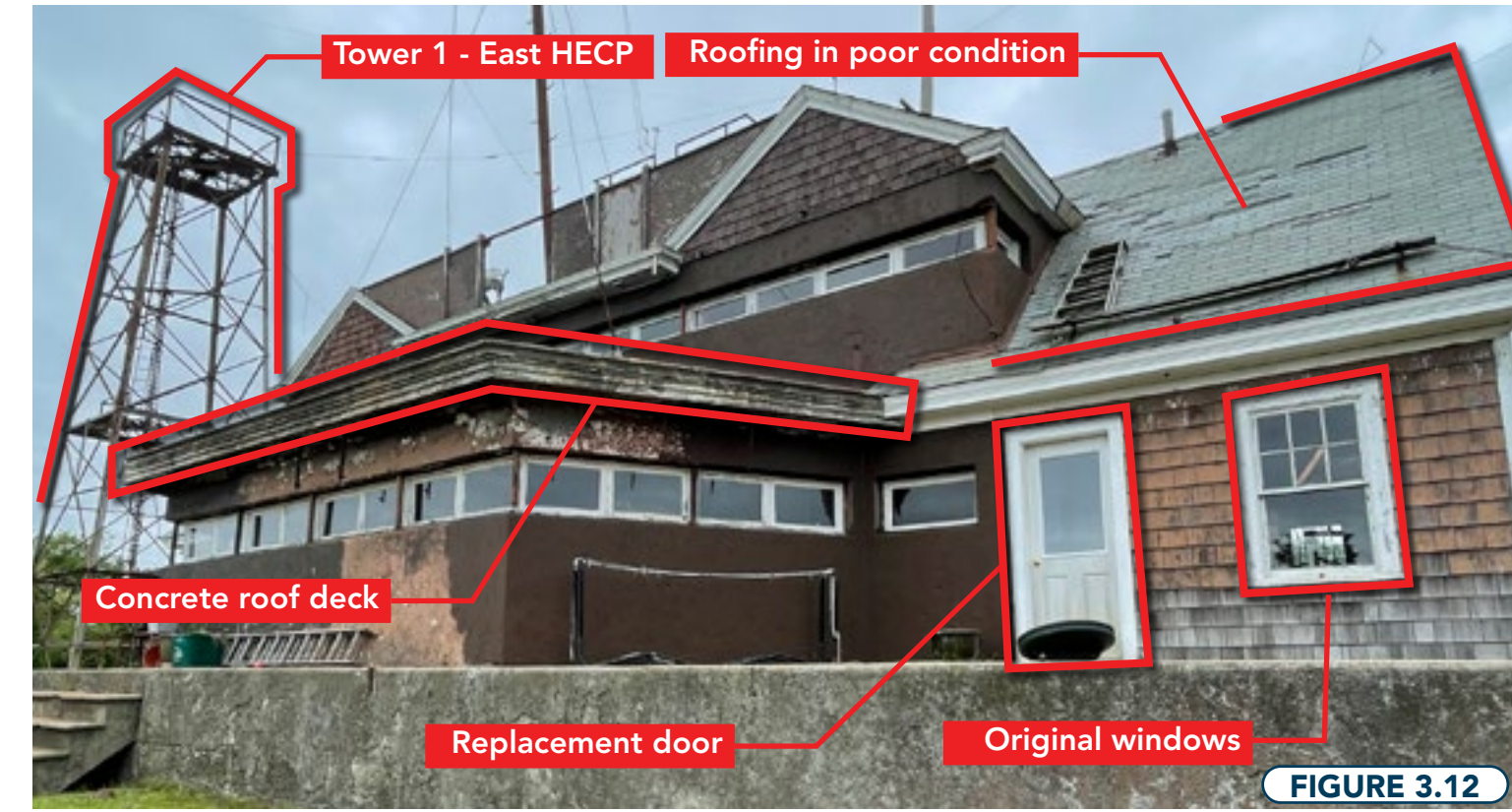
Five composting toilets exist on the northern edge of the central Light Station area. Of the five, only one had a ramp to allow for Americans with Disabilities Act (ADA) compliance.



Aerial photo showing the main building, Towers 1 & 2, and surrounding fence.

⑦ Harbor Entrance Command Post (HECP)

The HECP is central to Beavertail State Park. It is visually hidden from the entrance drive by trees and brush and is open to the public by appointment on a limited basis. The building sits on elevated grade with the intention to see out into the bay, specifically during WWII when it was used to monitor traffic coming in and out of the bay. Its footprint, including the concrete deck on the southern side, is about 3,400 square feet and is accompanied by towers to the east and the west sides of the building. There is also a garage adjacent to the building on the west side that is about 800 square feet. Currently, there is no ADA access into the building.



3.7 - Roadways and Infrastructure

Originally, linear access to Beavertail Lighthouse existed through the site, with the roadway roughly centered in the middle of the peninsula. The road network changed with the creation of the Park, which established the present-day one-way loop road and removed the single central road. The roadway travel pattern is counterclockwise, entering the Park from the north and circulating from west to east. In general, the roadways are in fair condition, with limited cracking and rutting. The roads are 18 feet wide, and the pavement thickness appears to be three inches. In specific areas along the roads, notable wear patterns and grass compaction exist. In many instances wear exposed sub-surface soils and led to erosion. This condition at the shoulders is due to vehicles parking illegally on the grass areas. In these areas, with the loss of the grass shoulders, the edge of the pavement is frequently unraveling, signaling future issues to be addressed with the roadway pavement.

The Park loop road is continuous and passes four turnouts to separate public parking areas. At one point in time, it was possible for traffic to travel an extended loop to the tip of the Park along the western edge and continue east past the Beavertail Lighthouse. This outer lighthouse loop had 14 parallel parking spaces along the interior edges of the roadway. In 2019, this roadway loop closed, eliminating access to these parking spaces.

Presently, visitors encounter Parking Lot 1 located at the northwest corner of the site. Parking Lots 2 and 3 are closer to Beavertail Lighthouse, and Parking Lot 4 is located at the northeast corner of the loop drive. The Parking lots are ‘single loaded’ with parking on one side only. Pavement widths are ample, with widths varying from 30 feet to 50 feet for the single loaded lots. In total, there are 104 available parking spaces across these four lots.

Stormwater Drainage Systems

The construction of Fort Burnside created location-specific drainage systems at each fortification. Area drains and trench drains are visible at the HECF and Battery 213. Underlying conditions at Spraycliff are unknown, and no other drainage structures beyond open drainage swales were observed. Archival research of original construction plans may provide site specific detail as to the systems in each isolated location.

Visible drainage systems including five catch basins are located along the closed loop road. The basins connect to a 12-inch reinforced

concrete pipe and discharge at headwalls above the intertidal zone to the east and southwest of the lighthouse. Most of the headwalls are damaged or dislocated. These catch basins and drainage pipe network near the lighthouse are approximately 400 feet in length.

The Park loop road is not curbed, so roadway drainage consists of largely overland flow to grassed areas without swales or collection structures. A notable exception is found at the southern apex of the inner loop road where a park roadway runoff is directed to a rip-rap lined drainage swale on the southern edge of the road beyond the northwestern edge of the original lighthouse property. The swale system adjacent to the existing stone wall is linked with a pipe under the roadway to a second swale, west of the loop road. This system is largely overgrown. An isolated catch basin is located to the west of the lighthouse loop road.

Parking Lots 2 and 3 both have more recent drainage improvements consisting of rip rap lined swales and corrugated high-density polyethylene (HDPE) pipe and headwalls.

Water System

As noted previously, the roadway from the north to the lighthouse was originally a direct, straight line. The water and electric utilities follow this corridor. Water service extends to the HECF and the lighthouse. RIDEM upgraded the water service in 2023. A new four inch line was installed from Beavertail Road to the Light Station.

There are two active fire hydrants located in the Park.

Communication and Electrical Systems

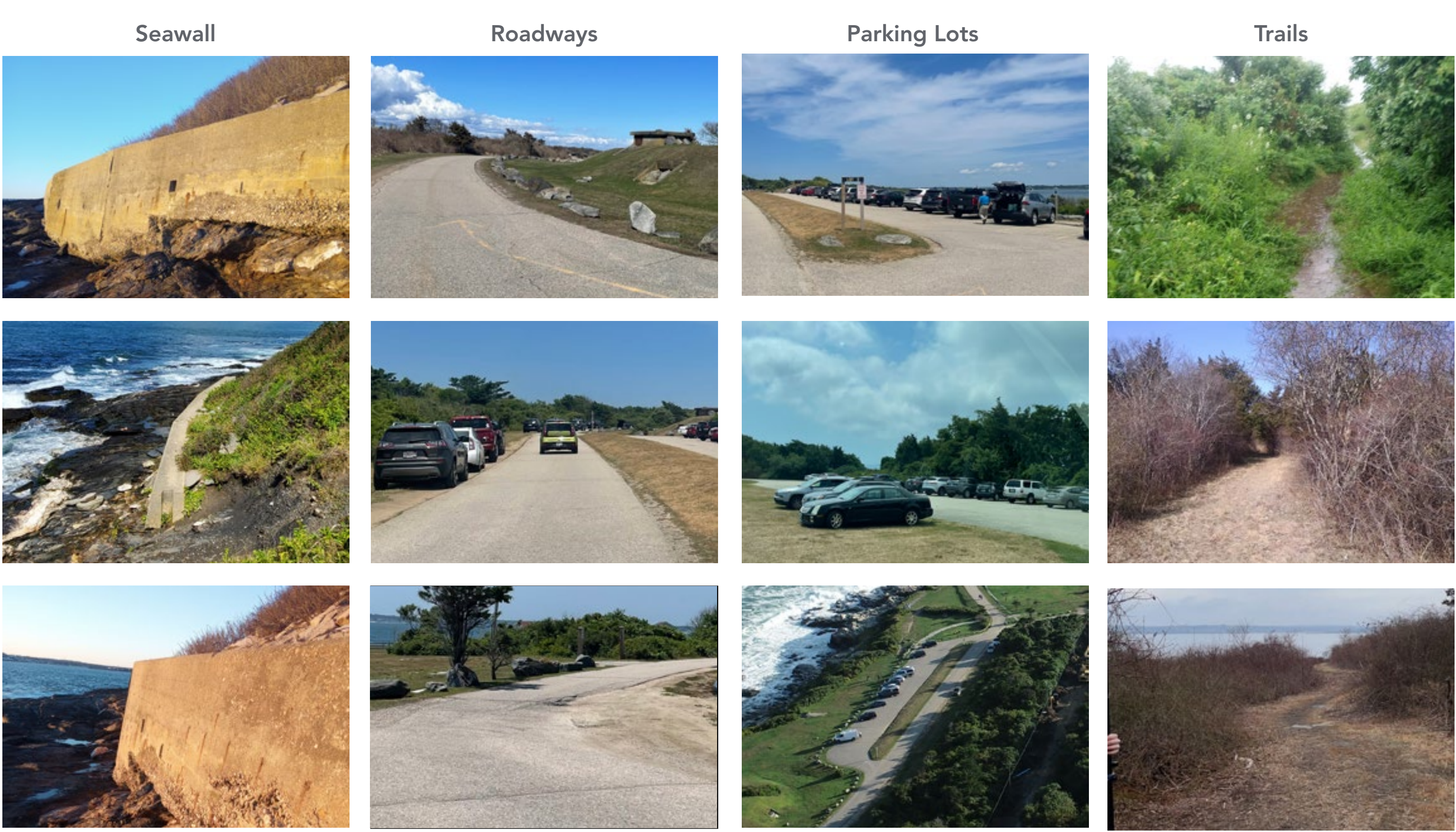
Power is supplied to the site via overhead and underground wires. Alignment and service pattern echo the water system distribution, and power is provided to the HECF and Beavertail Lighthouse. Communication is also provided to the Lighthouse.

Sanitary Sewer System

Both the lighthouse and the HECF have on site wastewater treatment systems consisting of a septic tank and drain field. The sanitary facilities likely are more than 50 years old and the layout and condition of each system is unknown at this time.

Infrastructure Photos

The following pages have a series of photos showing the existing sea walls, roadways, parking lots, catch basins, outfalls, and trails.



Catch Basins



Outfalls



Utilities

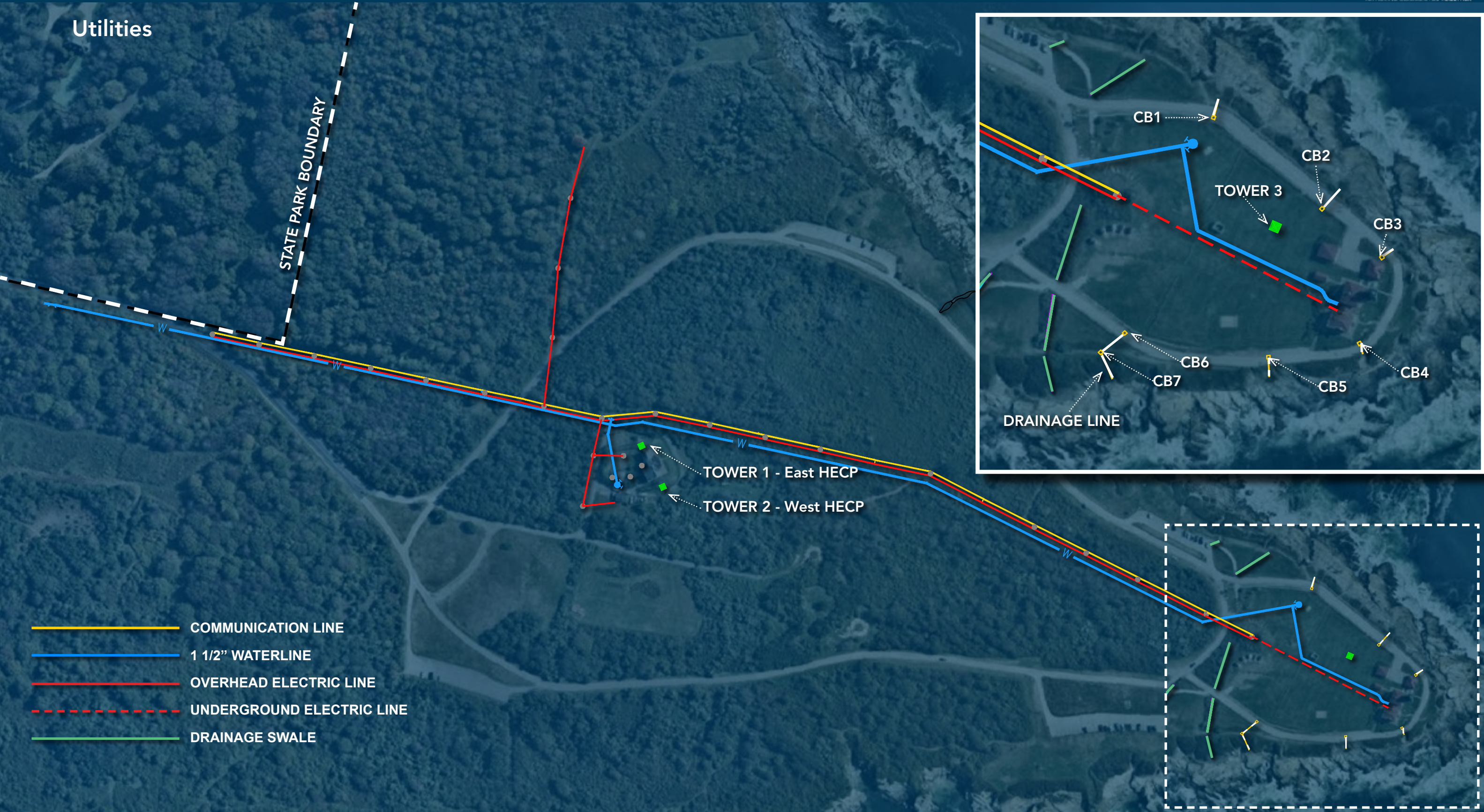


FIGURE 3.13

Water



Fire Hydrant - HECP



Fire Hydrant - Beavertail Light Station

Electric



Utility Pole - Transition to underground power



Electric Panels - Beavertail Light Station

Towers



Tower 1- East HECP



Tower 2 - West



Tower 3 - Radio Antenna - Beavertail Light Station

Underground Structures



Unknown Structure - Marked by concrete



Unknown Structure - Marked by boulder-



Underground bunker in the undergrowth

Amenities



Interpretive Signage



Wooden Guardrail



Foot Bridge

Signage



Wayfinding and Regulatory Signage



Wayfinding and Regulatory Signage



Wayfinding and Regulatory Signage

3.8 - Plant & Animal Communities

Wildlife

The project team performed numerous site inspections at Beavertail State Park to establish a wildlife baseline. These field inspections occurred from December 2021 to June 2022 to assess the habitat and catalog observed flora and fauna species. The project team observed wildlife species by vocalizations, sight, tracks, and signs. This survey should not be regarded as a complete inventory of the Park property, but rather as an ongoing inventory that warrants regular updates. There are many more species present on the site, but they were not observed at the time of the inspections. Refer to Table 1 in Appendix 12 for the full list of wildlife species observed within the Park during field inspections.

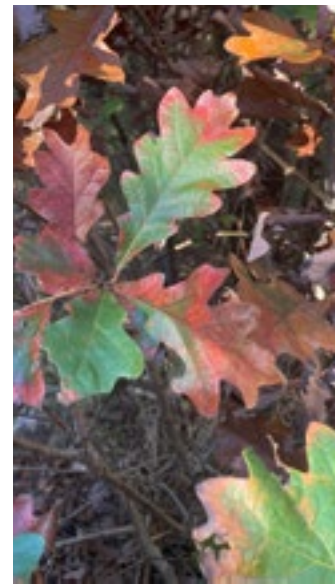
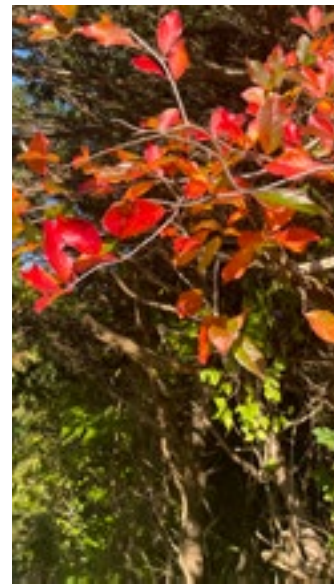
Beavertail State Park provides valuable habitat for the many species of wildlife observed and unobserved during the site inspections, but will use the habitat throughout the year. These species of wildlife include game and non-game species, which may be either obligate (wetland) or facultative (wetland/upland), and which may be permanent residents, seasonal, or transient in nature.

Birds

The project team spread out the field surveys so the winter waterfowl and spring migratory species could be documented on site. Some of the surveys were conducted in the mid-day or afternoon, when birds are less active than in the early morning. Several waterfowl species observed include harlequin duck, bufflehead, surf scoter, and common eider. Spring migratory species observed include prairie warbler, American redstart, white-eyed vireo, common yellowthroat, and yellow warbler. The rock outcrops along the shoreline can provide important habitat for bird species. The project team observed a snowy owl on the edge of the shore, as well as purple sandpipers.

The meadow and successional field conditions provide great habitat for bird species. While retaining forested areas is important to support forest interior species, the existing meadows and fields could also be maintained or even expanded to benefit the forest-edge species that are listed as species of greatest conservation need in the RI Wildlife Action Plan.

The wetland habitat serves as a nesting and resting site, feeding site, nursery and/or brood rearing site, seasonal breeding site, escape cover, migration stop, and overwintering habitat for many species



of wildlife. The property is an important migratory bird stopover site because it is situated in the middle of Narragansett Bay. Several potential vernal pools exist within the forested wetlands that provide beneficial habitat for breeding amphibians and invertebrates.

There are also numerous expected bird species that are found in this location but were not observed. Some of the expected waterfowl includes common goldeneye, brant, black scoter, white-winged scoter, long-tailed duck, and pied-billed grebe. Some expected birds of prey include red-tailed hawk, red shouldered hawk, merlin, turkey vulture, and barred owl. Some expected songbirds include black and white warbler, blue winged warbler, veery, blue gray gnatcatcher, and Baltimore oriole.

Mammals

The project team observed few mammal species during the site inspections. The team saw the mammals primarily on the trails in the forested areas, along the grassy power line corridor, and just off the shoreline. The species observed include American woodchuck, eastern cottontail, white-tailed deer, and grey seal.

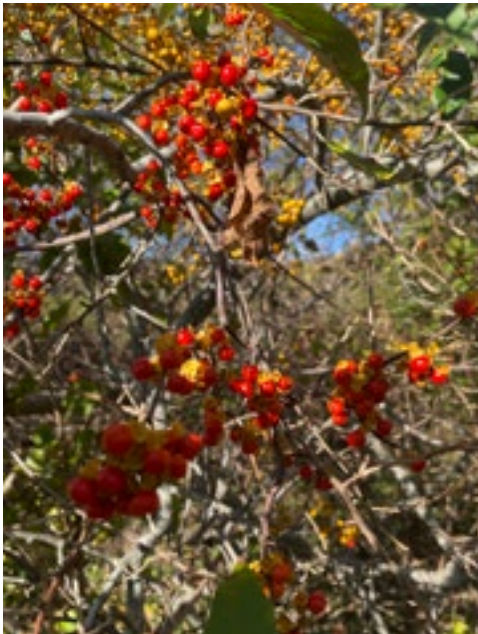
There are also expected mammal species that may be found in this location but were not observed by the project team. Some species not observed include eastern chipmunk, gray squirrel, short-tailed weasel, striped skunk, red fox, and eastern coyote.

Habitat Types

As discussed in the previous section, there are many habitat types within Beavertail State Park. The main upland habitats at the Park include deciduous forest, rocky shoreline, shrubby invasives, cedar grove, and open field. The primary wetland habitats in the Park include forested deciduous swamp and seepage. These habitats are further explained below.

Deciduous Forest

The dominant canopy species include white oak and red oak. The project team noted red maples and other trees present. The understory was densely vegetated by numerous varieties of invasive plants. The main wildlife species noted in the upland deciduous forest habitat include songbirds, owls, chipmunks, squirrel, coyotes, and red fox.



Rocky Shoreline

Beavertail State Park is bounded by rocky cliffs on the edge of Narragansett Bay. Some of these areas are deteriorating due to coastal erosion. The rocks and cliffs provide specialized habitat for wildlife such as seals, cormorants, sandpipers, and other shorebirds. These rocky shores also provide underwater habitat for numerous saltwater fish.

Shrubby Invasives

The area surrounding the hiking trails and near the coast are densely vegetated by invasive shrubs. The primary invasive plants are autumn olive, multiflora rose, and shrub honeysuckle. It will be a challenge to manage or remove these invasive plants. The shrubs should be trimmed and maintained so they do not encroach into the hiking trails. These areas do provide habitat for bumblebees, butterflies, dragonflies, small mammals, and songbirds.

Cedar Grove

There are several areas in the northwest forest habitat of Beavertail State Park that contain isolated, but dense stands of red cedar trees. These groves provide more shade and shelter than the surrounding areas. The isolated groves provide specialized habitat for small mammals, deer, owls, and birds that prefer to be in the “deeper” woods, such as eastern towhee and veery.

Open Field

There is a considerable amount of open field habitat within Beavertail State Park. Much of this open field habitat is adjacent to forestland and provides a valuable field-forest wildlife edge important to foraging wildlife species. The open field habitat in the northwest corner of the Park is more secluded and contains an extremely valuable habitat to wildlife. Open fields contain shrubs and grasses, as well as small trees. Wildlife such as white tailed deer, rodents, and foraging hawks are expected in this habitat. Maintaining the areas of open field habitat in a ‘suspended’ successional stage of plant growth is critical to the overall health and diversity of the natural habitat at Beavertail.

Forested Swamp

Forested swamps found within the Park contain a tree canopy of red maple with highbush blueberry and sweet pepperbush in the shrub layer, and cinnamon fern and skunk cabbage in the herbaceous layer. These wetland areas provide important functions and values, such as cleaner water quality, nesting/brooding habitat for wildlife, and flood

storage. There are some inundated areas within these swamps that could be classified as vernal pools. These pools provide breeding grounds for some amphibians and reptiles (these were not surveyed at this time).

Seepage

There are areas within the forests of Beavertail State Park where groundwater percolates to and flows along the surface. This is most likely due to the water table being “perched” on the top of bedrock that underlies most of the Park. There are two or more Intermittent Streams in the Park.



3.9 - Site Amenities

Pathways

Beavertail State Park has formal hard surfaced brick walkways at the Beavertail Lighthouse and walkways at the HECP. Additionally, the outer park loop road currently serves as a wide, paved pedestrian walk.

Pedestrian access in other areas of the Park consists of short pathways near Parking Lots 2 and 3 made from compacted stone dust, and additional mowed grass pathways in all other locations. In many areas of high traffic or low sunlight, the grass cover is worn, and the bare soil below is exposed.

In locations where the pathways cross wet areas, bare soil results in muddy, seasonally impassible areas. Some locations have been improved with round stone bedding, particularly at intermittent stream crossings. In several locations, short span, wood pedestrian bridges exist.

Early in the Park's existence, granite stairways were constructed near the lighthouse. These are damaged beyond functional use and there is no formal access to the intertidal zone.

Other Amenities & Related Elements

RIDEM's Division of Parks and Recreation maintains the Park to have a natural appearance with purposefully limited site amenities. RIDEM has a statewide carry-in/carry-out policy, encouraging personal responsibility and fostering a sense of stewardship to align with this policy. There are also no picnic tables or formal benches within the Park. On the western edge of the Park, a small number of informal, rustic wood benches, can be found.

There is no lighting in the Park other than the limited wall mounted lighting at the lighthouse. The roadways and parking lots are unlit and reflects Park hours of operation. This condition is dark sky friendly.

Limited fencing exists in the Park. Approximately 800 linear feet of wooden, split rail fence exists surrounding the lighthouse, defining an area for pedestrian and former vehicular circulation. Wooden

guardrail was installed along the edges of the paved path around the Lighthouse and remains despite the discontinuation of vehicular use. Chain link fencing also exists in limited locations. The northeast property line is lined by an eight-foot high chain link fence that creates a clear demarcation between the Park and the private properties to the north. However, the fence does not extend the full length from the shore to Beavertail Road. The HECP is fully enclosed by chain link fence and secured with a locked gate.

Limited stone walls exist on site; the most visible ones once defined the limit of the U.S. Coast Guard land and today occupy the area of the composting toilets. Unlike the chain link fence on the northeast property line, the northwest property line is marked by a low stone wall.

There are five composting toilets located on the site north-west of the lighthouse. They are positioned in close proximity to each other, sited between Parking Lot 2 and the Light Station.

Wood posts with chains and locks are used to restrict unauthorized vehicles from accessing trails. Currently this system restricts cars from entering the lighthouse loop road, as well as maintenance paths.

Large boulders sit in areas near vehicular access and parking areas to limit vehicle encroachment onto the grass. In recent years, additional boulders have been added to reinforce and define vehicular areas. Boulders have been used to secure WWII fortifications, placed often in combination with fill to restrict access.

Signage

The inventory process identified 65 signs of various types. The signage consists of regulatory traffic signs, park use and regulation signs, limited wayfinding and trail identification signage, and interpretive graphic panels. There is a large Beavertail State Park entrance sign at Beavertail Road welcoming visitors into the Park. The regulatory signage is typically aluminum sign panels mounted to 'U'-channel posts. The Parking lot and trail signage consists of wood posts and engraved wood signs with painted lettering.



Beavertail Light Station



Fresnel Lens Display

3.10 - Park Uses

Observation of the existing conditions of the Park provides some insights into who the Park goers are and how they use the Park. Many come to walk, look at the ocean, view wildlife, and visit the museum. There is little trash or litter evident in the Park, with the exception of isolated areas of concentrated trash deposits found in remote areas of the Park seemingly generated by fishermen.

The edges of the loop road in the vicinity of Parking Lots 2 and 3 are worn down to bare soil, evidence of vehicles repeatedly driving off the road and over the grass as park-goers look for a place to park. This area of the loop road offers open views of the lighthouse and ocean, and draws visitors from their vehicles. The Beavertail Lighthouse Museum Association reported over 300,000 visitors in 2023, the majority parking in this area. Hard packed grass and bare soil foot paths show where many visitors come to admire the scenery and picnic, or walk the edges of the Park where there are open ocean views.

There is a strong draw to the water's edge, with well-worn pathways crossing over the bluffs to the rocky intertidal zone. Fishermen

and their families often come and spend their entire visit on rocky outcrops on the east and south sides of the Park. Some come to fish during evening hours or overnight.

The attraction of the ocean's edge is not without risk. Every year, calls to assist Park goers include fall on the rocks, often resulting in severe injuries. The Park attracts visitors from different geographies, many of whom are unfamiliar with the wave action of the ocean, tidal conditions, and aquatic vegetation on the rocks. Over the years there have been several fatalities on the shores of Beavertail Point. Rescue and recovery operations are technically challenging for first-responders due to the expanse of trail, vertical drop, and rugged conditions.

Rescue responses often involve the deployment of watercraft, drones, and personnel on foot. Injured people are typically secured in rescue basket stretchers, hoisted out of the intertidal zone, and then carried by the rescue team across rocks and up foot paths until they reach an area that allows vehicle access. These complex operations and conditions frequently put rescue teams at risk, particularly during high surf or evening and night rescues.



Path that runs past the Helix Hut



Low-profile boardwalk over and intermittent stream



Composting toilets just north of the Lighthouse



Informational QR code in the Park

Park Activities - Primary uses are described below in Figure 3.26

SIGHT
SEEING

Many visitors come to Beavertail State Park to observe the coastal views. Visitors often bring chairs, tents, or umbrellas to enjoy the view of ships and sailboats making their way in and out of the bay. People often visit Beavertail to picnic, enjoy the sun, and take in the vistas that the Park has to offer. The east side of the Park has a clear view across the bay to Newport's Brenton Point Park, while the west side of the Park offers coastline views of neighboring towns such as North Kingstown, South Kingstown, and Narragansett. Some historic sight lines such as from the HECF have been obstructed by the growth from vegetation. The views at the Park attract photographers as well to photograph not only the scenery, but also birds and other wildlife throughout the Park.



LEARNING

Beavertail has interpretive signage dedicated to the lighthouse and surrounding buildings, but there are areas of the Park that lack interpretation. The only other interpretive signage available to visitors are Quick Response (QR) codes on signposts addressing historical elements, environmental characteristics, and coastal features. They are often overgrown by vegetation, hard to find, not always accessible, and in some cases, in poor condition. Many of the structures on site are historic and date to World War II. However, not all of the structures have interpretive signage or similar elements associated with them. Beavertail Lighthouse is an active museum and is one of the most visited attractions the Park has to offer. Rehabilitating and opening other structures to the public would expand interpretive opportunities on site and create a more diverse visitor experience.



RECREATING

Walking is one of the main forms of recreation at the Park. Informal trails and waterfront footpaths make up nearly 11,000 feet of paths. The named paths known as the Red Dot, Blue Dot, and Green Dot trails are often bisected by small wetland areas making them hard to traverse. All of the paths have trailhead signage, but no trail markers along the route, making it easy to get lost or confused on the trails themselves. Beavertail is an attractive destination for cyclists, however getting to the Park is challenging. Once in the Park, cyclists ride with the flow of vehicular traffic. Currently, there are no bike racks on site for visitors to park their bikes. Other recreational activities that take place at the Park include fishing, kite flying, playing field games, and hunting.



WATERFRONT
ACCESS

One of the most evident uses of the Park is the waterfront access. Beavertail State Park is visited for its coastal setting and access to the water. Visitors enjoy descending on the rocks, and some visitors seek out the small beach-like areas along the west side of Beavertail's coastline. Although waterfront access is desired, it is also one of Beavertail's most dangerous attractions. Signs are posted noting to "Keep Off Rocks." Few, if any, visitors obey the signage. There are currently no formal routes to access the intertidal zone. The only access is via eroded foot paths down to rock ledges.



3.11 - Site Assessment

The natural diversity and array of man-made features present at Beavertail Point warranted numerous site visits by members of the master planning team at different times of the year and under different conditions to inventory the man-made infrastructure, wildlife, plant communities and general park conditions encountered as described in the previous sections.

The indigenous people who inhabited Conanicut Island managed woody vegetation through controlled burning practices which generally kept the land free of large trees. Through grazing of livestock and farming practices, the open field condition was maintained generally through the Ft. Burnside era. Since that time, with the absence of more intensive agricultural land-use practices, the herbaceous low-lying wet areas became vegetated with woody shrubs and trees, accompanied by the large areas of open fields growing into successional meadows, with large tracts of trees and shrubs forming on the edges based on soil moisture and topography.

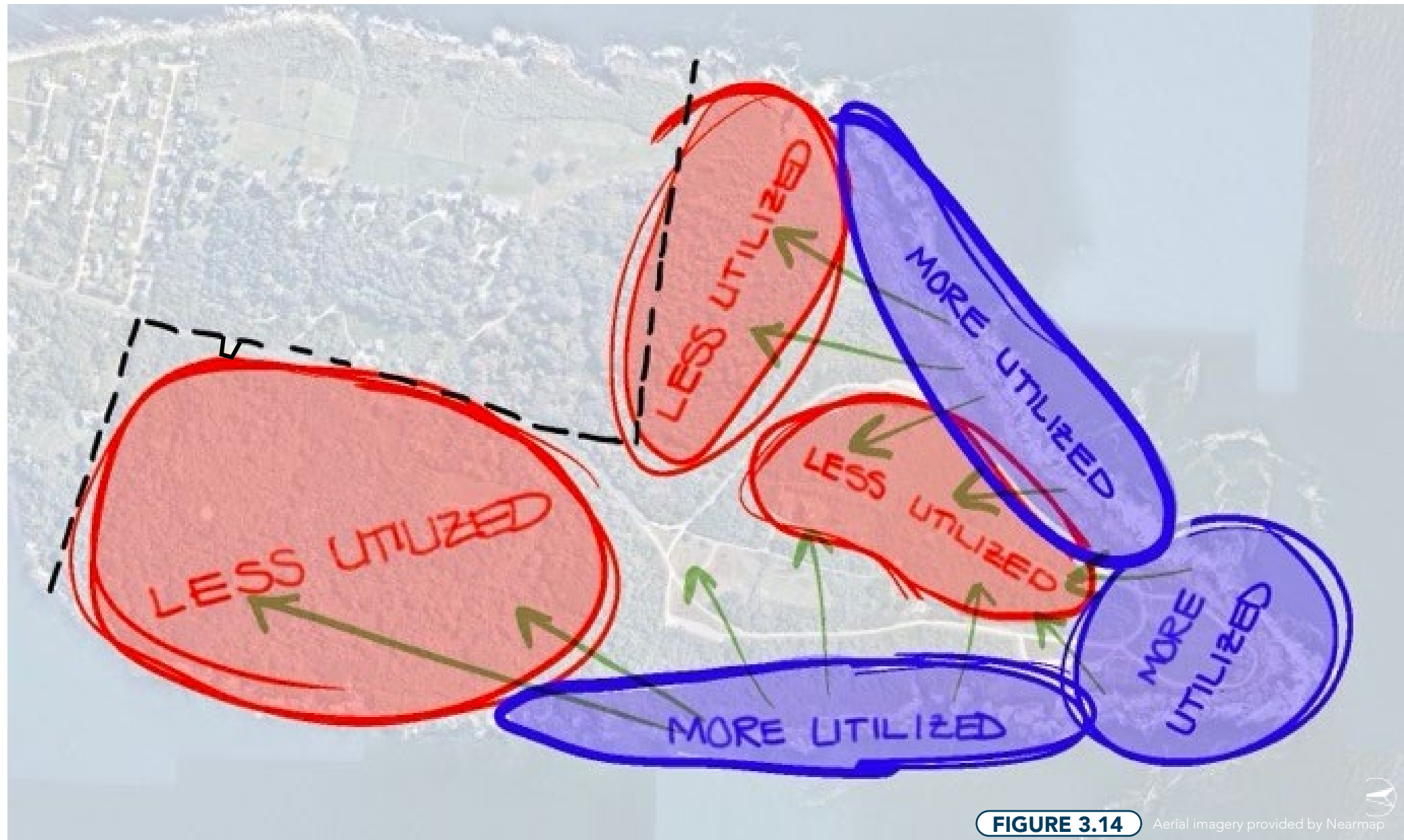
By the late 1980's the vegetative growth in the Park created distinct and large areas of different types of forest and shrub communities, leaving smaller areas of open meadows. The most intensively utilized areas of the Park are maintained turf grass, mown regularly. These areas are located at the tip of the peninsula near the light station and the two flanking areas to the east and west. Some interior areas of lawn exist near the HECF and parking lot No. 1. The maintained areas are frequented by people strolling, birdwatching, picnicking and fishing.

Large areas of land without park roadways or trails had limited formal maintenance operations and continued to grow into larger stands of trees and shrubs. The areas with dense vegetation became less and less traversable by pedestrians and thus these areas were less utilized as part of the Park. Views of the ocean are very limited from wooded areas.

While generally considered beneficial to wildlife, the tracts of forested areas in many cases are now host to exotic invasive plants such as Autumn Olive and Asiatic Bittersweet, which are negatively impacting indigenous plants and decreasing biodiversity and habitat. Unique habitats that exist in areas are now facing pressures from non-native plants.

The successional forested areas interwoven with invasive shrubs and vines create dense thickets of vegetation that for large areas of the Park eliminate pedestrian access and restrict views of the open ocean. Few open vistas exist in 2024, a marked contrast to conditions found in the Park in the mid 1980's.

In the present day, large areas of the Park are inaccessible and as such can be considered underutilized by humans. Those forested areas with a large quantity of invasive plants are also less utilized by wildlife and have lower habitat value. Figure 3.28 illustrates the general arrangement of the less-utilized areas.



3.12 - Existing Conditions Summary

Given the striking natural beauty of Beavertail State Park, it can be easy to forget that the Park exists on the site of a former military fortification. Limited information is available regarding how the decommissioning process operation unfolded and to what standards the site was restored.

With the exception of the water distribution system, which was replaced in 2023, as well as new communication infrastructure, much of the utility infrastructure is likely nearing the end of its functional life. The conditions of the septic tanks and drain field facilities are unknown for both the lighthouse and the HECF. While the primary electric service appears to be adequate to support the current uses, the condition of the internal wiring systems of the habitable buildings is unknown.

Since the Park was created in the 1980's there has been limited investment or change to the various structures in the Park beyond the building restoration and rehabilitation projects initiated by the BLMA. Battery Whiting observation post shows signs of structural decay and impacts from vandalism. Battery 213 has minor interior damage also attributable to vandalism and due to controlled burns from fire department training. Generally, Battery 213 and Battery Whiting appear to be in fair condition effectively 'mothballed' with no interior access by the public.

The HECF appears to be largely historically intact inside, with many rooms retaining original paint, doors, and woodwork. However, the

wooden 'seaside cottage' exterior shell surrounding the concrete fortification is in disrepair and needs attention beyond basic weatherization improvements to address issues with the roofing and siding. Doors and windows are original and failing. The large, exposed south-facing concrete roof structure over the first floor observation room also has several heavily rusted structural reinforcing members. The utility systems inside the building are dated with limited functionality. The adjacent garage is in an advanced state of disrepair, with holes in the exterior allowing water to infiltrate the structure. All issues require attention in the near-term to simply stabilize the structures.

Beyond these three large WWII structures, both visible and concealed military structures remain across the entire property, with many unknowns remaining in regard to underground piping, wiring, and conduits.

Visitor amenities beyond those found at the southern tip of the Park near the lighthouse are minimal, commensurate with the overall appearance and natural character of the Park.

Portions of the asphalt roadways are deeply fissured or have potholes. Long stretches of the roadway edges have unraveled, damaged by cars driving on and off the pavement that are most often to park illegally. The path network consists primarily of mown grass pathways and, after years of use and recent intensification of

use, show signs accelerated wear with exposed bare soil. Informal foot paths from upland areas down to the intertidal zone have become highly trafficked and eroded, exposing bare soil. Stormwater running down from the Parking lots channelizes water, which flows over the coastal bank and rapidly erodes bare soil. The rate of erosion depends on the intensity of the rainfall or storm event. The erosion caused by foot-traffic coupled with naturally occurring attrition both from rain and coastal storm events may represent the single most challenging issue to address and resolve on site.

The Park infrastructure, other than the new waterline, communications, and the improvements at Beavertail Light Station, is dated. The Harbor Entrance Command Post requires immediate attention in the near-term to weatherize the structure and to prevent permanent damage and structural issues on the interior. While the existing system of roadways, pathways, signage, and amenities has proven serviceable, aspects such as road and path surface conditions, overall connectivity, and accessibility can be improved.

Physical wear on surfaces and vegetation resulted in conditions that may lead to negative environmental impacts if not addressed. Pressures by visitors and frequent, intense, and severe rainfall events, are irreversibly changing the coastal edge of the Park. Action is needed to better accommodate park goers while minimizing human-generated impacts and protecting the coastline.





4 Constraints & Opportunities

- 4.1 - Overview
- 4.2 - Strengths, Weaknesses, Opportunities, and Threats Analysis
- 4.3 - Approach to Sustainable Design
LEED & SITES



4.1 - Overview

Beavertail State Park is a significant regional attraction and draws visitors from near and far with its iconic red and white light station, granite lighthouse, rocky shoreline, and natural, scenic character. Maintaining Beavertail as a unique-without-equal destination in an immersive, natural setting that imparts a sense of timelessness to the visitor and engenders an appreciation for the natural world requires an integrated strategy of preservation, protection, and enhancement.

Within the Rhode Island state park network, Beavertail is the third-most heavily visited park, from which the number of visitors can be estimated. The pressures exerted by increased vehicular and pedestrian traffic are perhaps most visible in landscapes that have few formal improvements, few visitor amenities, and have low maintenance inputs. At the present time, negative impacts to the Park are not able to be addressed on a regular basis. RIDEM maintains a vehicular counter which records the number of vehicles going through the Park.

Public input to development of this Master Plan identified key constraints and opportunities. Across multiple public engagement platforms, the following themes emerged consistently.

- Ocean views, walking trails, and Beavertail Lighthouse held a similar level of interest and attraction for respondents.
- Beavertail Lighthouse, birds and wildlife, marine life, and WWII history were identified as areas of interest.
- Concerns about over-building the Park.
- Concerns about attracting too many visitors to the Park
- Concerns with the level of current and future maintenance
- There is public interest and opportunity for enhanced interpretation with graphic panels exploring:
 - Indigenous Peoples’ history
 - Natural environment and wildlife found on site
 - The role of Beavertail State Park in World War II
- Visitors enjoy the natural setting and history of the site.
- People recognize the Park as unique and ‘timeless’
- Visitors exert a high level of pressure on the Park’s infrastructure and natural systems in many areas
- Loss of land and habitat due to invasive plants and coastal erosion
- Park-goers are concerned with erosion and congestion in the Park.
- Necessary improvements within the Park should be balanced with the predominantly natural setting.
- Care should be exercised to avoid extensive or overbuilt improvements that change the natural character of the Park.



Figure 4.2 below depicts the months of the year and shows the number of vehicles entering the Park per month. The average number of daylight hours per month is provided as well as the average number of cars per daylight hour that the Park is open. (Note: weather and other conditions may affect the day to day/hour to hour rate).

From 2019 to 2020 visitation increased 82 percent. This increase is not unique during those years, as parks across the world recorded an increase in visitation linked to the corona virus (COVID-19) pandemic. Figure 4.2 shows higher visitation rates in the following years as well, suggesting that the Park continues to receive an increase in visitation.

Using an occupancy rate of 3.2 individuals per vehicle, the math suggests park visitation from 2019 to 2020 significantly increased in the number of people using the Park in a single year.

Other inferences can be drawn from the data contained in the table. Of note is the visitation in the shoulder months, outside the of the peak season. From 2019 to 2020, the January through May year-over-year visitation increase approximately 30 percent. More noteworthy is the October through December year-over-year for the same period, which shows an increase in visitation of 350 percent.

The trend of increased shoulder season visitation continued strongly into 2021 and 2022. The data shows increased visitation, which indicates increased use of the fields, paths, and natural/ built resources. This translates into greater impacts such as compaction of the maintained grass areas and accelerated wear of the grass with less time to recover, leading to loss of crown density and slow root development, erosion, and accelerated stormwater flow over the flattened surfaces.

There was likely also a corresponding increase in foot traffic over the coastal bluffs and into the intertidal zone as vegetation on the edges of the paths were without foliage and thus less restrictive to passage. Such increased use of natural areas leads to accelerated erosion wear occurred on the coastal bank paths as well.

Park Visitation: 2019 - 2023

	2019				2020				2021				2022				2023			
	RIDEM Car Count	Estimated Visitors (*3.2)	Avg. Daylight Hours	Avg. Cars Per Daylight Hrs	RIDEM Car Count	Estimated Visitors (*3.2)	Avg. Daylight Hours	Avg. Cars Per Daylight Hrs	RIDEM Car Count	Estimated Visitors (*3.2)	Avg. Daylight Hours	Avg. Cars Per Daylight Hrs	RIDEM Car Count	Estimated Visitors (*3.2)	Avg. Daylight Hours	Avg. Cars Per Daylight Hrs	RIDEM Car Count	Estimated Visitors (*3.2)	Avg. Daylight Hours	Avg. Cars Per Daylight Hrs
January	7,752	24,806	297.6	26	7,531	24,099	297.6	25	26,127	83,606	297.6	88	16,147	51,670	297.6	54	6,598	21,114	297.6	22
February	7,638	24,442	296.8	26	8,146	26,067	296.8	27	19,364	61,965	296.8	65	14,932	47,782	296.8	50	7,671	24,547	296.8	26
March	7,693	24,618	372	21	15,107	48,342	372	41	14,340	45,888	372	39	17,970	57,504	372	48	9,080	29,056	372	24
April	10,930	34,976	402	27	6,162	19,718	402	15	14,018	44,858	402	35	12,005	38,416	402	30	11,321	36,227	402	28
May	11,218	35,898	452.6	25	21,641	69,251	452.6	48	15,423	49,354	452.6	34	14,680	46,976	452.6	32	18,276	58,483	452.6	40
June	18,139	58,045	453	40	29,832	95,462	453	66	14,682	46,982	453	32	20,979	67,133	453	46	16,101	51,523	453	36
July	22,316	71,411	458.8	49	36,136	115,635	458.8	79	16,382	52,422	458.8	36	29,780	95,296	458.8	65	27,673	88,554	458.8	60
August	27,065	86,608	427.8	63	36,599	117,117	427.8	86	17,189	55,005	427.8	40	26,942	86,214	427.8	63	26,291	84,131	427.8	61
September	16,695	53,424	372	45	28,830	92,256	372	78	16,374	52,397	372	44	18,691	59,811	372	50		0	372	0
October	13,149	42,077	341	39	35,003	112,010	341	103	16,866	53,971	341	49	15,041	48,131	341	44		0	341	0
November	6,019	19,261	294	20	32,487	103,958	294	111	8,796	28,147	294	30	10,264	32,845	294	35		0	294	0
December	7,897	25,270	285.2	28	27,237	87,158	285.2	96	16,378	52,410	285.2	57	8,357	26,742	285.2	29		0	285.2	0
Total	156,511	500,835	4453	34	284,711	911,075	4453	64	195,939	627,005	4453	46	205,788	658,522	4453	46	123,011	393,635	4453	25

FIGURE 4.2

4.2 - Site SWOT Analysis

As part of the Master Planning process, a SWOT Analysis - a review of Strengths, Weaknesses, Opportunities, and Threats - was developed to better understand the current conditions at the Park and gain insight as to future opportunities and challenges.

Strengths

What separates Beavertail State Park from other parks?

- Location and shape of the Park
- Overall size of the Park
- Intact wild and scenic character
- Diversity of natural attractions
- Diversity of historic, man-made attractions
- Beavertail Lighthouse Museum
- Beavertail Lighthouse Museum Association (501c-3)
- Beavertail Advisory Committee (BAC)
- Town of Jamestown
- RIDEM Aquarium
- Well recognized as a premiere destination in RI



Opportunities

What could make the Park more meaningful?

- Improved and accessible walking paths
- Improved shoreline access
- Restoration/stabilization of shoreline areas
- Expanded access to historic attractions
- Expanded interpretation of the man-made resources
- Expanded interpretation of historic resources
- Expanded interpretation of natural resources
- Additional parking
- Improved design and layout of parking areas



Weaknesses

What might stop the Park from being so special?

- Concentrated crowds
- Excessive numbers of vehicle traffic and parking
- Inaccessibility and location of restroom / comfort facilities.
- Aging infrastructure and deferred maintenance
- Degraded pathway network
- Shoreline erosion/ loss fo land
- Refuse/Trash/Vandalism
- Limited interpretive displays
- Limited operations and maintenance resources
- Limited qualified interpretive and management staff
- Invasive plant species



Threats

What factors have the potential to harm or change the Park?

- Coastal erosion
- Sea level rise
- Storm water erosion
- Construction of new buildings
- Loss of visual access to the ocean
- Loss of physical access to the ocean
- Excessive vehicular traffic
- Large-scale parking lots



4.3 - Approach to Sustainable Design

Addressing the weaknesses and threats to the site provides an opportunity to create resilient enhancements that will be sustainable. The following section describes two U.S. Green Building Council initiatives that can provide a framework for establishing performance goals when making improvements.

Leadership in Energy and Environmental Design (LEED)

For decades, Project Owners have sought to create more efficient and functional and sustainable approaches to both new construction projects as well as building renovation and rehabilitation work.

“LEED is a rating system created by the U.S. Green Building Council (USGBC) designed to evaluate the design, construction and maintenance of ‘healthy, efficient, cost-effective green buildings. The overarching goal participating in LEED is to foster responsible and efficient use of environmental resources.” USGBC.

LEED has four established levels of compliance for building projects: Certified, Silver, Gold and Platinum, verified by third party reviewers. LEED v5 was released in 2025 with the following areas of emphasis.

- 1. Climate Action (50%)
- 2. Quality of Life (25%)
- 3. Ecological Conservation and Restoration (25%)

Section 5 of the Master Plan puts forth recommendations for Beavertail State Park, including several recommendations regarding the restoration and rehabilitation of existing structures utilizing LEED objectives. The improvements contemplated for Beavertail State Park are anticipated to align with sustainability objectives and the above-mentioned categories. For Beavertail State Park, the values and objectives inherent in the LEED planning and design process appear to be desirable and attainable at the highest levels with proper planning, even if full certification is not pursued.

It has often been said “that the greenest building is the one that already exists.” and thus the rehabilitation of the Harbor Entrance Command Post (HECP) as an interpretive site is directly aligned with LEED objectives.

Sustainable Sites Initiative (SITES)

The Sustainable Sites Initiative (SITES) provides a comprehensive framework for the design, construction implementation and management of sustainable outdoor spaces. SITES is a tool that helps support nature-positive landscape design and construction projects from planning to implementation, operations and maintenance.

SITES and LEED rating systems are complementary and can be used independently or in tandem. LEED applies to the Building and the Site it is located on; SITES specifically applies to ‘everything else on the site’.

Designing with SITES-objectives will help improve water quality, enhance biodiversity, reduce energy consumption and improve human health, all objectives of this Master Plan. Presently SITESv2 is a 200 point rating system with four certification system that is aligned with LEED: Certified, Silver, Gold and Platinum.

SITES has a new project category for Major Renovation of Existing Sites as well as a newly established category for Existing, Built Landscapes: both emphasize sustainable site management. While a full SITES or LEED certification process is often not a specific requirement of a project, developing an approach to design and construction that is aligned with SITES and LEED objectives can be an important goal.

Both SITES and LEED have fees associated with the registration, compliance and certification of a project to verify conformance within the respective program. In many instances the basic certification level is attainable with low level costs and as such reflects a commitment benchmark for designing sustainable and resilient sites.

The following charts (Figure 4.4) depict seven areas of focus utilizing SITES approach to design. Organized and color coded as scorecards by category, the columns at the left indicate if there is alignment and opportunity to follow the objectives and/or action steps listed on the right of the score card in the process of implementing the Master Plan for Beavertail State Park.

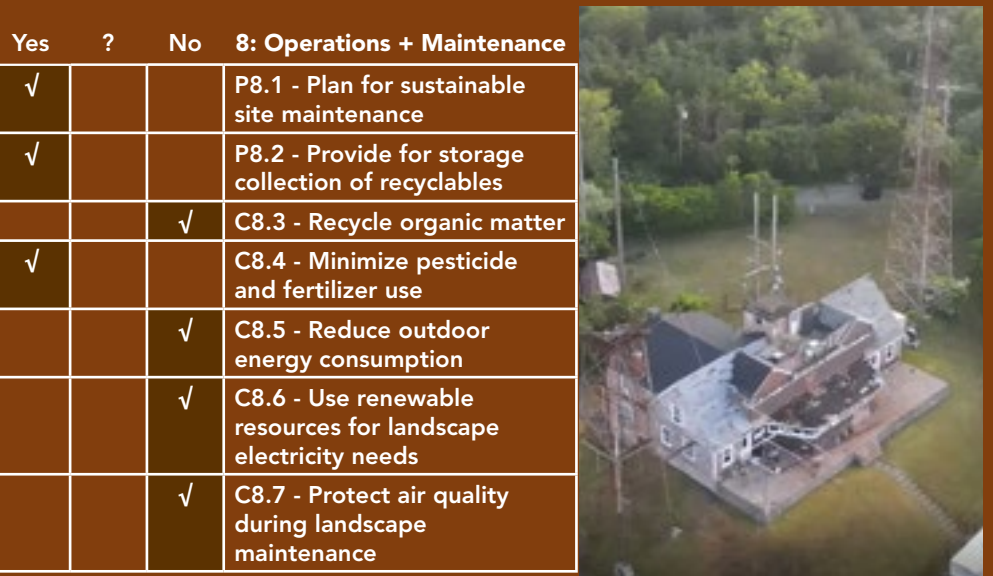
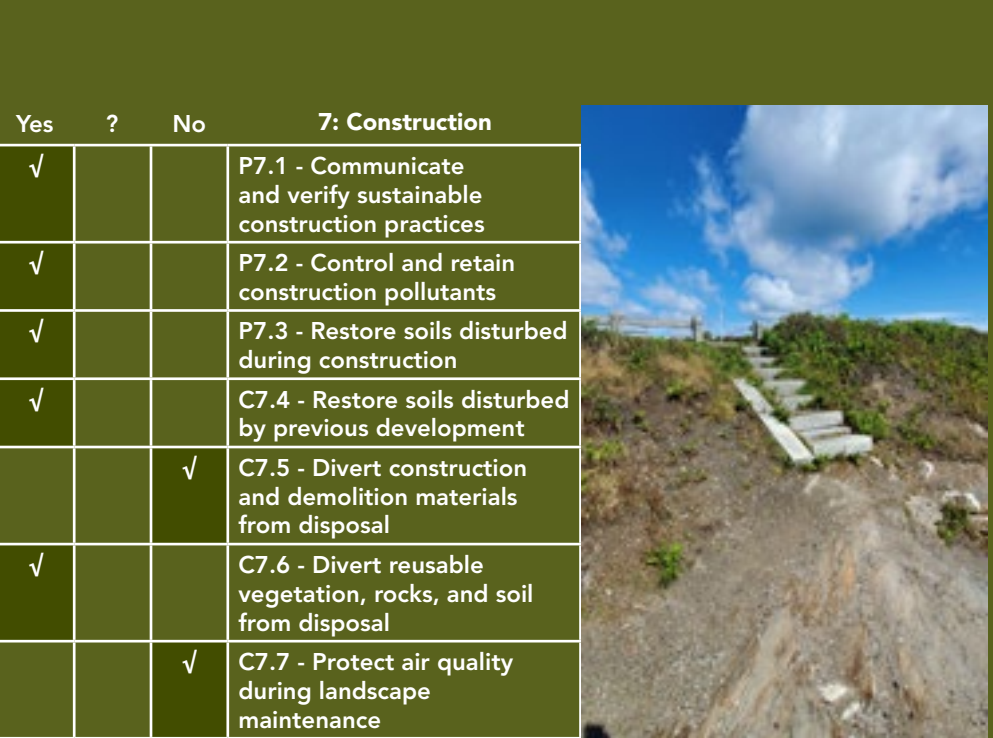
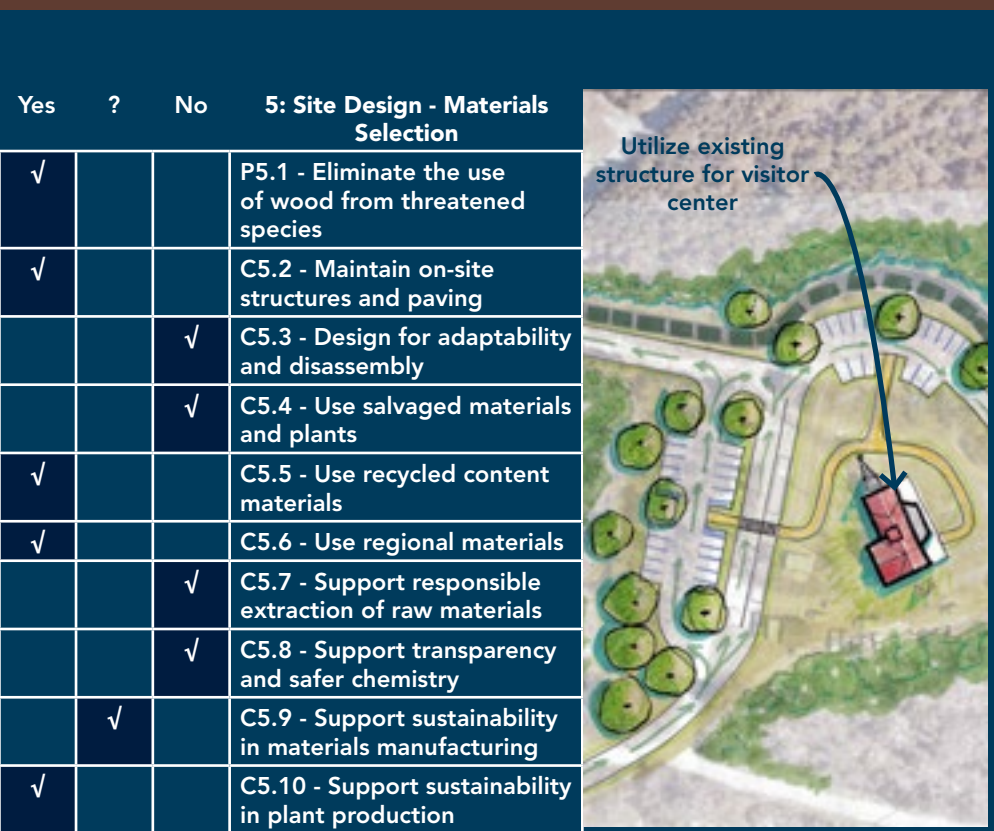
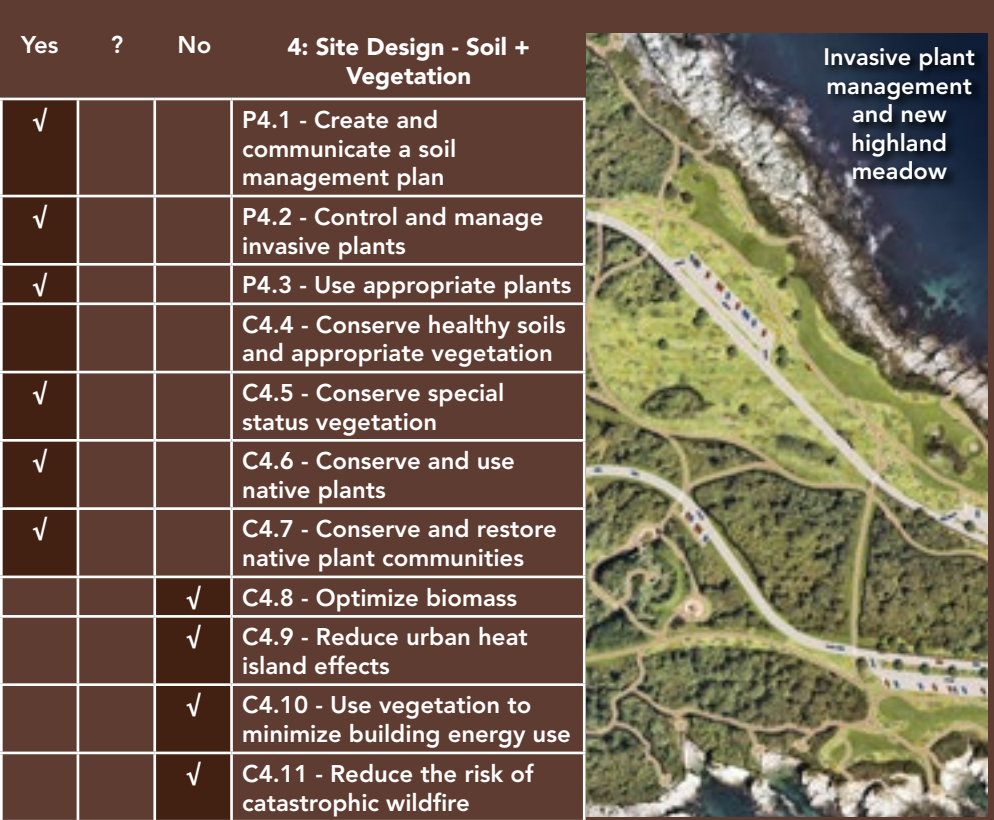
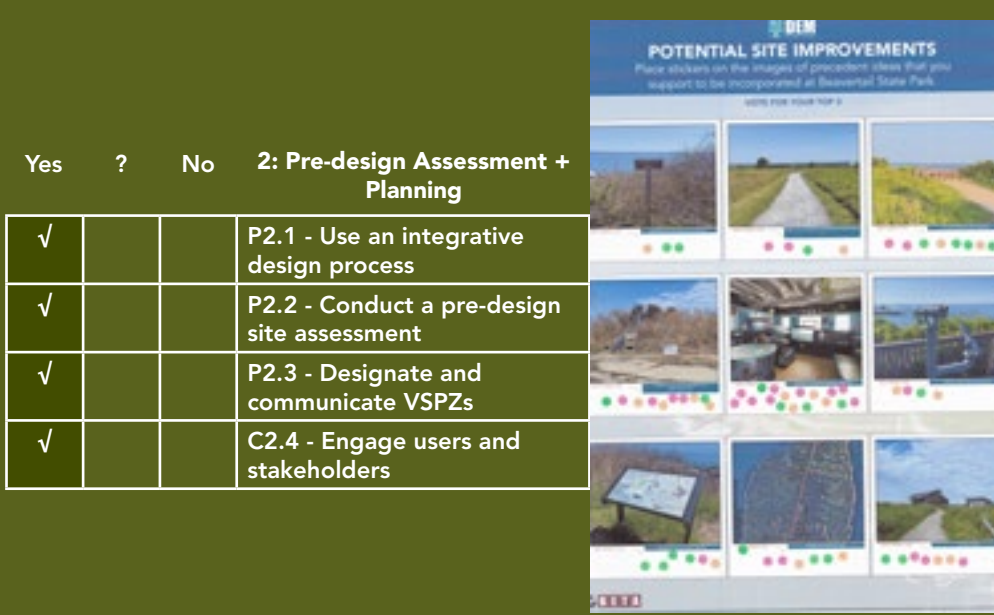
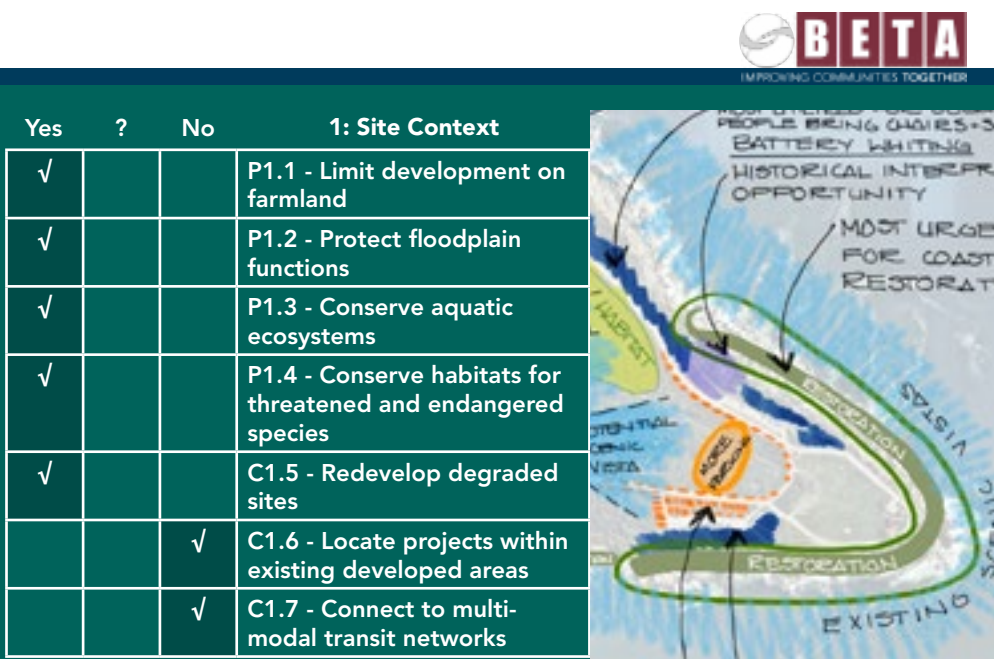
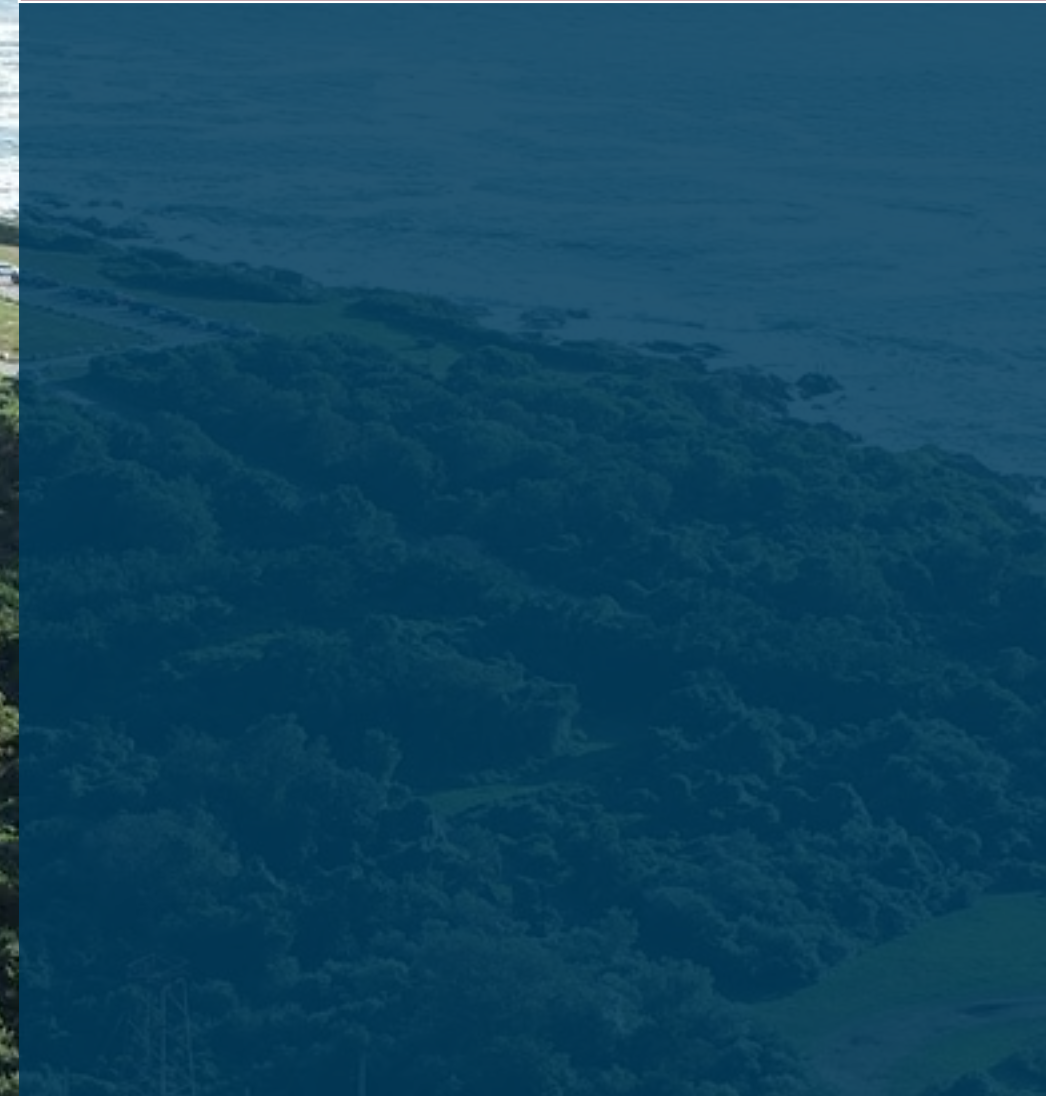


FIGURE 4.3



5 Master Plan Recommendations

- 5.1 - Objectives
- 5.2 - Conceptual Studies
- 5.3 - Site Recommendations
- 5.4 - Detailed Plans
- 5.5 - Perspective Studies & Sections
- 5.6 - Design Approach - Materials
- 5.7 - Design Approach - Plant Material
- 5.8 - Conclusion

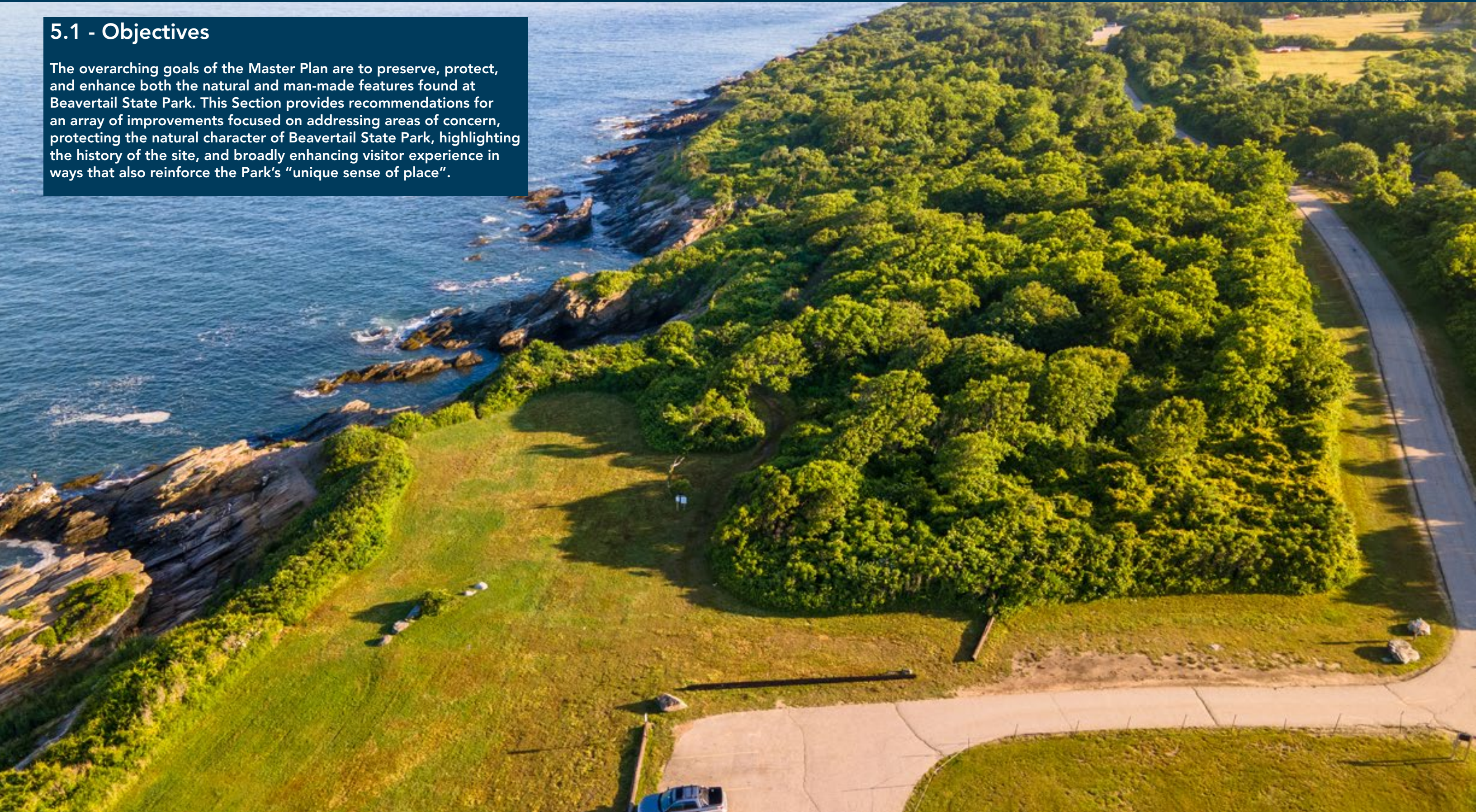


MASTER PLAN VISION: *Keep Beavertail State Park Natural!*



5.1 - Objectives

The overarching goals of the Master Plan are to preserve, protect, and enhance both the natural and man-made features found at Beavertail State Park. This Section provides recommendations for an array of improvements focused on addressing areas of concern, protecting the natural character of Beavertail State Park, highlighting the history of the site, and broadly enhancing visitor experience in ways that also reinforce the Park’s “unique sense of place”.



Preserve



Natural Environment

- Eliminate highly eroded and dangerous trails
- Revegetate areas of coastal bluff
- Develop a comprehensive invasive plant management plan

Built Environment

- Continue restoration of the Light Station
- Develop an approach for rehabilitation of the Harbor Entrance Command Post

Protect



Natural Environment

- Improve the alignment and surface of park trails
- Construct boardwalks and foot bridges over wet areas
- Reduce mowing operations
- Install protective fencing in areas

Built Environment

- Enhance stabilization of embankment at the Light Station
- Control and improve stormwater quality
- Improve necessary utility and road infrastructure

Enhance



Natural Environment

- Create new areas of upland meadow habitat in wooded areas
- Convert mown grassed areas to pollinator meadow habitats.
- Plant native plant species appropriate to varied site conditions

Built Environment

- Realign roads & parking areas to ‘Retreat’ from the edges
- Remove lighthouse loop road and parking
- Construct pedestrian access to lighthouse and new loop trail
- Construct central overflow parking lot
- Construct accessible oceanside overlooks/viewing areas
- Improve access to areas of the intertidal zone
- Construct or relocate Restroom Facilities
- Create ‘Inner loop’ walking path
- Establish Park visitor center and interpretive site at the HECP
- Rehabilitate WWII Fortifications as interpretive sites
- Create universally accessible trails throughout the Park
- Expand trail network for visitors and rescue personnel
- Create northern trail head and small parking lot
- Construct RIDEM Maintenance garage

FIGURE 5.1



In order to come to a consensus on a Master Plan, conceptual studies were done to identify key improvements that may be pursued. Below is a conceptual plan showing interpretive, naturalized, and built improvements to consider.

- 1 Introduce trail markers
- 2 Enhanced interpretation

- 1 Stabilize existing shoreline erosion areas
- 2 Invasive plant management
- 3 Vista / view corridors
- 4 Create habitat meadows

- 1 Formalize and improve existing trails
- 2 Additional walking trails
- 3 Mid-park parking lots
- 4 Transform HECP into visitors center
- 5 North-park parking lot (trailhead with composting toilet)
- 6 South-park parking area



5.3 - Site Recommendations

LEGEND

- 1 Reconfigure for Retreat, Realign Park Roadways and Parking Lots
- 2 Improve Visitor Parking and Drop-off
- 3 Redefine Access to Beavertail Lighthouse
- 4 Beavertail Light Station
- 5 Aquarium / Fog Signal Building
- 6 East and West Passage Viewing Stations
- 7 Redefine Shoreline Access (east and west)
- 8 Stabilize Coastal Bank (east and west)
- 9 Rehabilitate Battery Whiting
- 10 Rehabilitate Battery 213
- 11 Spraycliff Interpretive Site
- 12 Northern Parking Lot
- 13 Trail System (existing)
- 14 Trail System (proposed)
- 15 Create Inner Loop Walking Path
- 16 Rehabilitate HECF
- 17 Create Visitor Parking Lot at HECF
- 18 Construct RIDEM Maintenance Facility at HECF
- 19 Introduce Upland Meadows
- 20 Park Entrance Gate
- 21 Entrance Parking / Turn Around
- 22 Benches (project wide - as appropriate)
- 23 Parking Edge Control (project wide - as appropriate)
- 24 Interpretive Signage (project wide - as appropriate)
- 25 Wayfinding Signage Throughout Beavertail State Park



FIGURE 5.4 Aerial imagery provided by Nearmap

Master Plan Vision: *Keep Beavertail State Park Natural!*

The overarching goals of the Master Plan are to preserve, protect and enhance the natural and built elements of the Park. Through this lens, all Master Plan recommendations seek to expand universal access to the resources within the Park while protecting those intrinsic values to ensure future use and benefit, and expand interpretation of the historical and environmental elements that create the unique “Sense of Place” to be discovered at Beavertail State Park. The items described below correspond to the numbers identified on the plans.

- 1 Reconfigure: Proposed Improvements Should Retreat From Coastal Bank. Realign Park Roadways & Parking Lots**
(See figure 5.18)
- Retain the one-way park loop road circulation flow.
 - ‘Retreat’ through re-alignment of portions of the Park loop road and parking areas. Pull the road and parking back into the interior of the Park. Create integral stormwater management and water quality features to slow stormwater runoff and promote infiltration. Configure the road to visually engage the HECF and Battery 213, while purposefully retaining iconic view to Narragansett Bay and Beavertail Light Station.
- 2 Improve Visitor Parking and Drop-off.**
- Create several ADA-compliant parking spaces along southern edge of the road. Parking spaces to connect to new accessible pedestrian walkway leading directly to the lighthouse.
 - Create small pull-off area for van or shuttle bus drop-off along eastern edge of the loop.
 - Create a 40-space parking lot between Parking Lots 2 and 3. Allow this parking lot to have two-way traffic flow to allow visitors to re-circulate (counterclockwise) in this busy location rather than drive the entire one-way park loop road to return to this parking area. Consider utilizing pervious paving or grass-pave system.
 - Establish new (or relocated) composting toilets to be closer to new parking lot. Buffer restroom structures with native plantings.

- 3 Reimagine & Create New Access Plan for Beavertail Lighthouse**
(See figure 5.10)
- Permanently eliminate vehicular access around the lighthouse. Remove wood guardrail. Install split rail wood fencing in targeted areas. Construct 10-foot-wide lighthouse loop path to replace former driveway loop.
 - Construct a central ADA-compliant walkway directly to the lighthouse. Align with recent improvements at eastern side of the structure.
 - Extend this linear pathway beyond the lighthouse to a new pedestrian ocean overlook platform constructed on the base of the original lighthouse. Access via a gangway. Create interpretive site for the public within the existing footprint of the original lighthouse.
 - Construct a gated driveway to Light Station for deliveries and lighthouse keepers. Remove large sections of split rail around mown grass areas. Visually buffer driveway from view with pollinator meadows and low growing shrub plantings.
- 4 Beavertail Light Station**
- Continue rehabilitation and restoration work to the Light Station, historic structures, and features throughout the Park.
 - Conduct Risk Assessment to understand vulnerabilities of the site resulting from erosion, sea level rise, etc.
 - Expand public access where safe and possible.
 - Maintain and upgrade utilities to support the uses at the Park.
- 5 Aquarium (Fog Signal Building)**
- Make interior investments to make this popular attraction more accommodating for users with accessibility issues
 - Expand public interpretation and education.
 - Retrofit building to facilitate routine operations (filling, draining tanks, cleaning tanks, temporary holding tanks).
 - Upgrade water and power
 - Improve tanks, pumps, filtration etc.
- 6 East and West Passage Viewing Stations.**
- Eliminating visitor foot traffic over the coastal bluffs and onto the rocks below. Create ocean side viewing platforms, one on each side of the point. Construct platforms that extend beyond the edges of the bank to afford high-quality views to

- the north and south.
- Design platforms to be intimate and in scale with the setting. Utilize round wood timbers and integrate architecture with the surrounding landscape, creating platforms designed visually as wildlife blinds. Platforms can have railing systems that facilitate viewing at different levels. Provide interpretive panels on a variety of natural and maritime topics. Construct ADA-compliant pathways from nearby parking areas to the viewing stations.
- 7 Redefine Shoreline Access (east and west)**
(See figures 5.8, 5.14, and 5.17)
- Reduce the number of intertidal zone access points.
 - Revegetate the access points identified as undesirable. This classification is based on use, risk factors, erosion issues, and proximity to other access points.
 - Improve designated access points using a combination of approaches based on steepness of grades, vegetations, level of usage, and conditions in the intertidal zone below. Access to the intertidal zone should not be improved in locations where sensitive habitats exist, where exposed soils or friable ledge conditions predominate, or where the grades below are excessively steep. Access should transition to a stable, relatively uniform, and natural surface.
 - Create zig-zag pathways - eliminate the pathways that descend directly and vertically to the intertidal zone. Integrate with the contours of the land, and locate in areas to address severe erosion. Pathways should be designed to be natural in appearance, with intermittent places of increased width to allow people to pause or pass. Utilize boulder and ledge outcroppings to retain grades and control speed of water runoff. Revegetate edges with native plant materials, include grasses, perennials, and shrub materials.
 - Create paths a minimum of six feet in width, utilizing accessible surface materials with slopes that are less than 1:20. Establish grades in a manner that limits the need for handrails, ramps, or landings.
 - When pathway opportunities are excessively constrained, construct stairs with landing system.

5.4 - Detailed Plans & Cross Sections
Point Enlargement



FIGURE 5.5

8 Stabilize Coastal Bank (east and west)

- (See figures 5.9, 5.15, 5.16)
- Extend existing seawall east and west to create needed protection for Beavertail Lighthouse. Investigate an increase in height and re-configuration with curved, reflective face. Terminate wall in heavy armor rip rap transitioning to reinforced, vegetated, stabilized slopes.
 - Stabilize highly exposed and undercut bank areas with embedded rip rap overlaid with soil, erosion control matting, coir-fiber logs and native plantings.
 - Utilize coir fiber logs, matting, and plantings in less exposed settings.
 - Install split rail wood fence in high-visitation areas where access has been discontinued. Install wire mesh fence on wood fence where vegetation is planned. Keep mesh fence above grade to allow passage of small mammals underneath. In areas with less visitation, wire mesh fence embedded in the new vegetation will provide a more natural appearance.
 - Eliminate worn footpaths along the top of the coastal bluff. Revegetate these areas. Install fence in limited areas to redirect pedestrians.

9 Enhance Battery Whiting Area

- (See figure 5.11)
- Remove and manage vegetation on the slopes of the battery to create views for interpretation and to improve habitat.
 - Consider rehabilitating the observation station of Battery Whiting to allow visitors to enter and experience the spotter positions and views to the east.
 - Develop interpretive themes. Install interpretive panels.
 - Create accessible pathway to the battery.

10 Enhance Battery 213

- Remove and manage vegetation on the slopes of the battery to make the magazine, gun emplacements, and other elements of the battery visible for interpretation.
- Consider rehabilitating interior areas of the underground magazine to allow occasional guided tours. Level depressed floor areas, install lighting, ensure headroom clearances, etc.
- Install interpretive panels.
- Create accessible pathway to the battery. Create small visitor parking area and trail connections to the battery.
- Create path to top of battery to afford views to the south and west.

11 Spraycliff Interpretive Site

- Remove and manage vegetation around and on the slopes of the cistern to create views and improve habitat.
- Construct an accessible, concentric path to access the top of the structure.
- Create view corridor to East Passage to create water views.
- Resurface top of cistern to be accessible. Install benches.
- Develop historic interpretation. Install interpretive panel.
- Implement location-specific invasive plant management plan designed to address stands of Autumn Olive and Japanese knot weed at the former Spraycliff site. Regrade area, remove remnant asphalt pavement, pipes and drainage structures and associated WWII facility debris.
- Create and manage former Spraycliff site as upland meadow area.

12 Northern Parking Lot

- (See figure 5.12)
- Create new small parking lot at the northwest corner of the Park to replace previously existing informal parking lot at former electric substation. Location of this lot is to encourage expanded walking loops and use of interior areas of the Park.
 - Construct paved access road through lot. Parking bays on either side can be pervious pavement or grass-pave system. Install lockable access control gates.
 - Link parking lot to new park pathways. Install interpretive panel/trail map/kiosk.

13 Trail System (existing)

- Improve existing trail system. Realign trails that are perpendicular to slopes. Construct turns or switchbacks to slow stormwater runoff and limit erosion. Retreat or otherwise pull paths back from eroded areas of the coastal bank.
- Realign paths that are in intermittent streams or other portions of wetland areas.
- Create perpendicular trail crossings at intermittent streams and wetland areas using open bottom box culverts or small, short span bridges.

- Develop a hierarchy of surfaces to create a phased approach to expanded accessibility. Establish accessible trails closest to parking and trailhead facilities. Expand accessibility outward to engage other areas of the Park
- Establish trail system names associated with the trail color to convey understanding of place .
 - East Bank
 - Spraycliff
 - Lions Head
 - Beavertail Lighthouse Loop
 - West Bank

14 Trail System (proposed)

- Trails provide first responders better access to areas of the park to enhance response time.
- Create new trails to access areas of the Park currently not accessible to the public.
 - Maximum 1:20 slopes where possible and at least six-foot wide to accommodate 4WD ATV rescue vehicle and maintenance equipment.

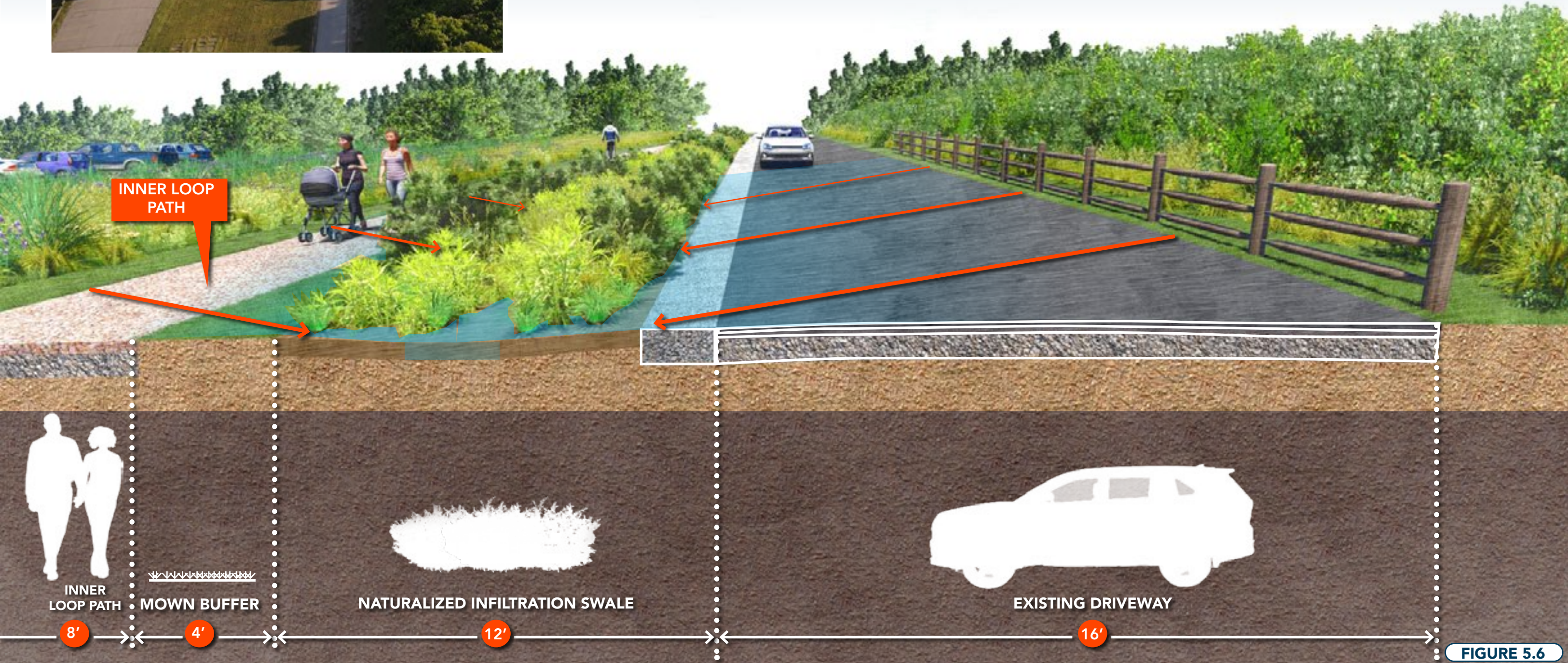
15 Create Inner Loop Walking Path

- (See Figure 5.6)
- Construct continuous eight-foot wide, ADA-compliant inner loop walking path to separate pedestrians from vehicles. On the western side of the Park, use areas vacated by the re-aligned roadway as a corridor for an inner loop walking path. The path can mirror the roadway loop but be offset and buffered by vegetation from the Park roadway loop when possible. Path shall have view corridors to the ocean for the entire length of the loop. Path should be kept free of snow in the winter.

Existing



15 Create Inner Loop Walking Path



- 16 Rehabilitate Harbor Entrance Command Post (HECP)**
- Rehabilitate of existing historic structures on the site. New structures in the Park embodies the philosophy that the “greenest building is the one that already exists.” Rehabilitation will require a creative approach. Developing accessible access to the building is envisioned as sloped, accessible walkways to the southeast facing plaza. New amenities such as public restrooms or similar features as part of this facility are best envisioned as distinctively different structures (glass, steel or other) creating minor additions to the HECP that allow for the architecture of the HECP building to physically and visually remain intact.
 - The HECP Primary Vision: Rehabilitate structure for use as an interpretive center. Create public access to the first floor as an interpretive site or visitor center/museum. Relocation of the aquarium to this location was discussed, but the current coastal location by the lighthouse is the preferred location. Allow for guided tours for access to upper and lower levels. Construct public restrooms.
 - HECP Alternate Vision: Rehabilitate structure, with provisions for a full-tim live-in park caretaker. Portions of the building could be made available as museum space or for limited special functions. Any rehabilitation of the HECP structure will include replacing the building’s plumbing, heating, and ventilation systems.
- 17 Create Park Loop Road and Visitor Parking Lot at HECP.**
- Improve visibility of the HECP through selective clearing and vegetation management. Establish open views and make the building an obvious point of interest and the first stop for visitors entering the Park. Create a small drive way loop to allow for vehicular circulation. Create a small parking lot adjacent to the HECP for visitors to the facility as well as to provide access to the nearby trails serving the central and northern portions of the Park.
- 18 Construct RIDEM Maintenance Facility at HECP**
- Presently, RIDEM has limited storage space for maintenance equipment on site, with Park Operations utilizing a single bay in the Beavertail Light Station Garage. This space currently contains hand tools and a small utility ‘gator’ vehicle with very limited space for additional equipment. It is recommended that a small park maintenance facility be constructed, with a basic field office and garage space for the on-site storage of mowing and trail maintenance equipment. Space for

the staging of on-site rescue equipment including ropes, harnesses, stretchers and 4WD ATV outfitted for rescues within such a structure was noted as highly desirable by First Responders.

- The facility should include adjacent, suitable outdoor space for equipment and attachments as well as for the storage of commonly used maintenance materials. This facility is best located and carefully sited near the center of the Park with equipment yard and material stockpiles screened from public view by mature native vegetation.

- 19 Create Upland Meadows**
- As part of a comprehensive invasive plant management plan, create upland meadow areas to establish bird and terrestrial wildlife habitats.
 - Eliminate areas of mono-species invasive plants. Conduct vista pruning and create view corridors to visually connect interior areas to the ocean.
 - Create more vegetated edge conditions for birds and wildlife. Establish outdoor ‘rooms’ within the forested areas and along pathways.
- 20 Establish Park Entrance**
- At entrance, the existing gate allows for park closures when conditions are unsafe for visitors such as during storm events.
 - Construct stone columns, boulder placement, or other gateway entry elements to eliminate bypass.
- 21 Entrance Parking / Turn Around**
- Create small parking area outside the Park entrance to allow visitors to turn around or park if park gate is closed.
 - Parking area for those who wish to access the trails near the entrance of the Park.
- 22 Benches**
- Include areas dispersed throughout the Park that have benches with the ability for companion seating.
- 23 Parking Edge Control**
- Introduce boulders or three-bar rail fence system along areas of the roadway where visitors tend to park outside of designated parking lots.

- 24 Interpretive Signage (project wide)**
- Beavertail has many interesting natural features, wildlife and historic elements that are of interest to the public. Strategically provide interpretative signage in key locations to describe aspects of the Park that visitors may encounter that are noteworthy.
- 25 Wayfinding Signage Throughout Beavertail State Park**
- Strategically expand wayfinding signage to help the pubic navigate the Park to locate areas of interest, historic features, shoreline access and amenities.

Stewardship Recommendations

In addition to these (previously identified) site improvements, the long term integrity of the historic buildings and vulnerable coastline will require additional study and strategic investment, such as:

- 1. Inspections & Studies**
- Assessment & Analysis of Beavertail Point Rate of Erosion
 - Risk Assessment to Beavertail Lighthouse
 - Feasibility Study and Cost Estimate for Relocating Beavertail Lighthouse
 - Building Assessment of Harbor Entrance Command Post
 - Assessment of Battery Whiting for Possible Public Use
 - Assessment of Battery 213 for Possible Public Use
 - Structural & Environmental Assessment of Spraycliff Cistern
 - Field survey of potential environmental and physical hazards related to Fort Burnside.
- 2. Exploration of New Partnerships**
- Native Plants
 - RI Wild Plants Society
 - Starry Sky Preservation
 - Skyscrapers Astronomical Society of Rhode Island
 - World War II Interpretation
 - Fort Adams Trust
 - World War II Foundation
 - Aquarium
 - Association of Zoos and Aquariums (AZA)
 - Coastal Systems
 - University of Rhode Island Coastal Institute

Visitor Center and Harbor Entrance Command Post Area Enlargement



FIGURE 5.7

5.5 - Design Approach



7 Redefine Shoreline Access (east and west)



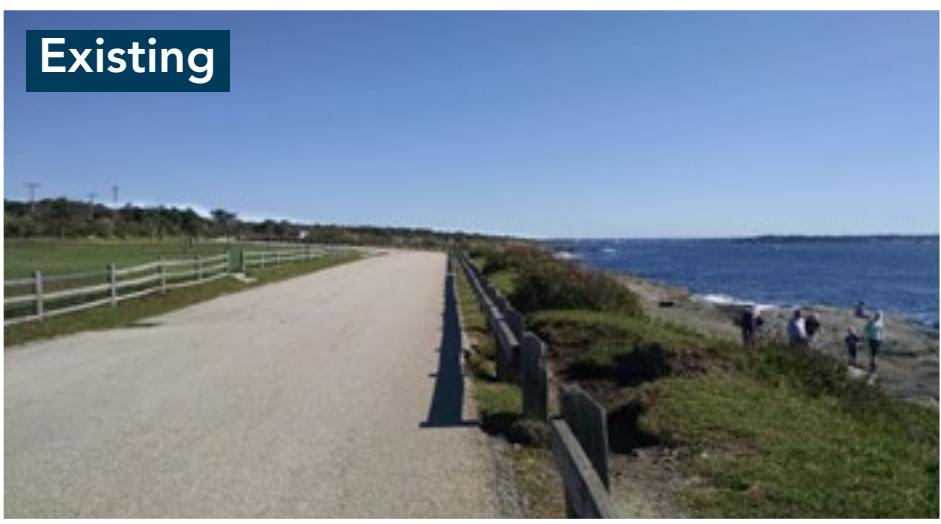
FIGURE 5.8



8 Stabilize Coastal Bank (east and west)



FIGURE 5.9



3 Redefine access to Beavertail Lighthouse



FIGURE 5.10



9 Rehabilitate Battery Whiting

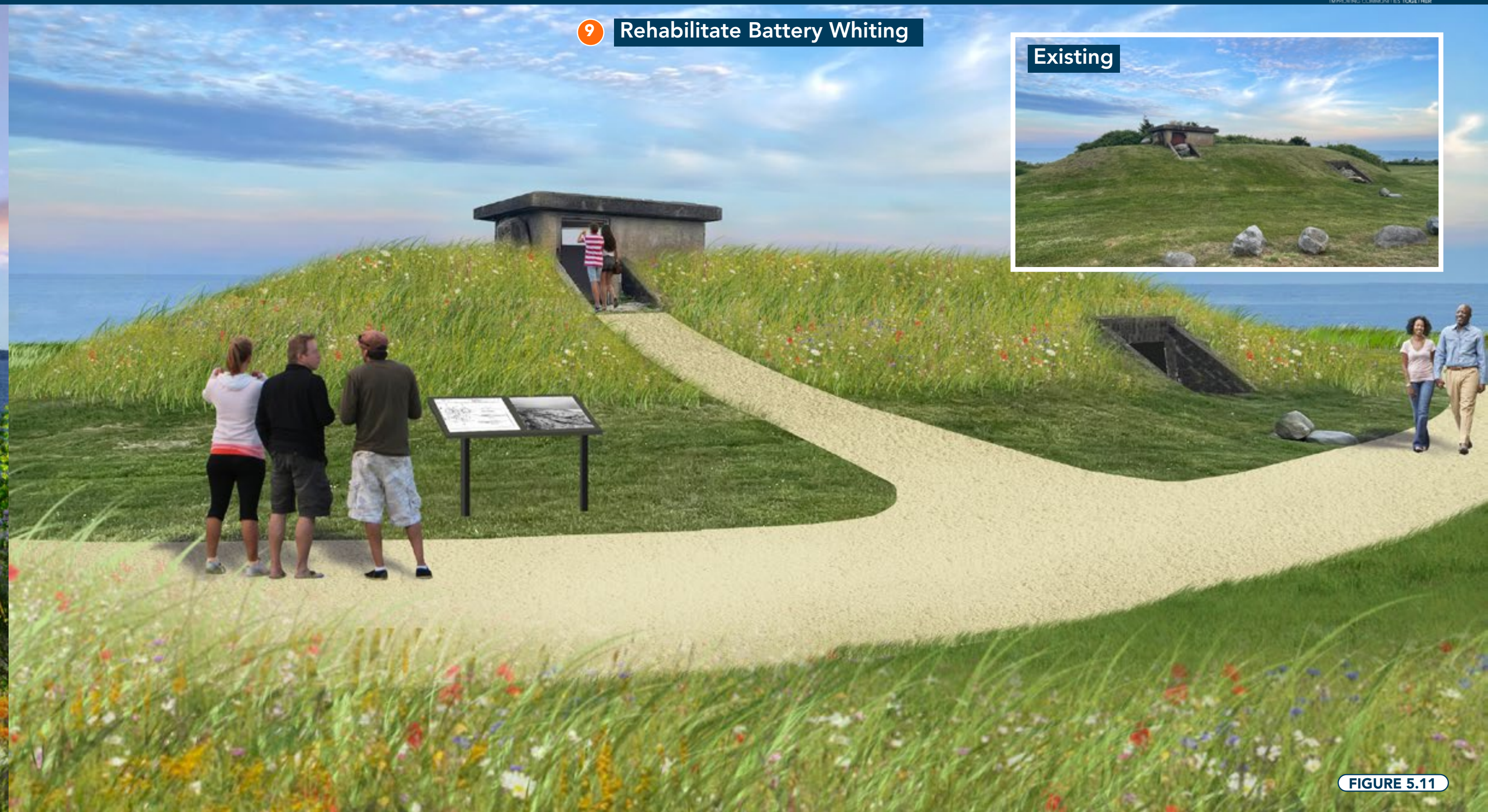


FIGURE 5.11



6 East and West Passage Viewing Stations



FIGURE 5.12

Intertidal Zone Access

Nearly one-hundred points of pedestrian access to the intertidal zone were identified in the inventory phase of the project. Many of these access points are highly eroded due to intensive foot traffic and the subsequent, rapid loss of vegetative coverage. Informal foot paths accelerate erosion and loss of the coastal bank. When paths are located in close proximity to one another, large portions of coastal bank are threatened and large scale erosion of the bank occurs.

Photos and an illustration depicting the typically occurring access pathway conditions is shown in Figure 5.13. These pathways often traverse the coastal bank perpendicular to the contours, with pedestrians walking in a straight line down the slope which creates a channel for stormwater to flow down the bank, carving away vegetation and accelerating erosion. Often secondary paths are developed nearby to provide similar vantage points proximate to the primary path.

Several different approaches are recommended to address shoreline access. It should be noted that visual access to the ocean is a form of public access and that not all areas of the shoreline are appropriate for physical access. The focus is to:

Figure 5.14-A: In areas where access over the coastal bank is determined appropriate and feasible, it is recommended that a serpentine path system with tight switch-backs be established to traverse the bank at the least slope possible. Re-grading slopes, installing boulders or ledge outcroppings to hold the grades and extensive revegetation is required with this approach. Paths should be stabilized aggregate or similar and not less than four feet wide.

Figure 5.14.B In locations with excessively steep slopes, stairs may be an option. Short stair runs terminating on solid ledge and configured with frequent wide landings and with benches are recommended.

Figure 5.14.C In locations where it is determined that physical access to the intertidal zone is not desirable, stairs and overlook platforms at strategic locations may offer interesting vantage points and waterfowl viewing areas at mid-slope without creating physical access to the intertidal zone.

Figure 5.14.D In several specific locations with high visitation, constructing overlook platforms at the top of the slope will provide maximum opportunities for universal access while affording the most desirable views of the ocean that park goers are seeking. In many locations these platforms can be elevated to afford enhanced views with access via short sections of ramps.

Figure 5.14.-E Many excessively steep pathways exist, often resulting in a highly eroded and unstable coastal bank condition. Often these paths are redundant paths, or are dead ends, terminating at a steep, untraversable slope. In some locations it is recommended that pedestrian access be eliminated entirely and the slope stabilized and revegetated. Regrading and stabilizing the slope, extensive revegetation plantings and the installation of fencing at the top of the slope are key components of this approach.

Existing



Illustration of foot path erosion patterns on the coastal bank

FIGURE 5.13



Undermined pavement



Footpath at top of bank



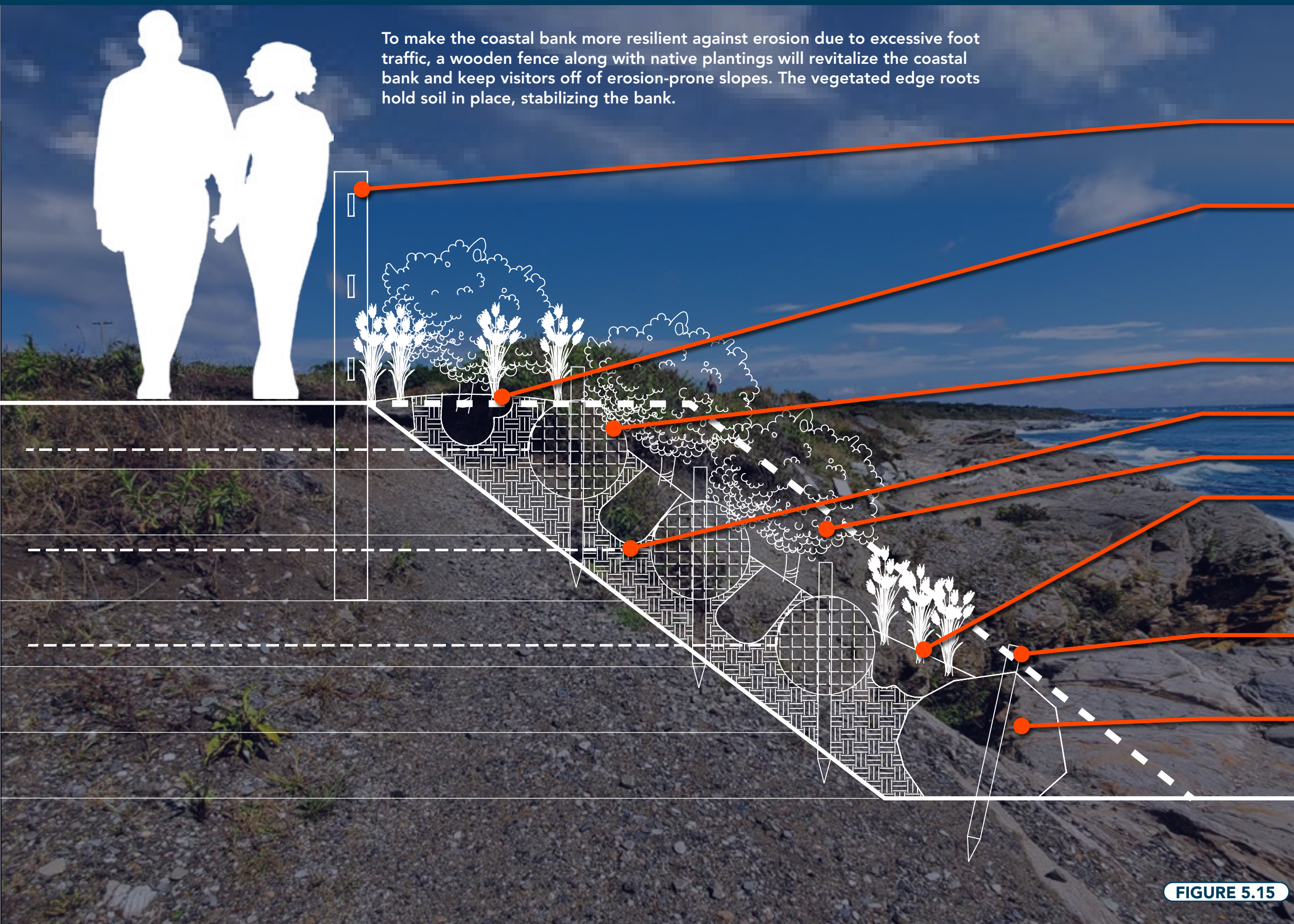
Damaged intertidal zone stair



Stormwater runoff rill in footpath

7 Redefine Shoreline Access (east and west)





8 Stabilize Coastal Bank (east and west)

SPLIT RAIL WOOD FENCE

REGRADE TO ELIMINATE STORMWATER FLOW OVER COASTAL BANK

COIR FILTER LOGS WITH VEGETATED PLUGS (TYP.)

GEOTEXTILE FABRIC

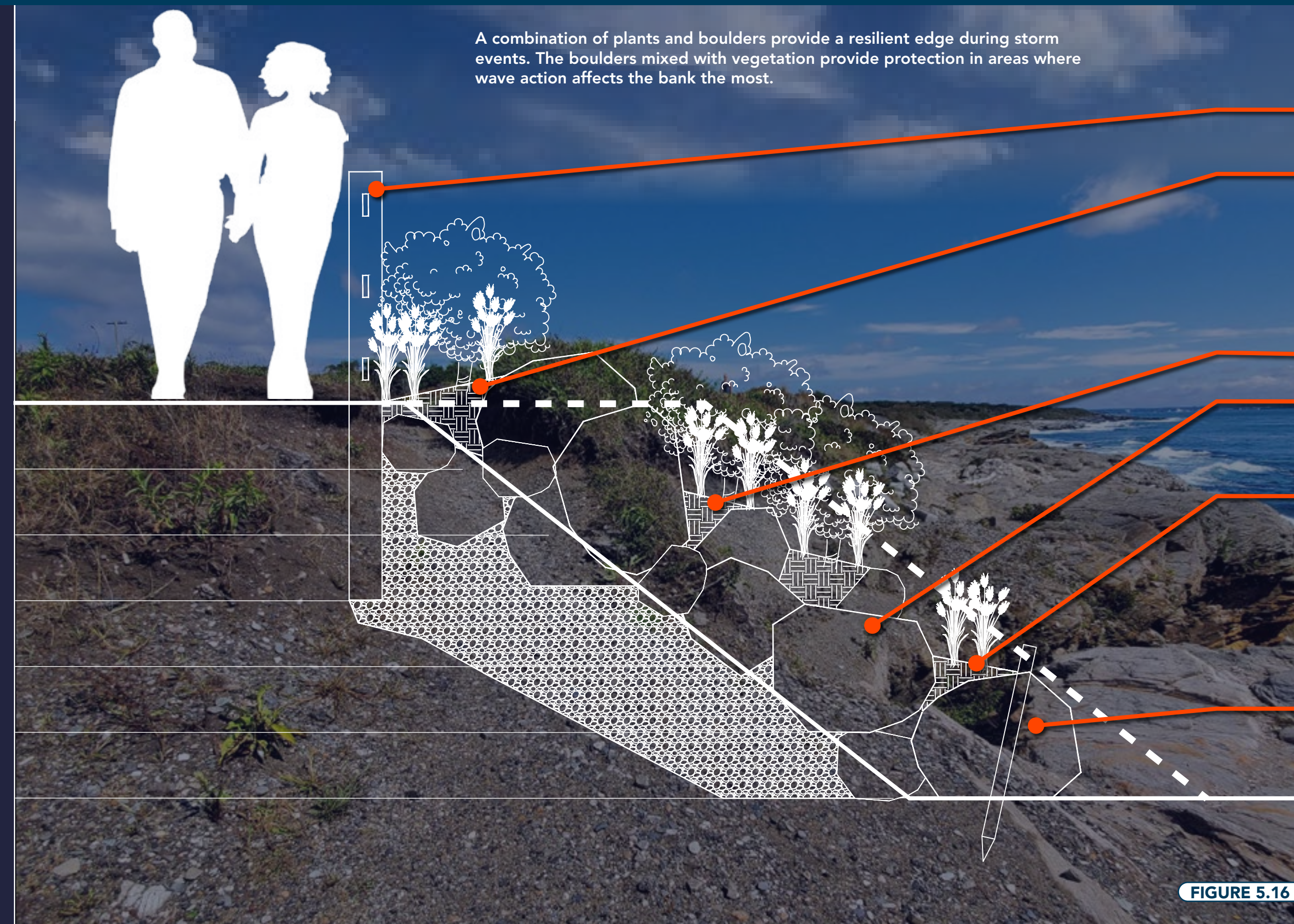
SHRUB PLANTING

NATIVE GRASS PLANTING

PREVIOUS GRADE BEFORE EROSION

BOULDER TOE STABILIZATION SET, DRILL AND PIN TO LEDGE

FIGURE 5.15



8 Stabilize Coastal Bank (east and west)

SPLIT RAIL WOOD FENCE

REGRADE TOP OF SLOPE

NATIVE PLANTINGS IN POCKETS WITHIN BOULDERS

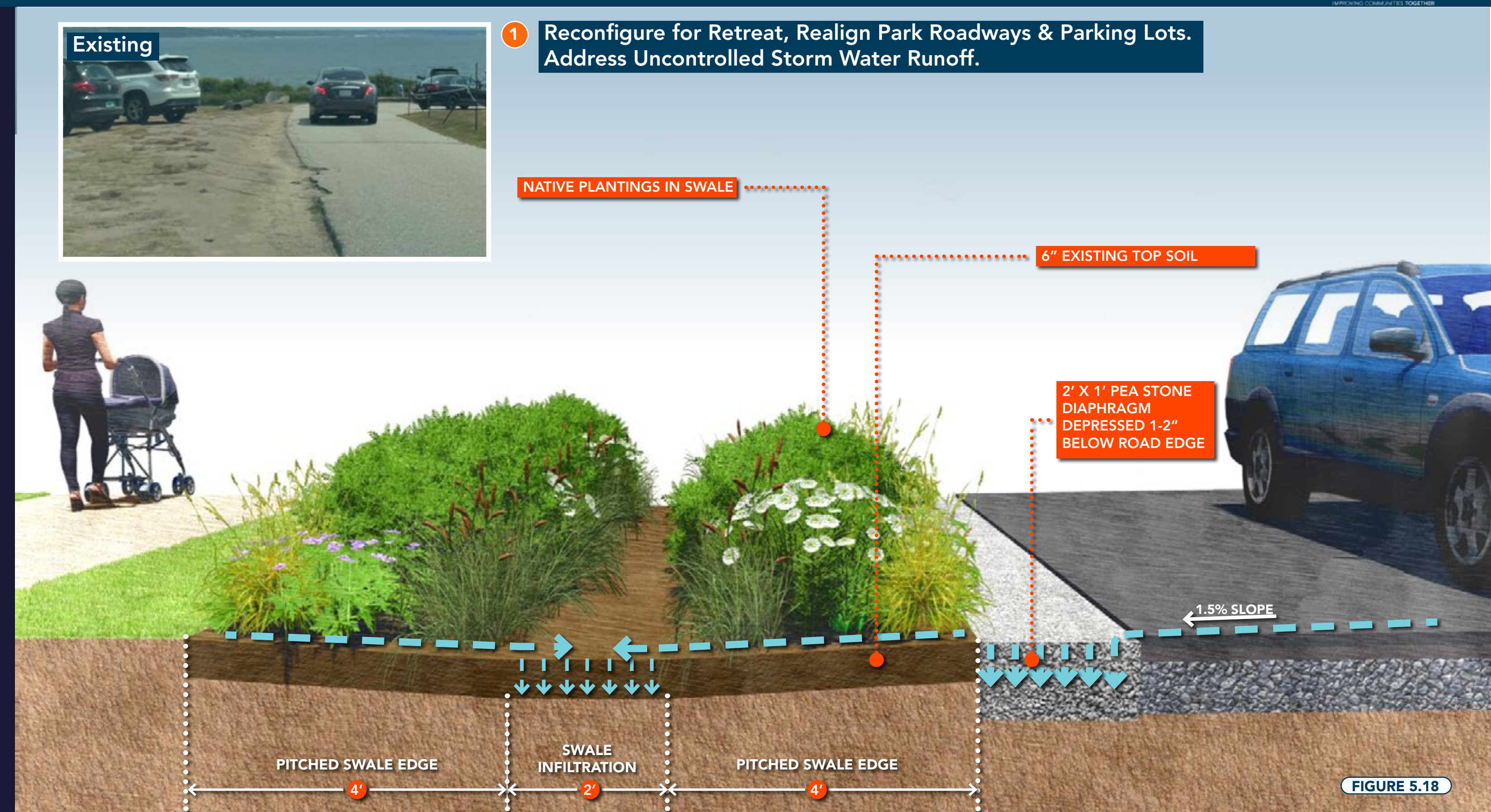
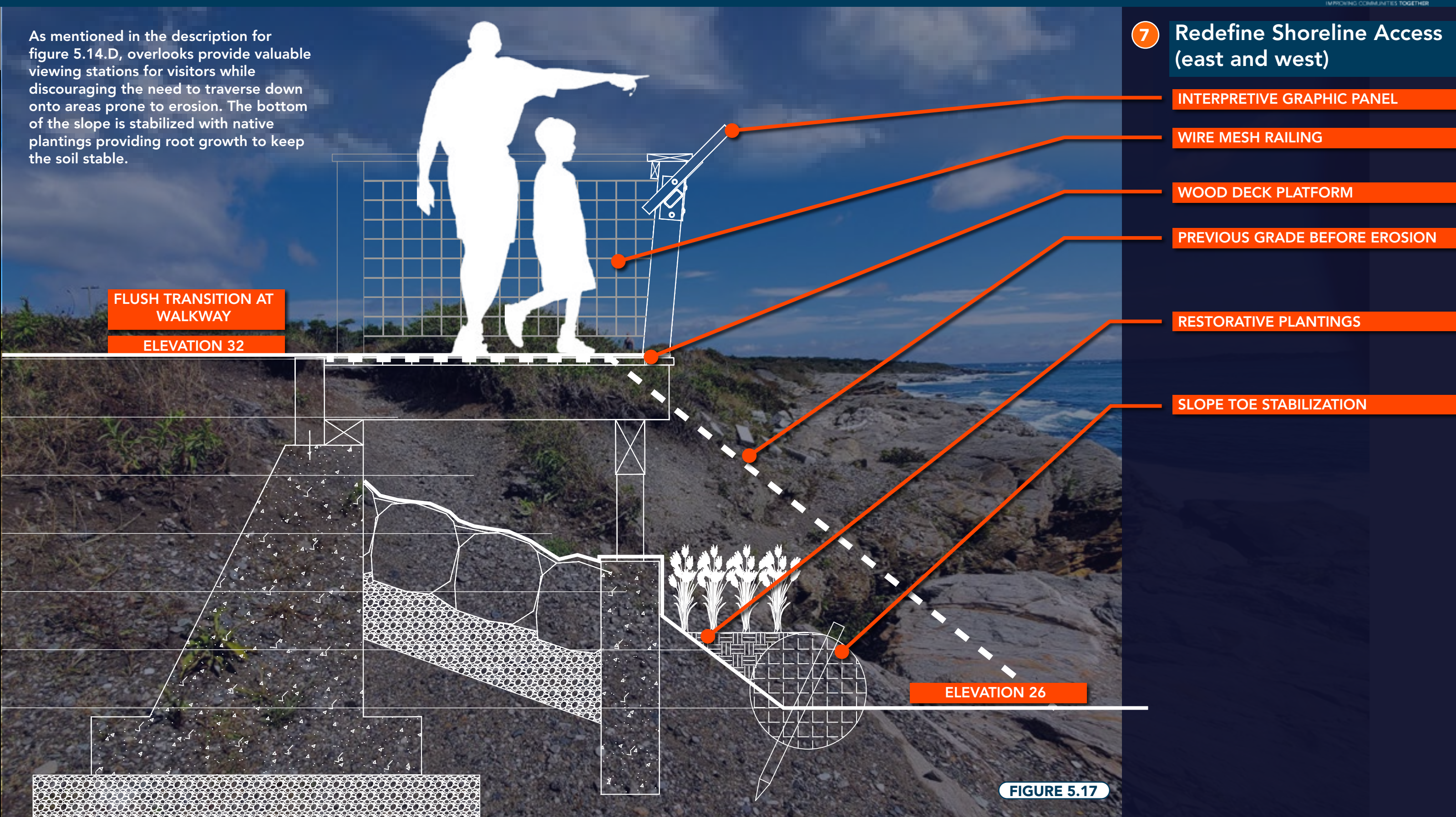
RIP RAP / BOULDERS SET INTO SLOPE

NATIVE SHRUB AND GRASS PLANTING

BOULDER TOE STABILIZATION SET, DRILL AND PIN TO LEDGE

FIGURE 5.16

As mentioned in the description for figure 5.14.D, overlooks provide valuable viewing stations for visitors while discouraging the need to traverse down onto areas prone to erosion. The bottom of the slope is stabilized with native plantings providing root growth to keep the soil stable.



5.6 - Design Approach - Materials



HMA Asphalt & Granite Curb
Hot mix asphalt (HMA) provides a cost-effective durable surface. Installed in lifts of different gradations, HMA is a recommended treatment as the surfacing material for the primary park roadway. The existing park roadways are made of this material.



Chip-Seal Asphalt Pavement
Chip-seal asphalt is a surface treatment applied over a Hot Mix Asphalt Base. This surface is comprised of an oil tack coat overlaid with small diameter crushed stone aggregate. Aggregate size and distribution is critical to provide an ADA-compliant surface. This material was installed at the Light Station in 2022.



Stabilized Aggregate Pathways
Stabilized aggregate pathways are created utilizing a blend of 5/16" minus aggregate stone mixed with a binding agent and overlaid on a crushed stone base. The system porous under favorable sub surface conditions. The surface is ADA accessible.



Brick Walkway
Clay brick is utilized in the existing walkways adjacent to the lighthouse. Work that reconfigures the walkways should utilize the same material to match texture and appearance. Brick walkways should be geometric and uniform in width.



Porous Asphalt Pavement
Porous asphalt is an open graded HMA mix of asphalt batched and installed in a manner that retains open pore space within the mix, allowing stormwater to pass through rather than run off. A deep bed of crushed stone as a 'reservoir course' is required below to store and infiltrate the water.



Exposed Aggregate Concrete
Exposed aggregate concrete is a finish treatment that exposes the crushed stone in un-cured concrete and results in a more formal textured surface appearance. It is an appropriate treatment for areas where pathways transition to buildings or other surfaces and precise grading is required: wheelchair ramps, etc.



Geo-Reinforced Paving System
Geo-technical support systems are suitable for seasonal parking areas. A system of composite materials or precast modular units installed over engineered base material provides integrity to support vehicles. Open 'cells' within the system may be filled with stone or for a green appearance, loam onto which grass is planted.



Wood Decking
Forestry Certified Council (FSC) certified natural wood timber, framing and decking lumber materials should be utilized for boardwalks, overlooks, as well as ramps, stairs and decks necessary to access such structures. Wood should be durable, rot resistant and sustainably managed and sourced.



Overlooks
Overlook platforms will afford visitors opportunity to view wildlife and Narragansett Bay while limiting foot traffic over the coastal bank. Platforms must be configured to be ADA-compliant with appropriate handrails. Open railings maximize views.



Low-Profile Boardwalks
Low-profile boardwalk systems located where foot paths cross wet areas will protect vegetation and wildlife and reduce erosion. Boardwalks may be installed close to the ground on pedestals. Complete systems should have curb rails and handrails, although guardrails may be avoided.



Short-Span Bridges
Bridges are warranted in several locations where trails intersect intermittent streams. The spans required are typically less than 30 feet. In open-highly visible areas architecturally designed bridge structures may be preferred. The bridges should be at least ten feet wide and rated for maintenance and rescue equipment loading.



Split Rail Fence
Rustic split rail wood fences exist presently on the site. Fence systems help define spaces and protect areas from visitor intrusion. Strategically placed fencing will keep visitors from parking outside of designated areas. Cedar or Locust wood rail fencing could be considered.



Split Rail Fence with Wire
Split Rail fences faced with wire mesh will limit passage of people climbing fences or slipping between rails. The addition of a top rail further restricts passage. Set wire mesh to maintain clearance for passage of small mammals is desirable.



Wire Mesh Railing on Boardwalks
Utilizing black or galvanized wire mesh in the design of the railing systems developed for overlooks and boardwalk systems will maximize visibility for users of all sizes and ages.



Pedestrian Bridges
Any bridge should have smooth-no-step transitions from trail surface grade to the bridge. Wood boardwalk approaches to the bridges are an effective way to achieve this. Bridges should not be less than forty-eight inches wide. Railings are necessary where grades exceeds thirty inches.



Benches with Companion Seating
Benches dispersed throughout the Park can be placed along the trails and at destination points. The areas that the benches are in allow space for companion seating for those who utilize wheelchairs. Granite bench shown above.

5.6 - Design Approach - Materials



Coir Log
Coir fiber logs comprised of natural fibers are key component of stabilizing and replanting eroded areas. Staked and layered with live ‘whips’ of native plants, the coir fiber logs help hold the soil as they slowly decompose.



Check Dam
Stone check dams incorporated into high volume swale systems will slow and attenuate stormwater flow. Use of stone slabs or naturally occurring, weathered stone bedded and flanked with smaller round stone is visually preferred to the use of crushed rip-rap in this park setting.



Planted Swale
Shallow rain gardens are appropriate in areas adjacent to walkways, parking areas or the Park roadway. Plant selection enables these water quality treatment areas to also provide valuable habitat.



Rip Rap-Lined Swale
Stone lined swales may be utilized in areas with higher volumes of water. Irregular edges plated with native plants is desirable. Voids in the rip rap may be planted to further visually soften the appearance and attenuate flow.



Vegetated Rip rap
Vegetated stone rip rap is a necessary treatment to address eroded slopes. Voids in the rip rap filled with soil and planted with native grasses and shrubs will allow the formation of a reinforced root mat. The initial courses of the rip rap should be ‘pinned’ to ledge. Covering the rip rap entirely with soil is often preferred.



Grass Swale
Wide, shallow grass swales slow and attenuate stormwater runoff. Swales should be planted with native grasses and graded to accommodate annual mowing operations as necessary to maintain water flow. A mown shoulder transition from pavement areas helps ensure conveyance.



Planted Swale
Vegetated swales slow and attenuate stormwater runoff and improve water quality. Shrub plantings create habitat and regulate pedestrian movement.



Wet Swale
Wet swales may be employed in areas where it is necessary to hold stormwater for a longer period of time with metered release. Swales are planted with emergent grasses and shrubs than can survive in a submersed condition.



Trail Marker
Durable posts made of granite are in use in other state parks. They are highly resistant to vandalism and require little maintenance. Text may be a panel that is then affixed to the post, or the markings may be engraved as shown above.



Interpretive Panels
Interpretive panels expand the visitor experience by enhancing understanding of the natural and man-made surrounds. ADA configured panels consist of high-density graffiti resistant laminate materials with steel or wood frames. Braille and textured elements accommodate vision impaired users.



Safety Resources
Visitor safety may be enhanced through the installation of safety equipment in the Park in areas of high risk. Coiled rope lines and life rings in weatherproof enclosures will afford park goers a means of offering assistance as a ‘first-line’ of response to help people encountered that are in danger.



Small-Scale Wind Energy
The use of small-scale windmills for power generation is appropriate at this site. Appropriate placement of the windmills is important to avoid negative impacts to wild life and the visual landscape, particularly at near the Light Station.



Stone Columns and Walls
Field stone walls exist on the site in several locations. Repairing the walls and in some areas constructing new stone walls to define spaces is recommended. Formalizing the entrance to the Park with stone columns or similar treatment allows for installation of an entrance gate and will create an enhanced sense of arrival.



Wayfinding Signage
Simple, non-obtrusive signage that communicates to park users where they are in regard to location in the Park and other important information is often helpful.



Viewing Stations
Observation platforms may afford opportunity for enhanced viewing stations. Configured for universal accessibility, and placed strategically in limited settings, fixed telescopes allow for observation of maritime activity and wildlife.

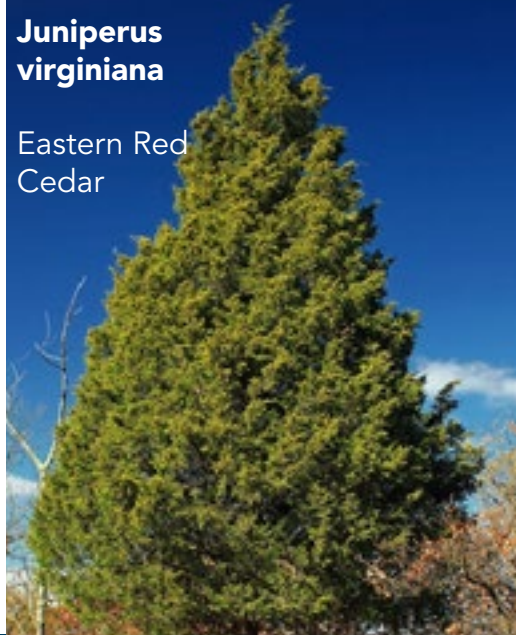


Solar Energy
Any new facility should be equipped with roof mounted solar panels, or as the technology expands, PV shingle systems. Panels should not be mounted on the ground plane.

5.7 - Design Approach - Plant Materials

New landscape planting installed in the park should be comprised of native plant species. Throughout the park grass, perennial and shrub plantings are envisioned along with strategically placed large shrub and tree plantings. New plantings are an integral element in addressing soil erosion issues, redirecting and framing pathways, defining pedestrian access points, and providing restorative vegetative cover on the eroding coastal banks . Improved stormwater management approaches include vegetated swales and shallow basins. New plantings should be an integral part of any new path, roadway and parking lot, providing new habitat and screening visually detracting elements from view.

The diversity of the plant communities found at Beavertail State Park supports a wide range of mammals, insects and birds. Over time, areas of the park have lost vegetative diversity due to the establishment of exotic invasive plants. Unchecked, the spread of exotic invasive plants will diminish habitat and reduce species diversity. It is important that in conjunction with the management of invasive plant species, and the reduction of maintained grass areas, new native plants are installed in appropriate location, selected and arranged to replicate the native plant community associations present. Recommended plants include:



Recommended Trees

Deciduous

Betula populifolia
Gray Birch

Celtis occidentalis
Common Hackberry

Nyssa sylvatica
Tupelo

Prunus serotina
Black Cherry

Quercus alba
White Oak

Sassafras albidum
Sassafras

Evergreen

Ilex opaca
American Holly

Juniperus virginiana
Eastern Red Cedar

Picea glauca
White spruce

Pinus rigida
Pitch Pine

Pinus strobus
White Pine



Recommended Shrubs

Deciduous

Amelanchier canadensis
Shadbush

Clethra alnifolia
Sweet Pepperbush

Ilex verticillata
Winterberry Holly

Hamamelis virginiana
Common Witchhazel

Lindera benzoin
Spice Bush

Myrica pensylvanica
Bayberry

Rosa palustris
Swamp Rose

Vaccinium corymbosum
High Bush Blueberry

Evergreen

Ilex glabra
Inkberry Holly

Juniperus communis
Common Juniper

Kalmia latifolia
Mountain Laurel



Recommended Perennials

Aster novae-angliae
New England Aster

Andropogon gerardii
Big Bluestem

Asclepias syriaca
Common Milkweed

Arctostaphylos uva-ursi
Bearberry

Comptonia peregrina
Sweet Fern

Elymus virginicus
Common Eastern Wild-Rye

Eragrostis spectabilis
Purple Lovegrass

Geranium maculatum
Spotted Cranesbill

Panicum virgatum
Switch Panicgrass

Schizachyrium scoparium
Little Bluestem

Solidago sempervirens
Seaside Goldenrod

5.8 - Conclusion

Beavertail Point features some of the most rugged and scenic coastline found in the Northeast. It is a place where land, water and sky meet dramatically. Understandably it is a place that humans have been drawn to for centuries. This narrow point of land and its fragile edges are home to an array of marine creatures, waterfowl, mammals, insects and bird species. The peninsula is an important migratory stop-over for birds and other pollinator species, with a diverse range of habitats and food sources available in the successional meadows, shrubby edges, and forested areas within the park. The site features significant decommissioned military fortifications and contains the nation’s third oldest lighthouse, Beavertail Light.

Beavertail State Park faces increasing pressures from both natural and man-made forces. High levels of visitation with corresponding increase in vehicles, pedestrians combined with coastal erosion are irreversibly changing the edges of the park. Undefined pedestrian routes to the rocky shore and various scenic locations has led to compacted soils and loss of vegetative cover. Unmanaged stormwater runoff over degraded surfaces further increases the rate of erosion.

This Master Plan outlines a sustainable vision for the future of the park with corresponding recommendations. Keeping Beavertail State Park in a natural state requires action to preserve and protect the resources found here. Carefully planned improvements are essential to address utility needs, manage parking, treat stormwater, and better accommodate pedestrians. With this approach there are opportunities to reduce impervious surfaces and create new habitat for plants and animals. And there are opportunities for enhancement of the visitor experience in regard to safety, universal accessibility, visual and physical access to the ocean and greater interpretation of the existing natural and man-made features present here.





6 Implementation



The Master Plan recommendations outlined in Section 5.0 represent a wide range of improvements envisioned for Beavertail State Park. The nature of these improvements varies from the relatively simple project such as the creation of interpretive signage to the more complex like the relocation of park roadways and parking lots, to very technically complex such as formalizing intertidal zone access and conducting coastal bank stabilization. Given the range and the scale of the Master Pan vision, it is anticipated that park improvements will be phased based on need and funding. Section 6 identifies potential phasing for future improvements based on budgeting and prioritizing information established by RIDEM in 2024.

It is foreseeable that changes in site conditions, park utilization, coastal storm damage or other factors could potentially re-organize phasing priorities. The approach to phasing should remain inherently flexible based on funding and emerging needs over the course of time.

This Section includes the identification of potential near term small scale or pilot projects that may be advanced separately within phases should interim funding become available. Initiating and implementing smaller scale projects that serve to improve access while protecting the coast bank and slowing the rate of coastal erosion are highly desirable with immediate and impactful results.

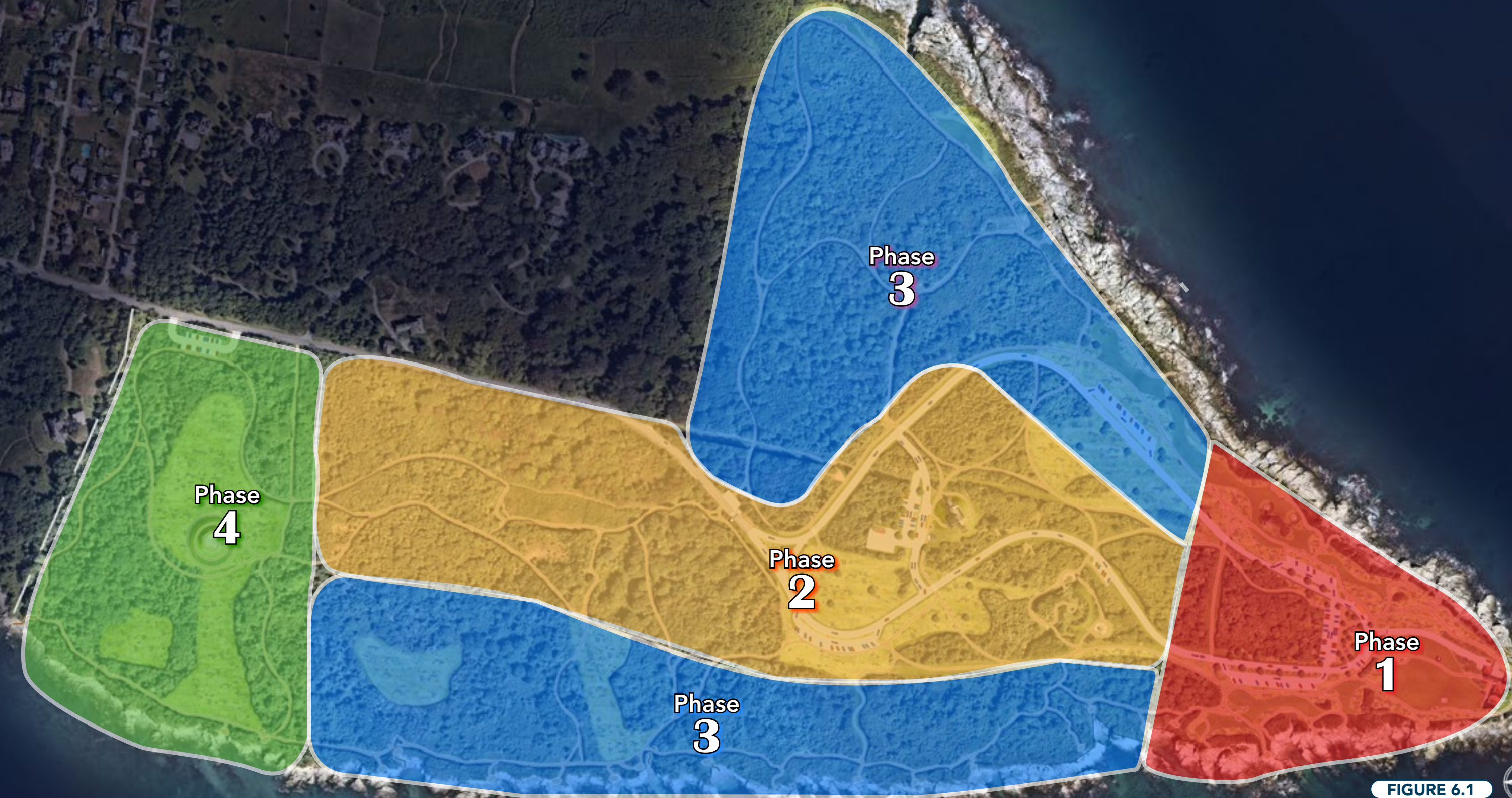


FIGURE 6.1
Aerial imagery provided by Nearmap

6. Implementation



- Phase 1:** Preliminary \$18M - \$30M
- 1,540 linear feet of east-facing coastal bank stabilization/revegetation.
 - East - Improve 5 paths to intertidal zone, introduce 1 overlook and 2 stairs, and revegetate 8 walking paths
 - Reconstruct east drainage system
 - Eastern Beavertail 'Upper Loop' walking path improvements
 - Rehabilitate Battery Whiting for public access
 - Remove existing roadway & construct Lighthouse loop path.
 - Lighthouse Keeper driveway & parking lot
 - North-South accessible walkway to Beavertail Light Station
 - Accessible improvement at existing composing toilets.
 - 400 linear feet of south-facing coastal bank stabilization/revegetation.
 - South - Introduce 2 stairs to intertidal zone and revegetate 6 walking paths
 - 1,300 linear feet of west-facing coastal bank stabilization
 - West - Improve 5 paths to the intertidal zone, introduce 17 overlooks and 5 stairs, and revegetate 23 walkign paths
 - Reconstruct west drainage system
 - Reconstruct Parking Lot 1 (Retreat Location) with LID stormwater quality improvements.
 - Western Beavertail 'Upper-Loop' walking path
 - Re-align southern loop of Park Drive.
 - Visitor/bus drop off area and new ADA-compliant parking spaces.
 - 40 car Visitor parking lot
 - New visitor restrooms at visitor parking lot
 - Habitat creation for Upland Meadows
 - Relocate above-ground utilities to be underground



FIGURE 6.2

Aerial imagery provided by Nearmap

6. Implementation



- Phase 2:** Preliminary \$24M - \$32M
- Renovate HECP, Create Visitors Center Interpretive Site, WWII Museum
 - Visitor parking lot & park drive to access HECP
 - RIDEM Facilities Garage
 - Reconstruct Parking Lot 1 (retreat)
 - Park Entrance Gate
 - New Trails & Trail improvements
 - Woodland Boardwalks
 - Western 'Upper Loop' path
 - Park Entrance Drive (re-aligned)
 - Battery 213 Interpretive Site



FIGURE 6.3

Aerial imagery provided by Nearmap



- Phase 3:** Preliminary \$12M - \$17M
- 2,260 linear feet of east-facing coastal bank stabilization/revegetation.
 - Reconstruct Parking Lot 3 (Retreat Location) with LID stormwater quality improvements
 - Improve four walking paths to intertidal zone
 - Revegetate five walking paths to the intertidal zone
 - Introduce one coastal overlook
 - Park Entrance Drive (Re-align)
 - Eastern 'Upper Loop' path
 - Habitat creation for Upland Meadows



FIGURE 6.4

Aerial imagery provided by Nearmap

- Phase 3 Cont.**
- 3,050 linear feet of west-facing coastal bank stabilization/revegetation.
 - Improve one walking paths to intertidal zone
 - Introduce four stairways to the intertidal zone
 - Introduce 14 coastal overlooks
 - Revegetate 12 walking paths to the intertidal zone
 - New & improved trails
 - Boardwalk
 - Habitat creation for Upland Meadows



FIGURE 6.5

Aerial imagery provided by Nearmap

- Phase 4:** Preliminary \$5M - \$8M
- 1,250 linear feet of west-facing coastal bank stabilization/revegetation.
 - Introduce one stairway to the intertidal zone
 - Revegetate two walking paths to the intertidal zone
 - North visitor parking lot
 - New & improved trails
 - Spraycliff Interpretive Site
 - Habitat creation for Upland Meadows

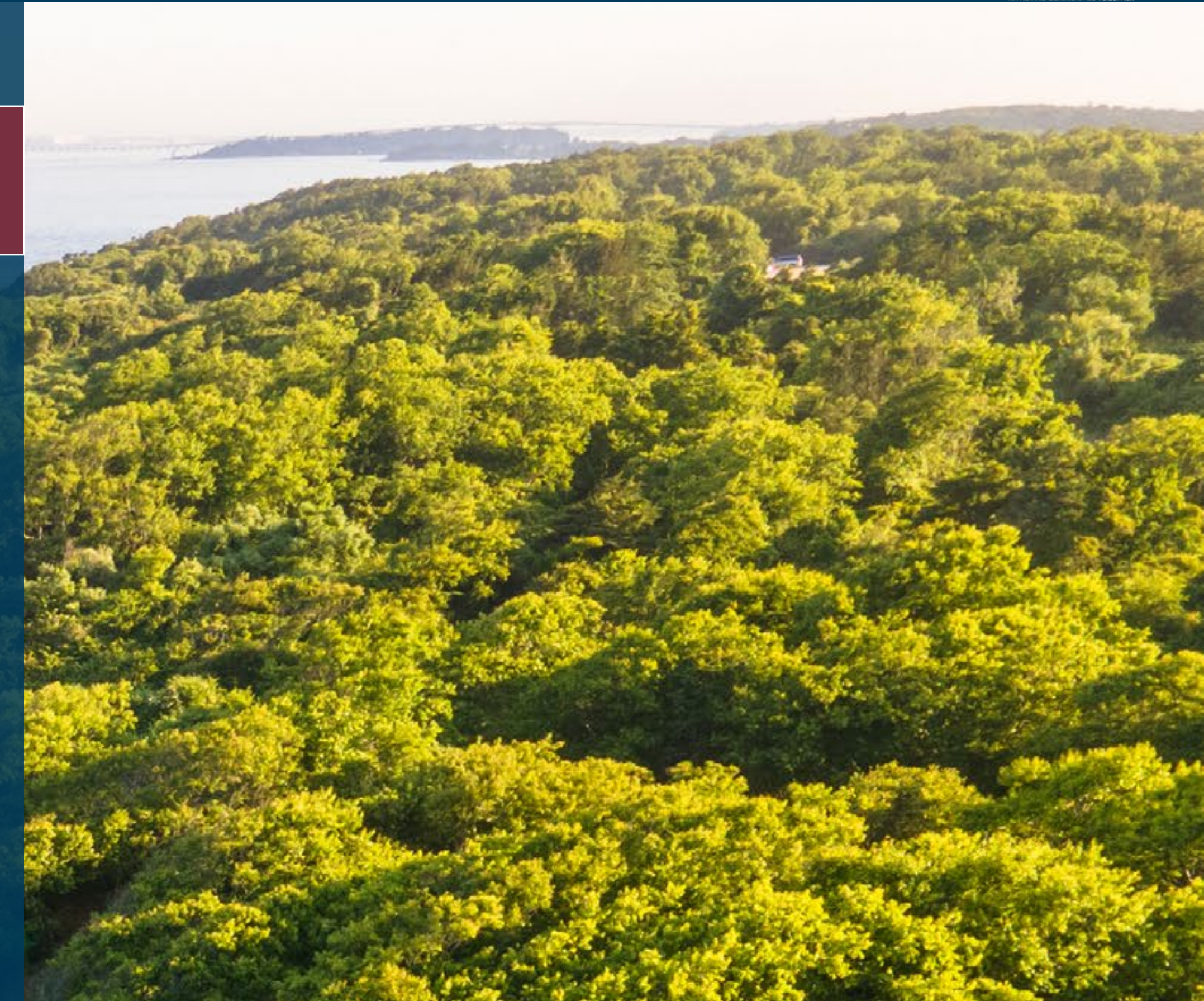


FIGURE 6.6

Aerial imagery provided by Nearmap

7 Reference

- 7.1 - Resources and References
- 7.2 - Appendices Table of Contents



7.1 - Resources and References

Coastal Defense Study Group - <https://cdsg.org>
Jamestown Historical Society – jamestownhistoricalsociety.org
National Fish and Wildlife Foundation - <https://www.nfwf>
National Oceanic and Atmospheric Administration – <https://www.noaa.gov>
National Park Service – <https://nps.gov>
National Recreation and Park Association – <https://www.nrpa.org>
Narragansett Bay Estuary Program – <https://www.nbep.org>
Rhode Island Historical Preservation and Heritage Commission – <https://preservation.ri.gov>
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7.2 - Appendices Table of Contents (under separate cover)

1. Beavertail State Park Property Deeds
2. Beavertail State Park - Park User Survey
3. Beavertail State Park - Visitation Data 2019-2023
4. RIDEM Hunting Map
5. Beavertail State Park Master Plan - 1986
6. Historic Report - Spraycliff - US Navy Radar Research Installation - Research Paper, Va
7. Battery 213 & HECF Construction Historic Photos
8. Battery Whiting Construction - Historic Photos
9. Historic Report - Harbor Entrance Command Post Research Paper, Varoujan Karentz
10. BETA Harbor Entrance Command Post Interior Photos
11. Beavertail State Park Case Studies
12. Beavertail State Park Wildlife Inventory - 2021
13. Beavertail State Park Parking Inventory
14. Beavertail State Park Waterfront Access Point Analysis
15. Public Presentation of the Beavertail State Park Master Plan