ALAMEDA POINT REDESIGN: RESTORATION AND ADAPTATION

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ABSTRACT

This project is a fresh look at a previous design challenge. It assumes the constraints of environmental toxicity, habitat conservation and sea-level rise; then creates op-potunities for passive and freely programmed recreation that meets the needs of the community with the limits imposed by existing environmental constraints.

The ultimate solution is one that honors the community, history and developing ecologies of the site, in a realistic and implementable way.

DEDICATION

To my niece Caroline. Every moment that I experience success, good fortune and recognition, I think of you, hoping that I am being a good role model for you and Kevin Sawyer, inspiring you to work hard to experience your own successes. Remember to always follow your dreams!

To my father. Thank you for always looking out for me. Although you are gone, I still feel your influence with every success and lesson learned.

To my mother. For always keeping your head high and supporting all of my wildest hopes and dreams.

To the rest of my family. Emily, Grampy, Aunt Kim, Uncle Dan, Aunt KK, Aunt Sharon, Grammy, Nancy and everyone. Thank you for all of your support and good wishes. I am so proud to be the first in our family to graduate from the University of California, and hope our children will follow similar paths.

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Thank you Jeff Loux
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PREFACE

The human population is growing exponentially and demands on our resources are heavily-taxing our natural systems. The affect of our growth has been seen for years in our polluted water ways, through the loss of wildlife species and damage to our forests.

Increasingly, the affect of human population growth can be felt. Climate Change is warming our globe, increasing severe storm events and threatening our water supply. Sea level rise is the most significant threat to the Bay Area, potentially damaging billions of dollars in infrastructure and urban developments.

This design for Alameda Point will look through the lense of Global Climate Change, and propose solutions that can be implemented on the island to protect the urban population. The park will transition from its heavily industrialized and polluted state, back towards a naturally functioning ecosystem, which benefits wildlife with habitat and humans with climate adaptation.

Fig 1 Main Gatehouse and Sentry House (Source: Historic Survey).

1.0 URBAN CONTEXT

1.1 SOCIAL CONTEXT

The Alameda Naval Air Station is located on the western tip of Alameda Island, in the San Francisco Bay. Looking west from the former base, there is an unobstructed view of the San Francisco skyline. To the North, enormous shipping cranes dominate over Oakland Inner Harbor, a major site of freight shipping for Northern California. To the east of the base is the City of Alameda, the City of Oakland, and the Berkeley Hills.

Alameda Population

Population in 2010	1,510,271
Population Growth Rate	6.5%
Population in 2075	167,746

General Plan Themes

- Strengthen awareness of its island geography, maintaining the nature of entering and departing from the island as an event, a journey through water.
- Maintain the small town feeling, which developed around a history of commute by rail or ferry.
- Respect the diverse residential, commercial, industrial and institutional architecture that makes Alameda a unique community.
- De-emphasize the automobile through the vigorous support and improvement of transit, ferry service, and the pedestrian environment.
- Develop the Northern Waterfront into a multi-use recreational and industrial development.

General Plan Alameda Point Amendment

In 2003, the City amended their General Plan to include the Alameda Point General Plan Amendment (GPA) to focus their growth at the site of the former base and preserve and protect the habitat of the endangered California Least Tern, which had established a portion of the runways as their nesting grounds. The GPA also allows for the construction of a links-style golf course on the northern portion of the base, but requires that the course develop and maintain naturalistic grasslands to provide foraging for existing raptor species, among other constraints.

REGIONAL CONTEXT

Fig 2 Regional Context

1.2 HISTORIC CONTEXT

The Naval Air Station at Alameda covers a total of 2,842 acres; 1,734 of which are on land and the remaining 1,108 are under water. During its peak it was a major center for naval aviation in the Pacific Region, with facilities including: an airfield, seaplane lagoon, hangars, repair facilities, and residential facilities for military personnel. It was closed n 1992 under the Defense Base Realignment and Closure Commission, during the Clinton administration.

Alameda Origins

The first human occupants of Alameda Island were the Coastal Miwoks. Settlement by Spanish and Mexican populations began after 1776 when Luis Peralta divided his land grant, Rancho San Antonio, among his four sons. The 1849 Gold Rush brought a stream of Northern Europeans and Americans to the island, and it began to develop around its water and rail transportation industry. The city continued to grow through the industrial revolution, and the base itself experienced its largest expansion during World War II.

Naval Air Station Development

NAS Alameda was constructed in the late 1930s and early 1940s after a two-year long dredging and filling operation. In its past, it served as an Army airfield, civilian airport and municipal marina. The Japanese attacks on Pearl Harbor led to a major expansion of the station, turning it into vital asset during the Second World War and the Korean War. It served as a logistical supply base, as well as an aircraft repair facility, seaplane base and homeport for aircraft carriers.

Historic Significance

In 1992, upon its closure, a historical survey was conducted of the site to determine the significance of the remaining structures. The base was determined to qualify as a potential historic district of pre-war and World War II era buildings and landscapes, due to its role in turning the Bay Area into America's "Arsenal of Democracy" during WWII, and due to its characteristics of "Total Base Design" in a Streamline Moderne Style. "Total Base Design" was typical of bases built during this period and is described as a place "where architecture, site planning and landscape architecture are integrated, informing a whole, highly organized design." (Hist Survey). The uses of the base were highly segregated, reflecting the concurrent development of municipal zoning ordinances. There is also a clear influence of the City Beautiful Planning Movement in the landscape aspects of the design of the base.

Fig 3 "Pegasus," Building 4, 2004 (Source: Historic Survey)

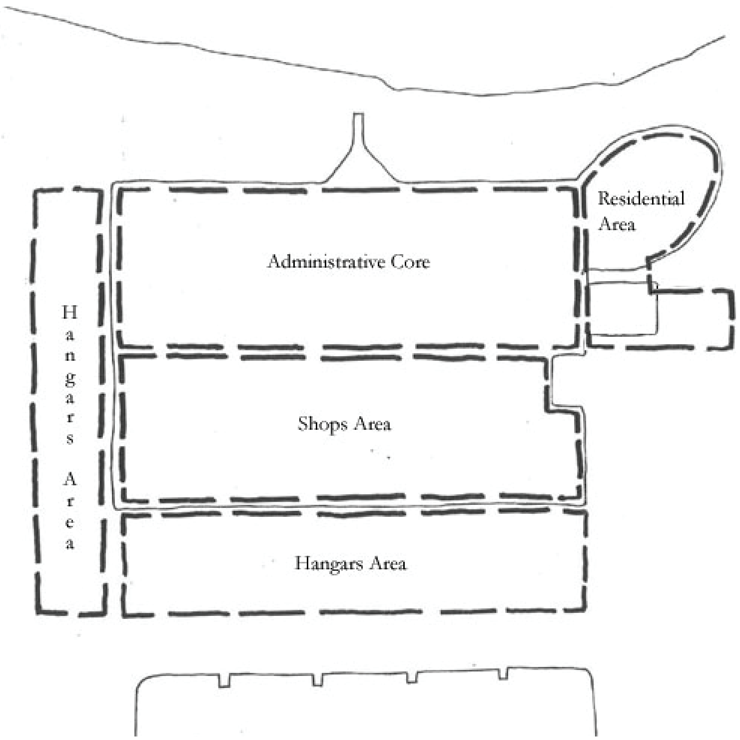


Fig 4 Historic District: (1) Administrative Core, (2) Land plane Hangars Area, (3) Seaplane Hangars Area, (4) Shops Area and (5) Residential Area. (Source: Historic Survey)

Fig 5 View from north of the central Mall at NAS Alameda, 1950. (Source: Historic Survey)

1.3 COMMUNITY DEVELOPMENT

Various plans for redevelopment of the historic district have emerged since the bases closure. The first was the NAS Alameda Community Reuse Plan of 1996, which laid the framework for the community, as well as the golf course and wildlife preserve. In 2006, the Preliminary Development Concept (PDC) suggested a transit-oriented and mixed-use development with minimum densities, which took into consideration the development constraints, found within Alameda's voter approved legislation.

Transit-Oriented District

A more recent proposal suggests two alternatives, each which are denser and provide a greater variety of housing to support a range of incomes and strengthen the ability of transit to meet the needs of the new community. These new Transit-Oriented Development Alternatives propose keeping more of the historic structures for adaptive re-use and ignoring the development restrictions of Alameda to create a denser community, which might make transit more successful.

Constraints

Some of the challenges to the development of Alameda Point include: the realities of the local and global economy; the need for extensive investment and infrastructure; the significant level of environmental cleanup required; the variety of institutional, regulatory and fiscal demands; and site, as well as operational constraints.

TOD Transportation Strategy

The transportation strategy that is proposed in the TOD plan suggests the following;

- Optimization of transit, including the bus, BART and ferry systems
- Develop new transit, such as bus rapid transit (BRT), water taxis and shuttle services
- Build on Alameda's history of transit by promoting intra-island transit and neighborhood centers
- Reduce car dependence through incentives, such as transit passes, car share programs, reduced parking etc
- Encourage partnering of local agencies to enhance integration of transit servies

Alternative #3: Transit Plus

- 4,000 housing units, 1,000 affordable units (25%), and 9,000 jobs
- maximum residential density of 48 units per acre
- increases the number of residential units to increase density
- encourages greater transit use
- decreases traffic
- strengthens community character
- more financially viabile
- maintains a development scale
- and character that is consistent with
- Alameda
- transportation is feasible without significant Federal, State, or outside funding

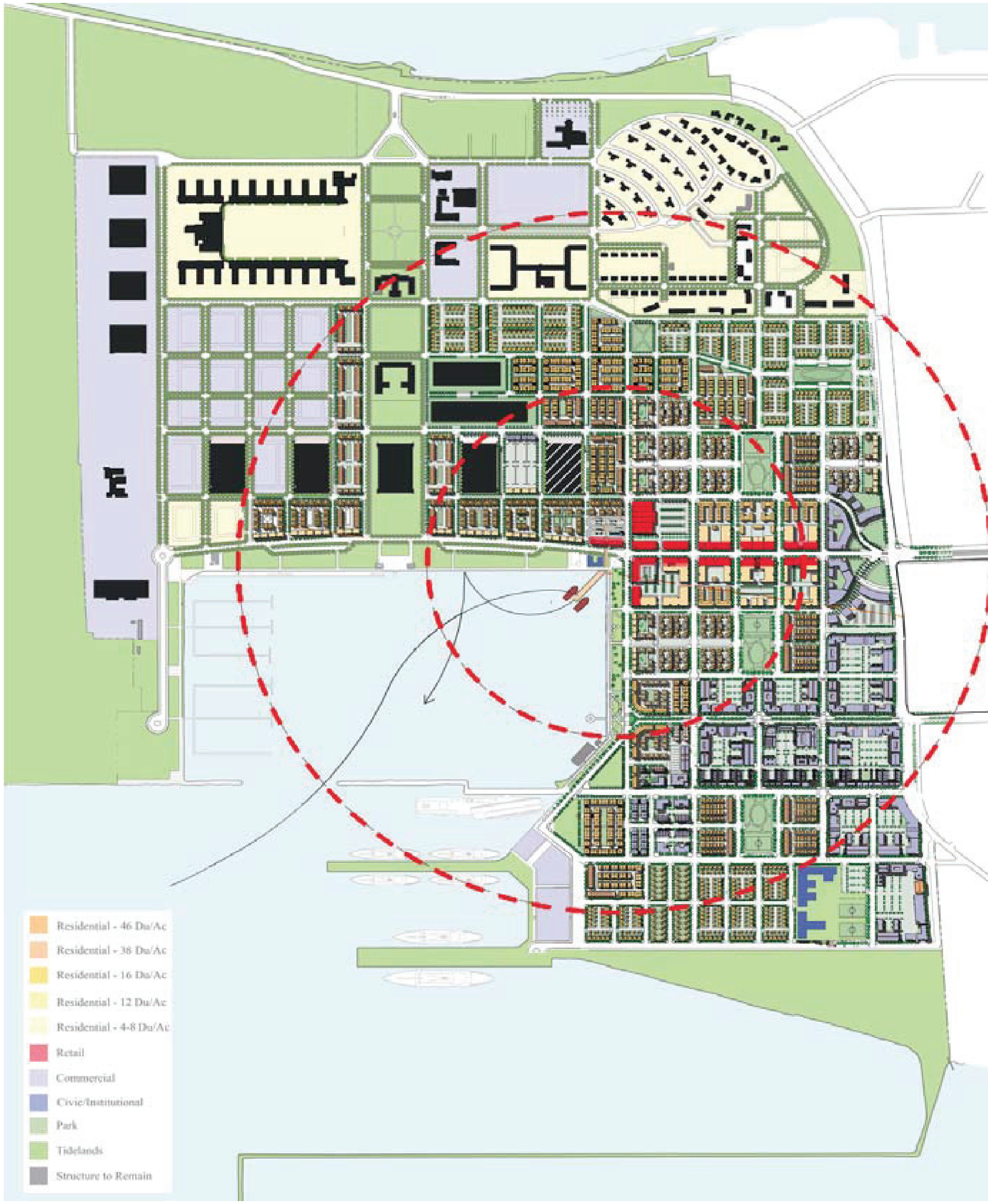


Fig 6 Transit-Oriented District plus model. (Source: TOD Plan)

1.4 PROPOSED RECREATIONAL OPPORTUNITIES

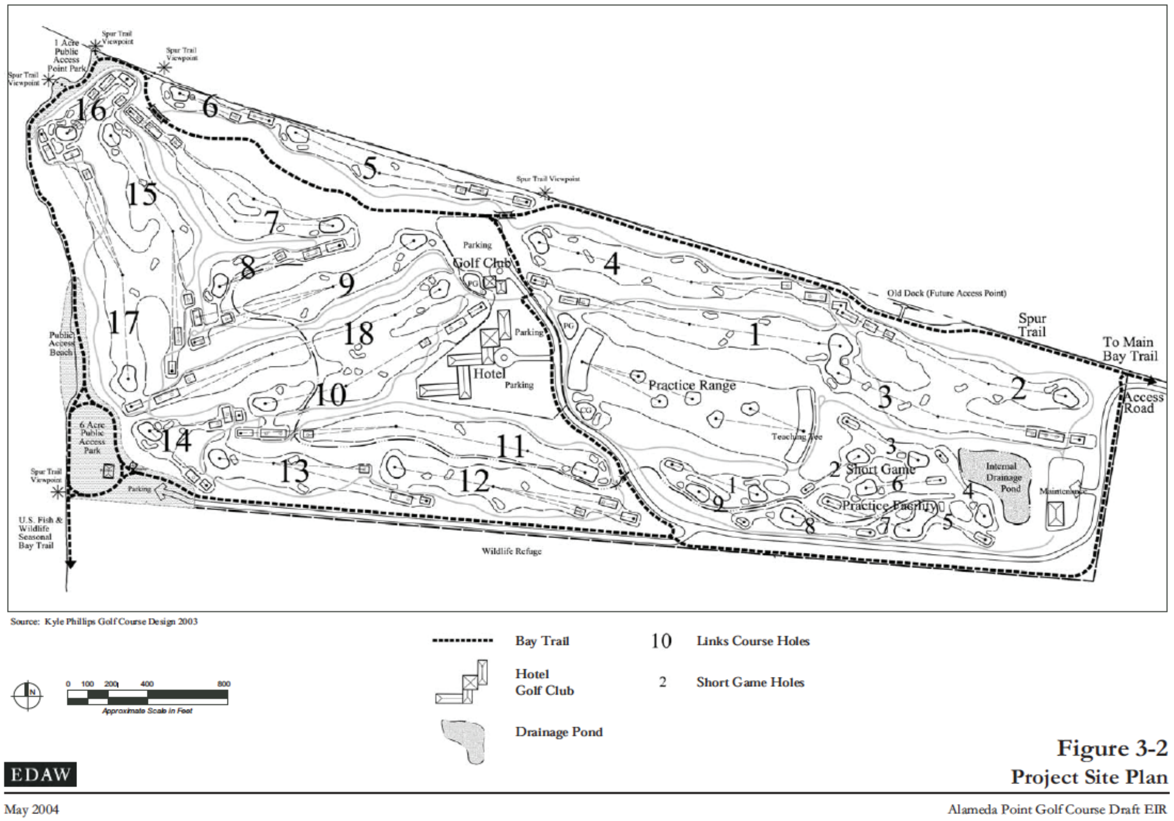


Fig 7 Proposed Golf Course. (Source: Draft EIR)

Proposed Golf Course

The Alameda Point Golf Course Project (Project) includes an 18-hole and 9-hole golf course, a golf clubhouse, hotel/conference facilities, public access trails (Bay Trail), and public parks on approximately 215 acres at Alameda Point (former Naval Air Station [NAS] Alameda).

The Project includes stockpiling of dredged materials via barge to the Project site in order to contour the site. The Draft Environmental Impact Report (DEIR) evaluates the environmental impacts of this project.

Alameda Sports Complex

Plans for a sports complex at Alameda Point include a variety of programmed recreational uses, while making use of the existing guard shack to continue the character of the historic district. Proposed recreational opportunities include plans for sports facilities, including baseball, softball, football, lacrosse, soccer, volleyball and tennis. Other proposed recreational opportunities include a BMX and mountain bike skills-park, trails and picnic areas, a gymnasium, and the suggestion of a swim complex.

Fig 8 Proposed Sports Complex. (Source: General Plan)

Fig 9 Aerial View of Alameda Point. (Source: TOD Plan).

2.0 ENVIRONMENTAL ANALYSIS

2.1 WILD LIFE

USFWS Biological Opinion and

In 1999, a Biological Opinion was prepared by the US Fish and Wildlife Service to guide development at the site while protecting endangered species, especially the California Least Tern and Brown Pelican. Several restrictions were imposed on any future development on Alameda Point, which were adopted in the 2003 General Plan Amendment. Such restrictions include; building size, height, design and location; appropriate uses adjacent to the Wildlife Refuge; predator management strategies; parking restrictions; lighting provisions; landscaping restrictions and stormwater management requirements.

EIR Mitigation Measures

As found in the Alameda Point Golf Course Environmental Impact Report, the most notable mitigation measures are the restriction on the planting of trees or shrubs, the development and maintenance of native grassland habitat, the restriction on night-time lighting, and the predator management plan. These mitigation measures are intended to reduce habitat destruction, nesting disturbance due to human activity and construction, increased predation, increased water pollution, disturbance from lighting or the creation of predator habitat.

Fig 10 California Least Tern

The Least Tern Colony at Alameda was growing, but has stablilized between 300 and 400 breeding pairs in the last 10 years. The Least Tern prefers to nest on flat sandy beaches, laying their eggs in shallow depressions in the ground while relying on the color as camoflauge and the protection of the nesting females in the colony. Most of their habitat has been taken over by development or recreational uses, casting them off to inland mudflat and dredge fill sites, which makes them more susceptible to predation by foxes, raccoons, cats and dogs. The males can often be seen hunting small estuarine fish at Crissy Field to bring food back to the nesting colony at Alameda. Numbers of total nesting pairs have risen since being put on the endangered species list, from 225 in 1970 to 6,561 in 2004, due to the protection of their nesting and feeding grouds

Fig 11 California Brown Pelican

The Brown Pelican (Pelecanus occidentalis) is found throughout the Pacific, Atlantic and Gulf Coasts of the Americas. Once a threatened species, it has been taken off of the list due to its significant recovery. With few natural predators, their largest threat was the effect of human actions on their habitat, including the effects of DDT and overfishing of their food source. On the Pacific Coast, their diet consists primarily of sardines and anchovies. They nest on the ground, in shrubs or at the top of trees, and tend to congregate in large flocks.

Fig 12 Burrowing Owl

The Burrowing Owl is listed as a Bird of Conservation Concern with the US Fish and Wildlife Service. They live in dry, open areas with low vegetation, such as; grasslands, deserts, farmlands, rangelands, golf courses and vacant lots in urban areas. Their food source consists primarily of insects and small rodents, while occasionally eating reptiles and amphibians as well. Their greatest threat is the destruction and degradation of their habitat, caused by land development and ground squirrel control measures. They, like the Least Tern, experience predation from coyotes, birds of prey, feral cats and dogs.

Fig 13 Other species

Other species of bird that may be seen in the proposed bird and wildlife refuge include the Merlin, California Horned Lark and Loggerhead Shrike. Canadian Geese have been seen on site, as well as Egrets. Other animals noted to inhabit the area are the Greater Western Mastiff Bat, the Pacific Western Big-eared Bat and the Winter-run Chinook Salmon.

2.2 SOIL TOXICITY

Soil Toxicity

NAS Alameda was dedicated as a Superfund cleanup site in July 22, 1999.There are stwenty-five locations, throughout the site, which are known to contain environmental contaminants, including PCB's, nuclear waste and industrial waste.

Some of the most contaminated areas include the industrial disposal area to the north-west of the runways, and the west beach landfill, on the south-west corner. Both of these areas are highly vulnerable to sea-level rise; even at the lower end of the projections, presumably allowing the toxins to leach into the Bay's water supply.

Phytoremediation

Agricultural Resource Science plant physiologist Leon V. Kochian is an expert in phytoremediation, a technique which uses plants, specifically metal hyperaccumulators, to extract elements and concentrate them in the roots of the plant. Thlaspi caerulescens is one such plant that thrives in soils with high levels of zinc and cadmium.

Kochian is also having success removing radio-active materials from soils using metal hyperaccumulators. "One species, a pigweed called Amaranthus retroflexus, was up to 40 times more effective than others tested in removing radiocesium from soil. We were able to remove 3 percent of the total amount in just one 3-month growing season," says Kochian. "With two or three yearly crops, the plant could clean up the contaminated site in less than 15 years."

Fig 14 Common Plants for Phytoremediation.

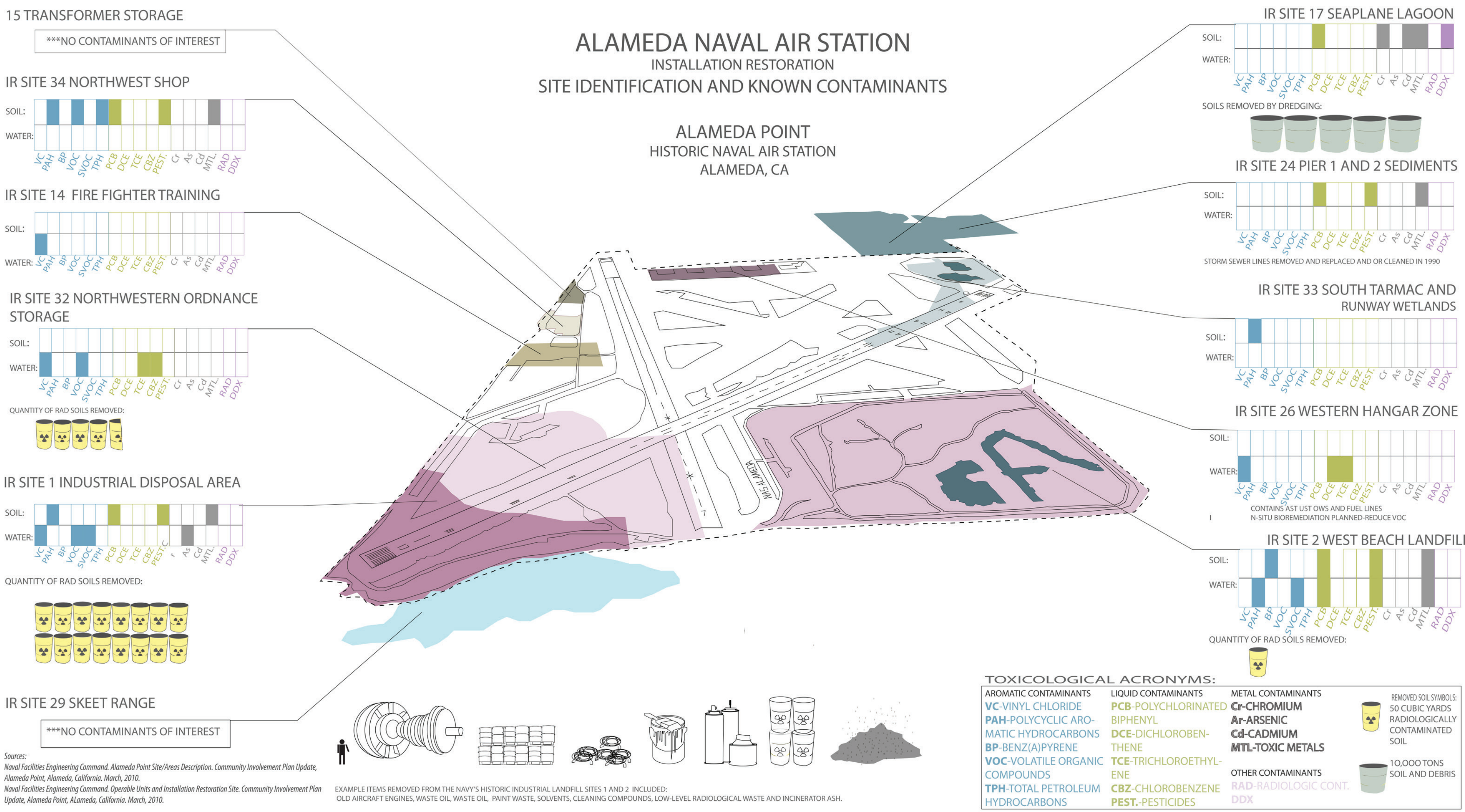


Fig 15 Soil Contamination Diagram. (Source: Thompson)

2.3 CONSTRUCTED WETLANDS

Overview

Constructed wetlands improve the quality of polluted water, including stormwater runoff, domestic wastewater and agricultural waste-water.

Constructed wetlands are being used to control stormwater flows and quality more frequantly, while producing much needed habitat. The system is low-cost, low- energy and requires minimal attention.

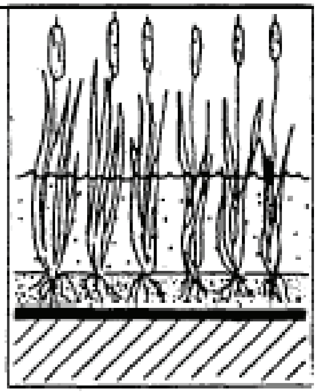
Vegetation

Constructed Wetlands require both vascular plants (the higher plants) and non-vascular plants (algae).Photosynthesis by algae increases the dissolved oxygen content of the water which in turn affects nutrient and metal levels.

Vascular plants stabilize substrates, limit channelized flow, slow water velocities, allowing suspended materials to settle as they take up carbon, nutrients, and trace elements, they transfer gases between the atmosphere and the sediments, provide sites for microbial attachment and create litter when they die and decay.

Constructed wetlands are usually planted with emergent vegetation. Common emergents used in constructed wetlands include bulrushes(too tall and possibly invasive), cattails, reeds, and a number of broad-leaved species.

Fig 16 Wetland Habitat.

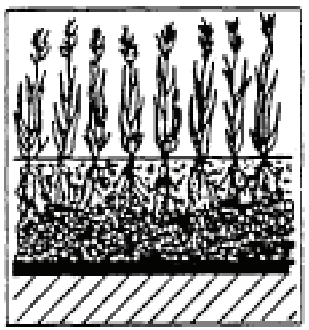


Water level is above the ground surface; vegetation is rooted and emerges above the water surface: waterflow is primarily above ground

WETLAND PLANTS AND WATER

SOIL
LINER
NATIVE SOIL

Surface Flow Wetland



Water level is below ground; water flow is through a sand or gravel bed; roots penetrate to the bottom of the bed

WETLAND PLANTS

SOIL, SAND, AND GRAVEL
LINER
NATIVE SOIL

Subsurface Flow Wetland

Figure 1. Surface flow and subsurface flow constructed wetlands (from Water Pollution Control Federation 1990).

Fig 17 Surface and Subsurface flow wetlands. An Alameda Point wetland ecosystem would see a combintion of both types throughout phasing and implementation. (Source: A Handbook of Constructed Wetlands.)

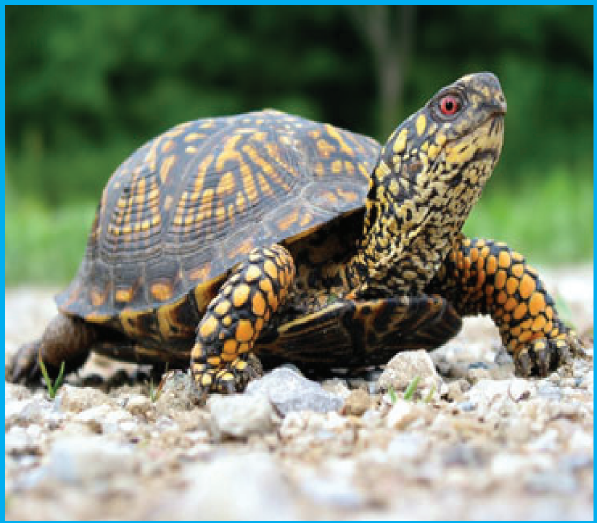
2.4 CONSTRUCTED WETLANDS

Wildlife

Constructed wetlands provide habitat for a rich diversity of invertebrates and vertebrates.

Invertebrate animals, such as insects and worms contribute to the treatment process by fragmenting detritus and consuming organic matter, as well as the larvae of many insects which are aquatic and consume significant amounts of material during their larval stages. Invertebrates also fill a number of ecological roles; for instance, dragonfly nymphs are impor- tant predators of mosquito larvae.

Although invertebrates are the most important animals as far as water quality improvement is concerned, constructed wetlands also attract a variety of amphibians, turtles, birds, and mammals, including; waterfowl and wading birds, including mallards, green-winged teal, wood ducks, moorhens, green and great blue herons, and bitterns. Snipe, red-winged blackbirds, marsh wrens, bank swallows, red- tailed hawks, and Northern harriers feed and/or nest in wetlands. reactions



Hydrology

Wetlands form where landforms direct surface water to shallow basins and where there is a relatively impermeable subsurface layer. These conditions can be created by shaping the land surface to collect surface water and by sealing the basin to retain the water.

Hydrology links all of the functions in a wetland. The key feature of wetland hydrology is a large surface area of water with a shallow depth, which allows the wetland system to interact with the atmosphere through rainfall and evapotranspiration.

The density of vegetation of a wetland affects its hydrology by obstructing flow paths as the water finds its sinuous way through the network of stems, leaves, roots, and rhizomes and by blocking exposure to wind and sun.

Substrates

Substrates used to construct wetlands include soil, sand, gravel, rock, and organic materials such as compost. Sediments and litter then accumulate in the wetland because of the low water velocities and high productivity typical of wetlands.

Substrates support many of the living organisms, permeability affects the movement of water, many chemical and biological transformations take place within the substrates, provide storage for many contaminants, litter increases the amount of organic matter in the wetland. Organic matter provides sites for material exchange and microbial attachment, and is a source of carbon, the energy source that drives some of the important biological reactions in wetlands.

In a saturated substrate, water replaces the atmospheric gases in the pore spaces and microbial metabolism consumes the available oxygen. Since oxygen is consumed more rapidly than it. can be replaced by diffusion from the atmosphere, substrates become anoxic (without oxygen). This reducing environment is important in the removal of pollutants such as nitrogen and metals.

Fig 18 Wetlands.

2.5 LOCAL BIOMES

Summary

The location of Alameda, surrounded by the ocean waters that wash into the bay, and relatively flat topography lends this site to a number of hydrological and beach side habitats, primarily wetlands, sand dunes and grasslands. Before human occupation Alameda was a peninsula, which was predominantly covered with a dense Coast Live Oak Forest. Presently, the site is covered extensively in cement and gravel, but several species of non-native plants have begun to take over, breaking up the concrete and turning the site back into habitat.

Sand Dunes

Sand dunes form as wind and waves push sand particles up-shore, mounding around logs and other debris. Vegetation growth eventually fixes them in place. On the northern California coast they form as a series of parallel ridges that face perpendicular to the winds. Plants such as beach strawberry, silver beachweed and yellow sand verbena cover the surface of the foredune, along with dune grasses. Wild buckwheat, yellow bush lupine and purple flowered beach lupine grow on the back dunes, providing habitat for wildlife and insects, including some very rare butterflys like the Pheres blue butterfly and the Morro blue butterfly. Dune depletion is caused by the development of dams and seawalls, which deplete the supply of sand and disrupt the natural cycle of dune creation.

Fig 19 Coastal Dunes. (Source:ccber.ucsb.edu)

Wetlands

Wetlands result from flooding by tidal waters, rainfall or runoff, and foster rich biodiversity. They are important habitats for many migrating birds, coming along the Pacific Flyway, as well as a safe environment for many juvenile aquatic organisms. They serve as an important link, circulating food and nutrients between fresh water sources and oceans. Wetlands have several key functions, reducing the effect of storms, shoreline erosion and improving water quality through filtration. California wetlands are predominantly estuarine salt marshes, which transition with tidal channels and mudflats. The dominant plant species that occupy wetlands include cattails, sedges and rushes. Over 90 percent of the original wetlands that existed in California around 1850 have been destroyed by human disturbances.

Grass Lands

"Foredune grassland" is an endangered biome found only in the dunes along the coast of the Pacific. They cover the area primarily on the upper beach and first dune along sandy coastlines and beaches. Brackish shorelines with calmer waters in the bay will have plant colonies predominated by the species Leymus mollis and Leymus x vancouverensis, which were the predominant grasses of California's foredunes before the invasion of European beach grass. This habitat is well suited for the stresses of storm waves and high winds, creating a sparsely vegetated habitat and providing much needed nesting grounds for the western snowy plover.

Fig 20 Coastal Grasslands. (Source: www.virtualtourist.com)

2.6 CLIMATE CHANGE

Temperature

Alameda will likely experience increases in the lower range for the state of California, in line with all other coastal cities. Over the next hundred years, the projection for temperature increase for the coast of California is estimated to be around 3.4˚F, with the higher range occurring closer inland over the mountains at around 4.2˚F.

Precipitation

Rainfall is projected to increase to around 51″ annually; in the mid to low range of expected precipitation increase. Projections for precipitation how little change, on average, and do not show much of a consistent trend in some models. Some models show that, while Mediterranean seasonal patterns remain the same, California may experience drier winters, while other models say they will be wetter; these subtle changes, however, can have drastic impacts on our ecosystems and water resources.

Sea level Rise

Much of the land surrounding the runways, the land which is not paved over today, is already in the 100 year flood zone; and nearly all of the land, aside from a small portion where the Least Terns nest, is threatened by even the lower projections of 19″ sea level rise at the 100 year flood zone. At the highest project, of 55″ at the 100 year flood zone, even less of the land on Alameda Point remains, and most of the base would be under water. Furthermore, due to rising seas and increased erosion from more dramatic winter storms, beaches are shrinking.

Fig 21 CalAdapt Regional Sea Level Rise Projection. (Source: Thompson, CalAdapt)

Fig 22 CalAdapt Local Sea Level Rise Projection. (Source: Thompson, Cal-Adapt)

2.7 ADAPTATION POLICY GUIDE: BAY AREA

Vulnerability
The Adaptation Policy Guide suggests that, in the likely event of climate change, the Bay Area should evaluate their preparedness to address the following;

- Temperature increases between 1990 and 2100 of 4˚F and 5˚F in January and increase between 5˚F and 6˚F in July.
- Moderately reduced precipitation levels with a decline in annual rainfall between 4 and 5 inches by 2090.
- High end sea level rise projections suggest an increase of up to 55 inches, threatening an estimated 20-30 percent of the acreage across the bay, with an additional 15 percent acreage vulnerability for coastal communities like Alameda, and will result in coastal inundation and erosion.
- Public health issues, resulting from increased heat and air pollution, include; cardiovascular stress and failure, respiratory illness, heat stroke, heat exhaustion, kidney stones, increased rates of skin cancer and cataracts.
- Reduced agricultural productivity and inland flooding result from changed climate conditions and weather patterns.

Significant Threats
Sea level rise is likely to be the biggest threat to the Bay Area, potentially causing significant affects to development and infrastructure, which is predominantly concentrated along the extensive shorelines. Increased flooding, resulting from the changed climate will affect hydrologic systems by inundating and eroding wetlands and transitional habitats. Biodiversity will be affected as a result of the loss of habitat and decreased water quality. The alteration of inland freshwater flows will increase salinity and alter intertidal and subtidal habitats. Tidal marsh habitat will be lost, as a result of the highly developed coastline that would force the habitat upstream while flooding and erosion would counter-act such a migration.

Decreases in the amount of precipitation and increases in temperature could threaten the Bay Area's water supply by reducing the Sierra Snowpack, which is the source for most of the reservoirs and aqueducts that supply nearly 70 percent of the regions water.

Fig 23 Flood and extreme storm events are likely to increase. (Source: www. democraticunderground.com).

Policy Recommendations

Policy recommendations to deal with sea level rise will require the collaboration of many regional and local political entities. Actions suggested by the San Francisco Planning + Urban Research Association suggest the following actions;

- Manage tidal flows in and out of the bay by forming tidal barriers.
- Utilize levees and seawalls to armor coastal development and maintain the existing coastline.
- Raise the height of developments along the coast, elevating the land or existing developments.
- Create floating and floodable developments to decrease vulnerability to changes in tides.
- Encourage "living shorelines" by creating wetland habitat along that absorb floods, slow erosion and create habitat for wildlife and aquatic organisms.
- Remove existing settlement from areas with encroaching shoreline to accommodate change in water levels and restrict development in threatened areas.

Alameda Specific Measures

The APG also suggests that Alameda, specifically, will see an increase in superfund sites, hazardous waste generators and other potential pollution sources that are managed by the Environmental Protection Agency to accommodate the potential for inundation of such sites to release pollutants into surrounding hydrologic systems.

Alameda's low and flat elevation increases its vulnerability to sea level rise compared to other cities, and suggests a logical transition towards aquatic habitats on the low-lying runway portion of the base, which could help buffer the developed areas to the east. Also, levees and seawalls should be utilized to buffer existing and future development.

Fig 24 Seawall. (Source: www. spacemika.com).

Fig 25 Administrative core. (Source: Historic Survey)

3.1 SPONGE PARK

Gowanus Canal in King's County, Brooklyn NY, part of NY Harbor Estuary 1881 commercial shipping chanel created by excavating Gowanus Creek under severe environmental stress due to numerous chemical resleases and spills over its 100 year lifespan of industrial use and destination for sewage, as well as stormwater.

Sponge Park is an opens space system that remediates surface water runoff while also adding accessible urban open space to underserved neighborhoods dlandstudio llc created SPONGE PARK slows, retains and filters stormwater within the cultural context of important historic sites applicable to mature cities with ageing infrastructure, as well as areas where industrial development has left behind inhospitable toxic landscapes.

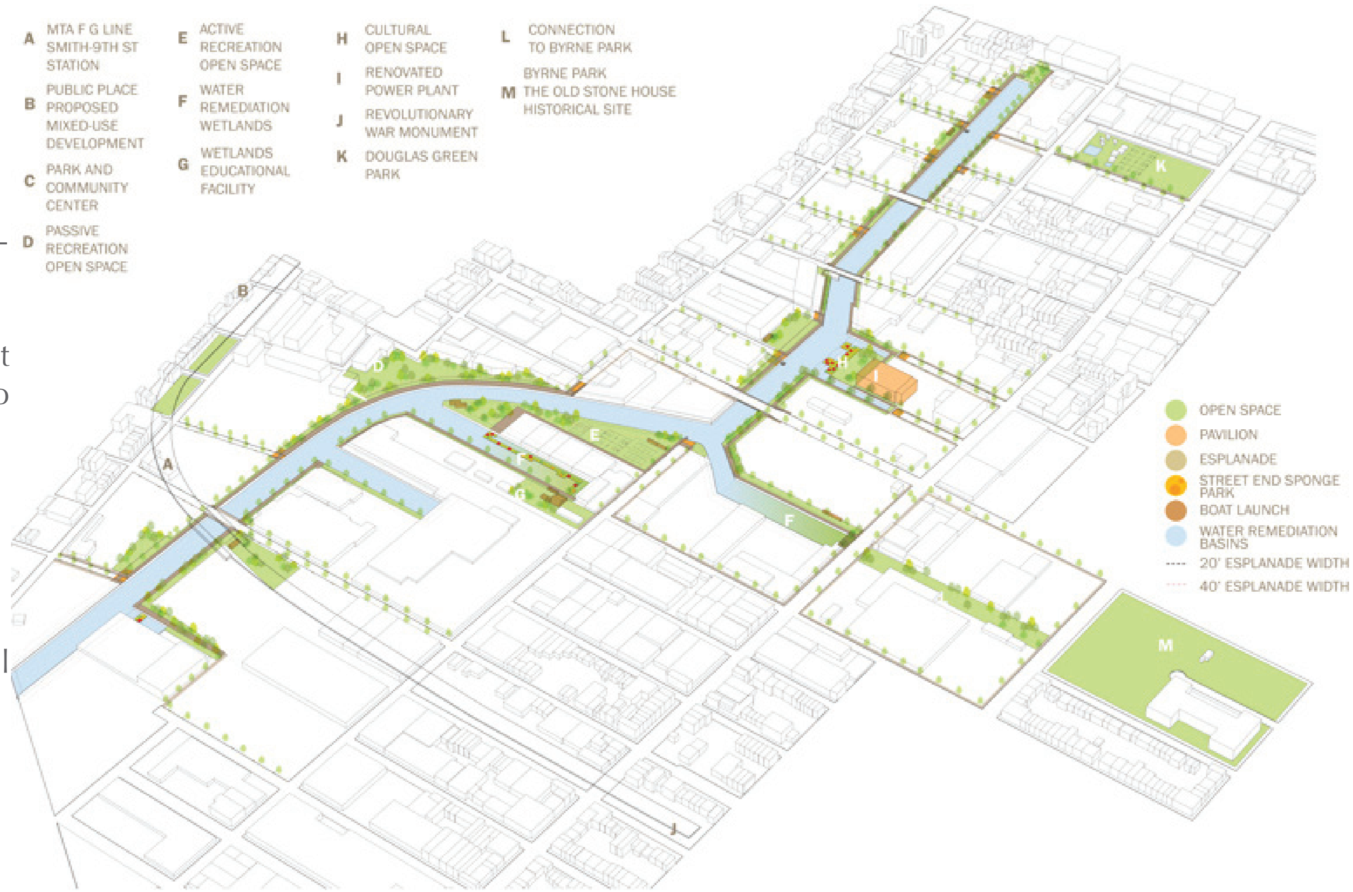


Fig 26 Sponge Park Plan. (Source: http://spongepark.org/).

3.2 PALISADE BAY

Fig 27 Palisade Bay Plan. (Source: http://www.palisadebay.org/).

Palisade Bay is a conceptual plan to reduce the effect of sea level rise on the New York-New Jersery Upper Bay. While mitigating storms and water pollution, the plan creates additional recreational, agricltural, ecological and urban opportunities.

The Plan was the result of a collaborative effort between a team of architects, landscape architects and engineers, who imagined the nexus of infrastructure and ecology with their concept of "soft architecture." In addition to turning existing infrastructure into wetland and riparian habitats, they propose the creation of many small islands, as well as reefs out of old subway cars to increse habitat.

Alameda could utilize similar 'soft infrastructural' techniques to counteract its threat of sea-level rise, while providing habitat and recreation.

3.3 CASE STUDY: LANDSCAFTS PARK

Located in Duisburg Nord, Germany, this park is a conceptual experiment on how to understand and live with the industrial past. A former coal and steel production plant, the soil was cleansed through phytoremediation, and many of the old structures are re-used.

Fig 28 Landscafts Park

Fig 29 Climbing Wall

3.4 CASE STUDY: COSUMNES RIVER PRESERVE

Fig 30 Sandhill Cranes

Fig 31 Boardwalk at Cosumnes

Located 20 miles south of Sacramento, Califrnia, the Cosumnes River Preserve was once home to the largest oak tree savanna, as well a large expanse of riparian oak forest and wetland habitat.

Many species of oak can be found on the preserve, as well as several species that are indemic to California. One of the notable events at the preserve is the fall migration of the sandhill crane. More than 250 species of bird have been seen here, as well as more than 40 fish and over 230 plant species.

Recreation opportunities are minimally impactful on the protected habitat, and include things like; wildlife-viewing, paddling,nature workshops, photography, hiking, nature study and limited fishing.

3.5 CASE STUDY: CRISSY FIELD

Crissy Field is another former airfield base, located near the Golden Gate Bridge in San Francisco's historic Presidio Area. The site was also heavily affected by the military's dumping of hazardous materials, and required clean-up before being turned into a large urban park.

Historically it was a salt marsh and estuary. Most of the land was filled in to create the airfields, similarly to Alameda. The final design was created by Hargreaves Associaters, who preserved much of the military history of the site.

Restored marsh and dune habitat contribute largely to the San Francisco Bay ecosystem, while providing ample recreational opportunties for communtity members.

Fig 32View along path of the Golden Gate Bridge. (Source: www. miriamgrebeimages.com).

Fig 33 Adaptive re-use and the old air field. (Source: www. ranacreekdesign.com).

3.6 CASE STUDY: HUNTER'S POINT

Hunter's Point was the first dry dock on the Pacific Coast, with origins going back to 1869. In 1940 it was converted to a Naval Ship Yard, and then a submarine servicing center during World War II. From 1941 it continued to operate as a shipyard.

Hunter's Point is similar in scale to Alameda, around 939 acres. The shipyard was closed in 1991 after numerous pollutants, including PCB's, solvents and pesticides, were confirmed at the site. Since then, several efforts have been made to clean up this superfund site.

The site was divided into parcels for the cleanup process. So far, plans for the total clean-up and reuse of the site exist for one parcel, and include the construction of wetland habitat.

Fig 34 Aerial View of Hunters Point. (Source: www.sfheritage.org).

Fig 35 View towards north west end. (Source: Thompson)

4.0 SITE DESIGN

4.1 ALAMEDA POINT RE-DESIGN: RESTORATION AND ADAPTATION MASTER PLAN

Urban Use and Climate Change

The Naval Air Station at Alameda is located in the San Francisco Bay, to the west of Oakland and south of the Bay Bridge. Alameda Point is the 800 plus acre parcel of land, adjacent to the base, where the historic runways are located. The site is entirely fill, constructed both as a result of demands on Alameda as a center for transportation and industry, as well as the need for a major Naval-Air port in the Pacific during World War II. With the advent of Climate Change, the low elevation of the base puts it at particular risk for inundation with sea-level rise. Alameda Point will utilize Adaptation strategies to armour useable space, while also constructing wetlands to buffer the effects of sea-level rise for the rest of the island.

Contamination

The long history of industrial activity has left parts of the site heavily polluted with nuclear waste, PCB's and other contaminants. Presently, it sits vacant; unaccessbile and unusable for Alameda Island residents.The base presents a unique opportunity to return a portion of Alameda's heavily industrialized and polluted lands back into a natural, functioning ecosystem while also seeking a solution to Alameda's climate change concerns.

SITE FEATURES:

- Protective Levee and Sea Wall
- Constructed Wetlands
- Least Tern Habitat
- Military Themed Obstacle Course
- Campgroud
- Recreational Beach
- Preserved Military Structures
- Sculptural Planters on Runway
- Native Meadow
- Running Trails
- Educational Walkway
- Picnic Lawn

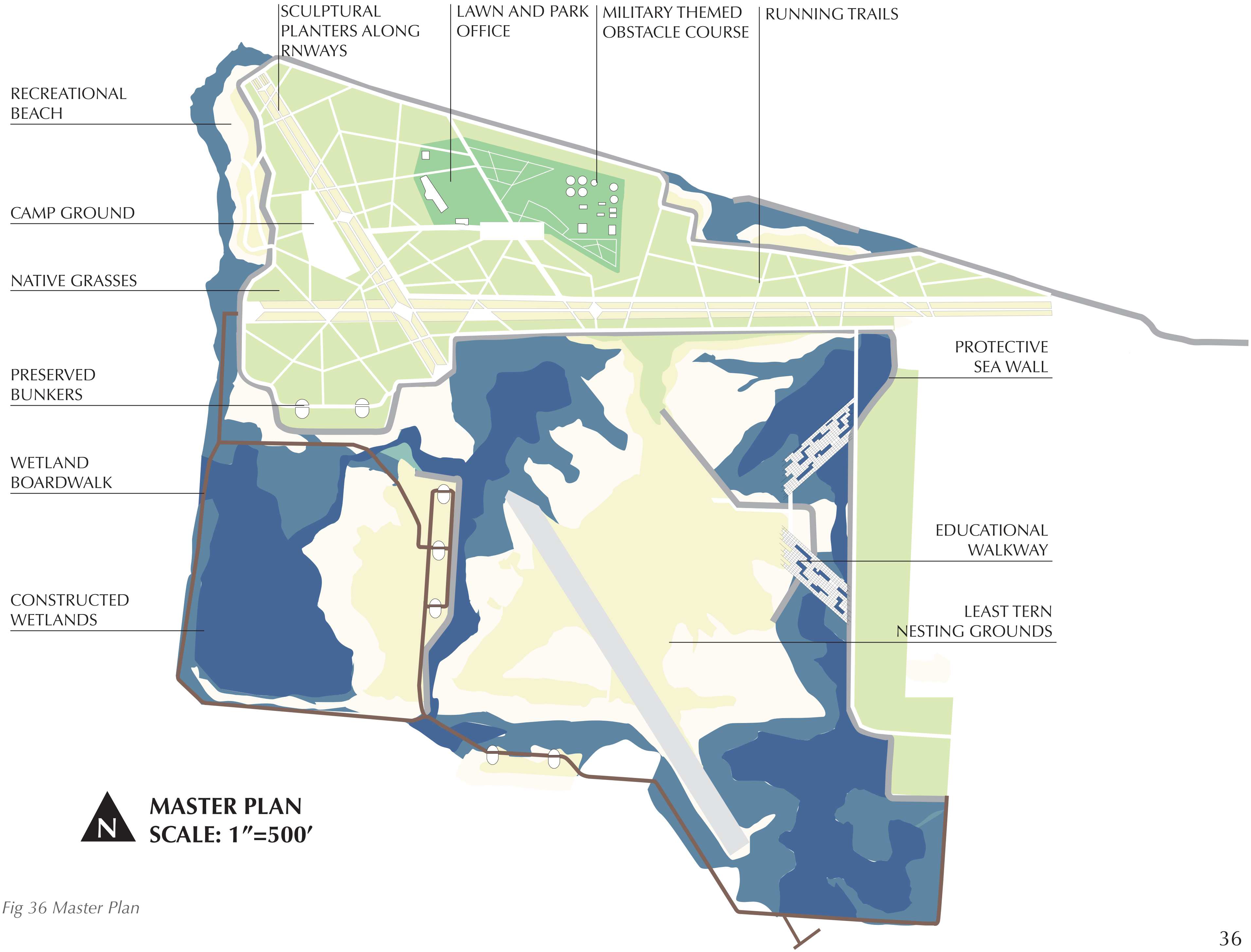


Fig 36 Master Plan

4.2 LAND FORM

Landform
Past, Present, Future

The Island that we know as Alameda today, began as a peninsula, attached to the main land at its southern end. As the island developed, its land form came to reflect the shipping and transportation industries of Alameda.

By 1938, rail and frieght shipping dramatically changed the form of the land. The shallow waters of the Oakland Estuary were filled to extend the rail line out into the bay. A dredgeing operation cleared way for ships to pass through along the south.

With the advent of World War II in 1940, another expanision operation filled in the remaining south west portion of the island to allow for the construction of two runways.

Fig 37 Urban Development

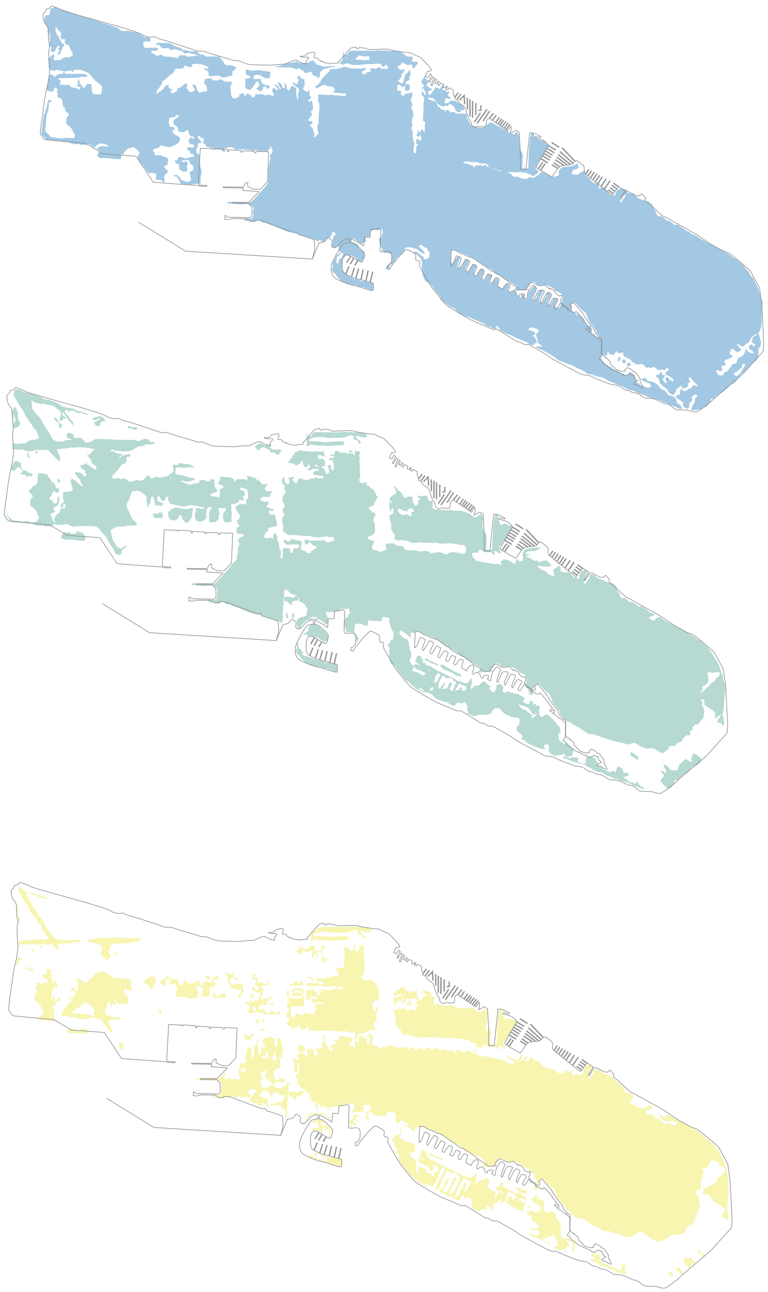


Fig 38 Sea Level Rise

Sea Level Rise

The low topography of Alameda makes it highly vulnerable to sea level rise, which is a likely result of Climate Change. Such an occurance would again alter the land form, reducing its area as water encroaches on urban development. Cal Adapt predicts three scenarios based off low, medium and high projections, for what the island may look like within the next century.

4.3 SECTION ELEVATIONS

Armoring Against Climate Change

The Adaptation Policy Guide recommends several structural solutions to mitigate for sea level rise.

One of the recommndations is for “coastal armoring with linear protection, such as levees and seawalls to fix the soreline in its current place.”

This “linear protection” couples with their concept of “living shorelines” throughout the site, to absorb potential floods while slowing erosion and creating a barrier to protect existing development.

Section A

This section describes the the Port of Oakland on the left, the top of the runway in the center, and the Bay to the right, and how their linear relationship is changed by the addition of a protective sea wall.

Also included is a series of planters which run down the course of the runway, emphasizing its length with one main central axis, and creating a series of interjecting views and vistas as walking paths cut through the planters.

Section B

This section describes a scenario where a levee is combined with a sea wall, to fortify the Hangars and other existing development against extreme storm conditions.

To the left of the levee is the educational area, which discusses climate change and demonstrates the functions of wetlands. The educational walk leads up to a Least Tern viewing area.

Section C

This section describes the transitional habitat and relationship between the land that is retained by the sea wall and the boardwalk that leads visitors through the wetlands.

Also shown is the old military bunker, which is restored and incorporated into the pedestrian pathways, so as to become an event.

Section A

Section B

Section C

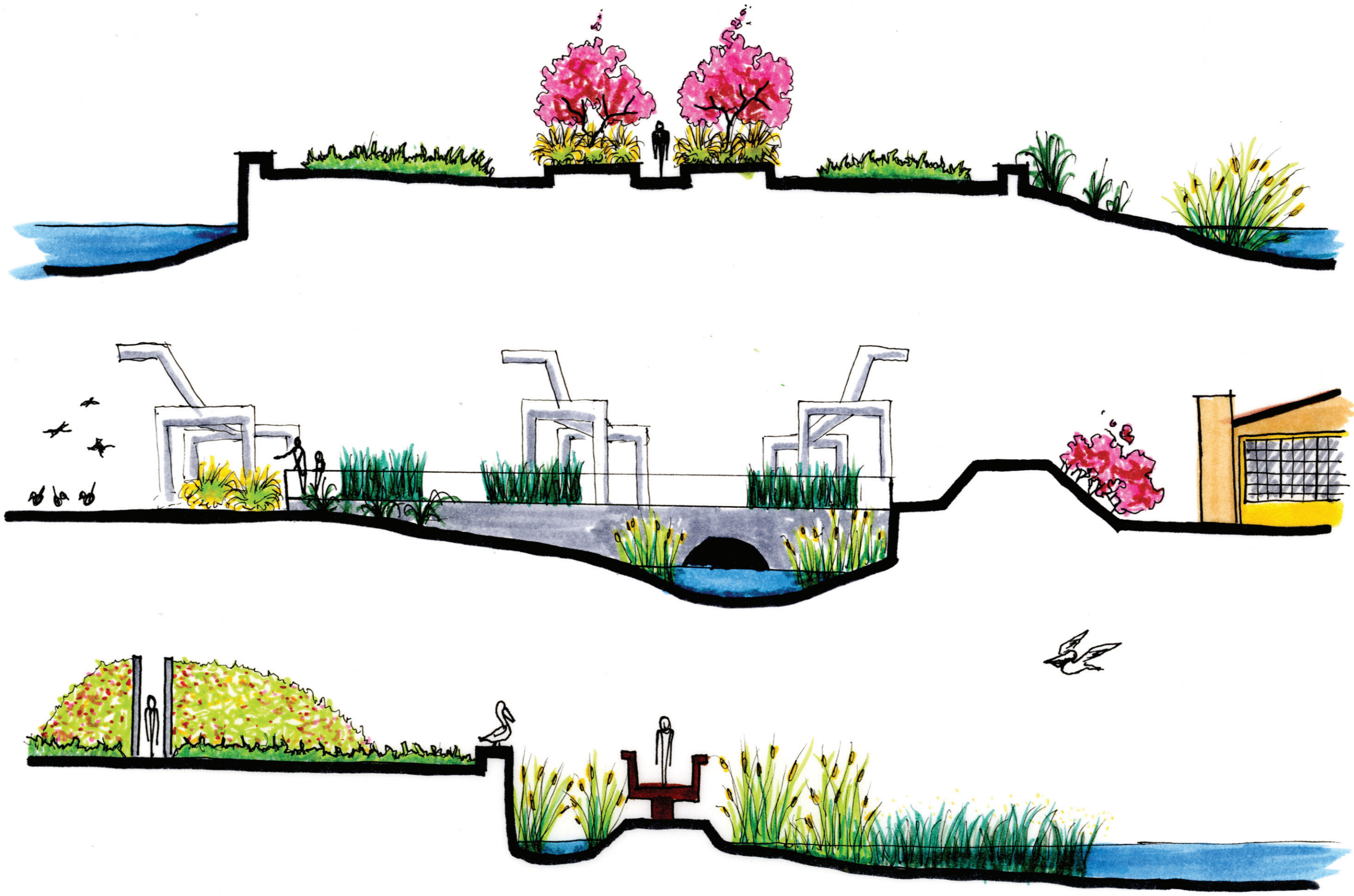


Fig 39 Sections

4.4 CHRONOLOGY

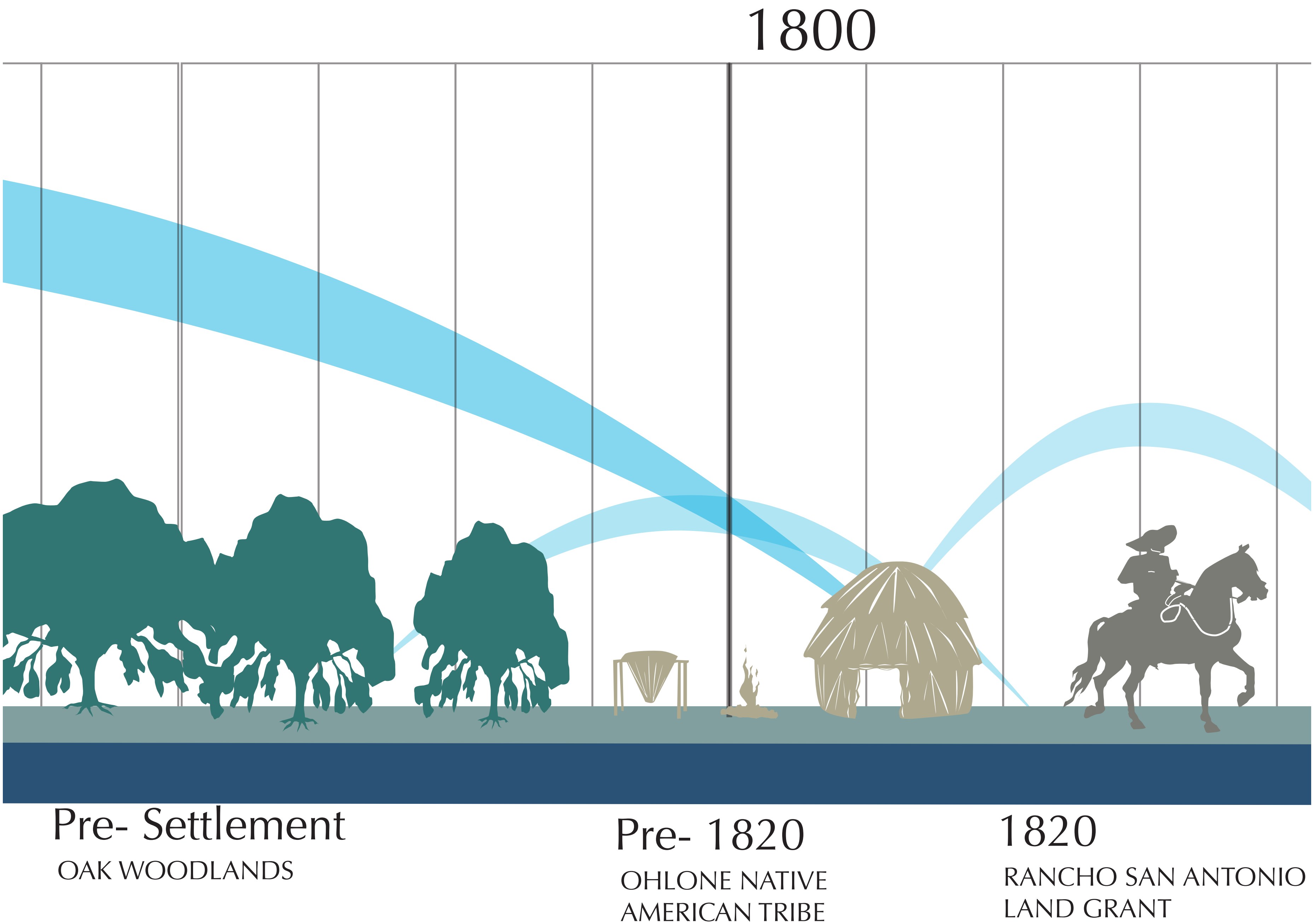
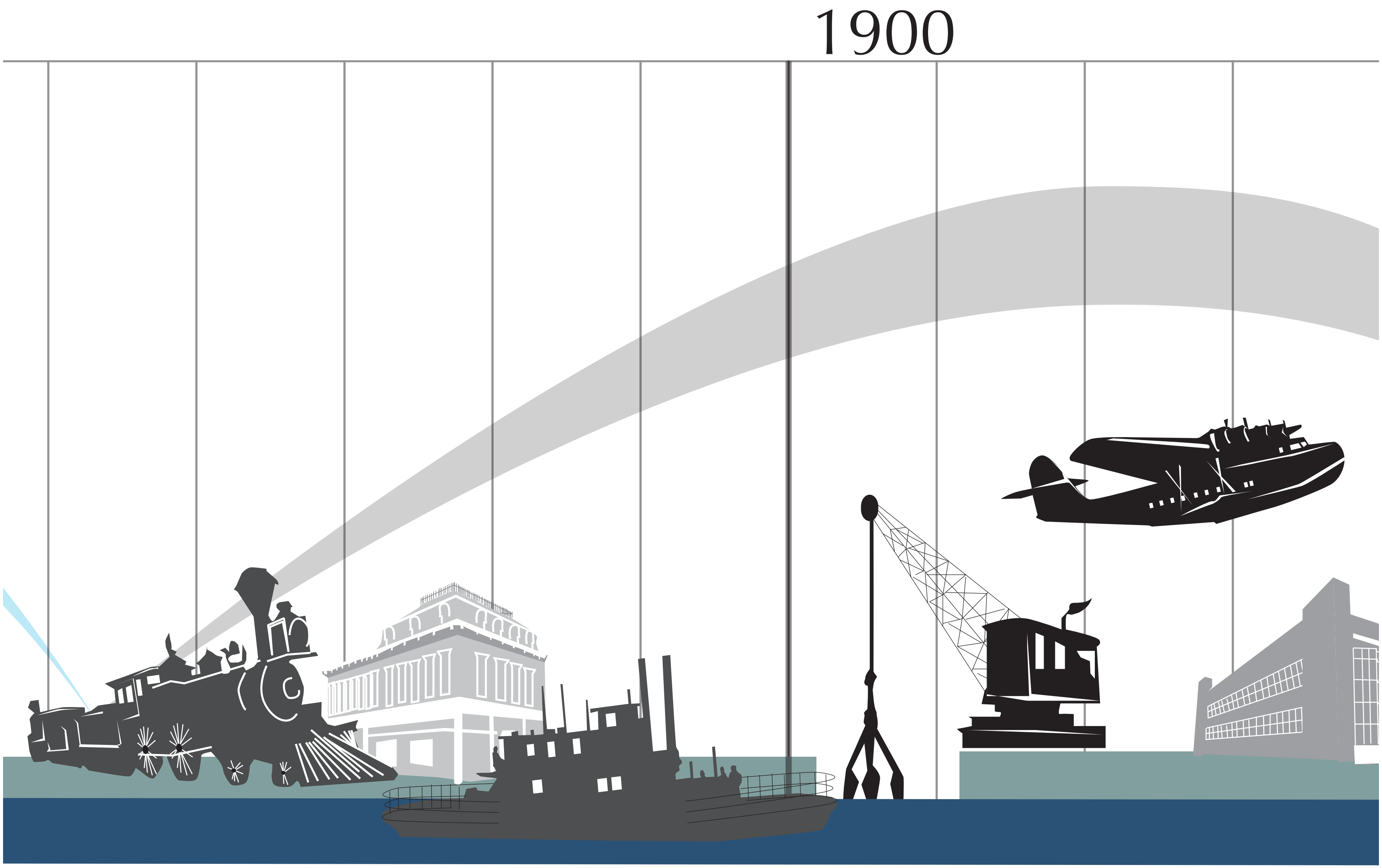


Fig 40 Chronology



1853

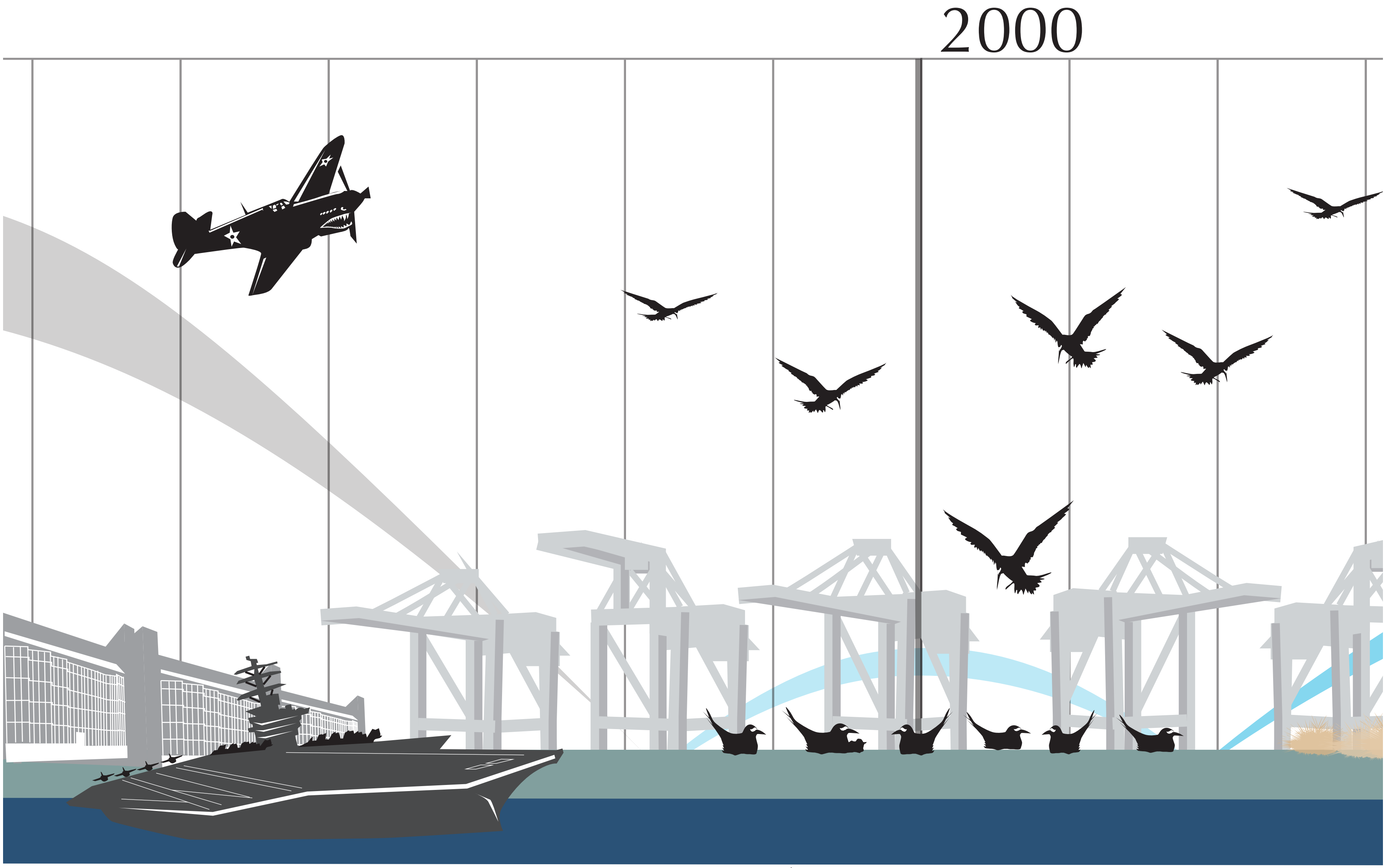
CITY IS FOUNDED; FERRY AND
RAIL SERVICE INTRODUCED

1902

DREDGEING TURNS
THE PENINSULA INTO
AN ISLAND

1930'S

CHINA
CLIPPER

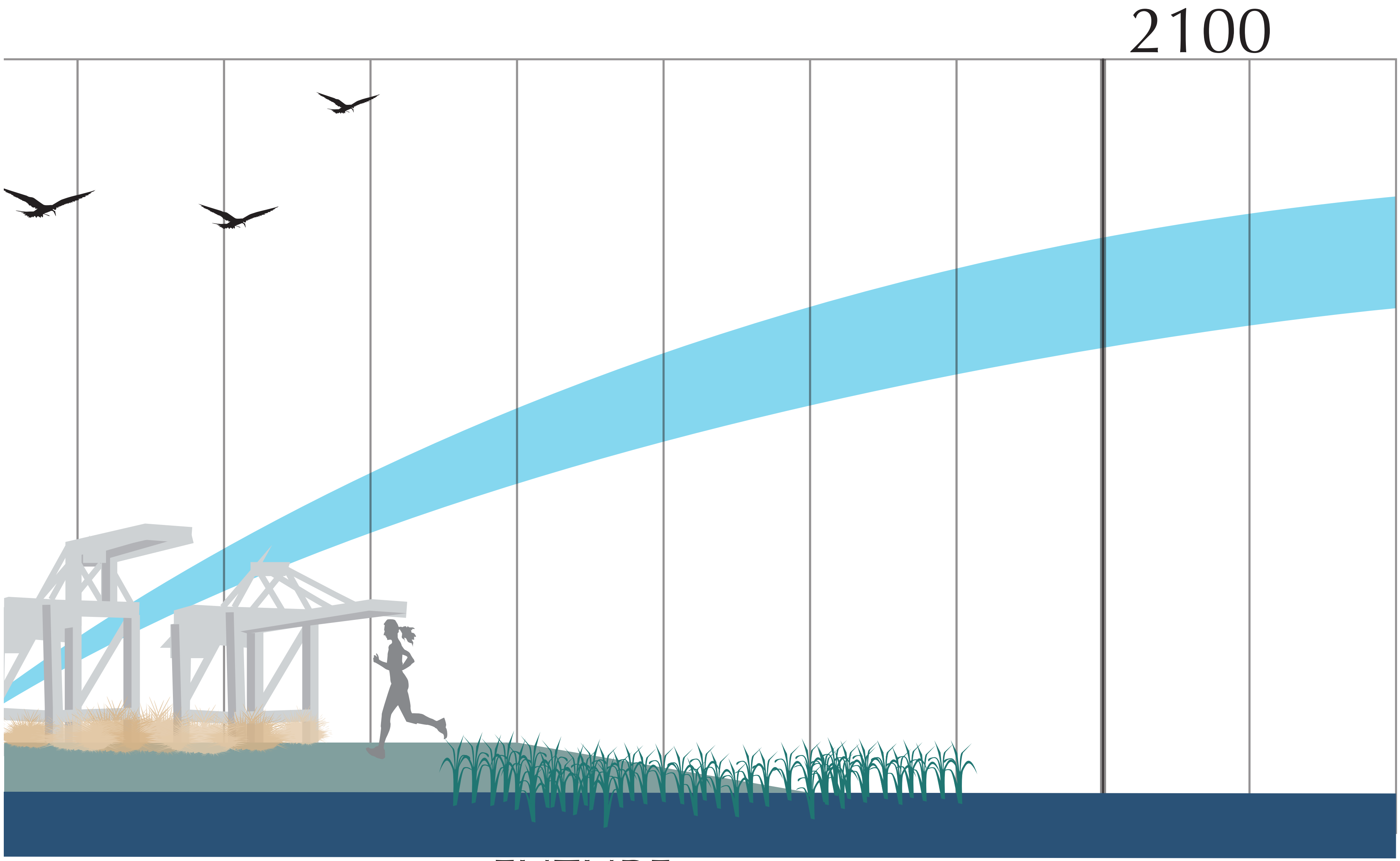


1942
WORLD WAR II
BASE EXPANSION

1962
PORT OF OAKLAND
CRANES FOR FREIGHT SHIPS

1997
BASE CLOSURE
AND LEAST TERN
OCCUPATION

2012
PRESENT DAY



2015

PHYTOREMEDIATION

FUTURE

WILDLIFE PARK
AND WETLANDS

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