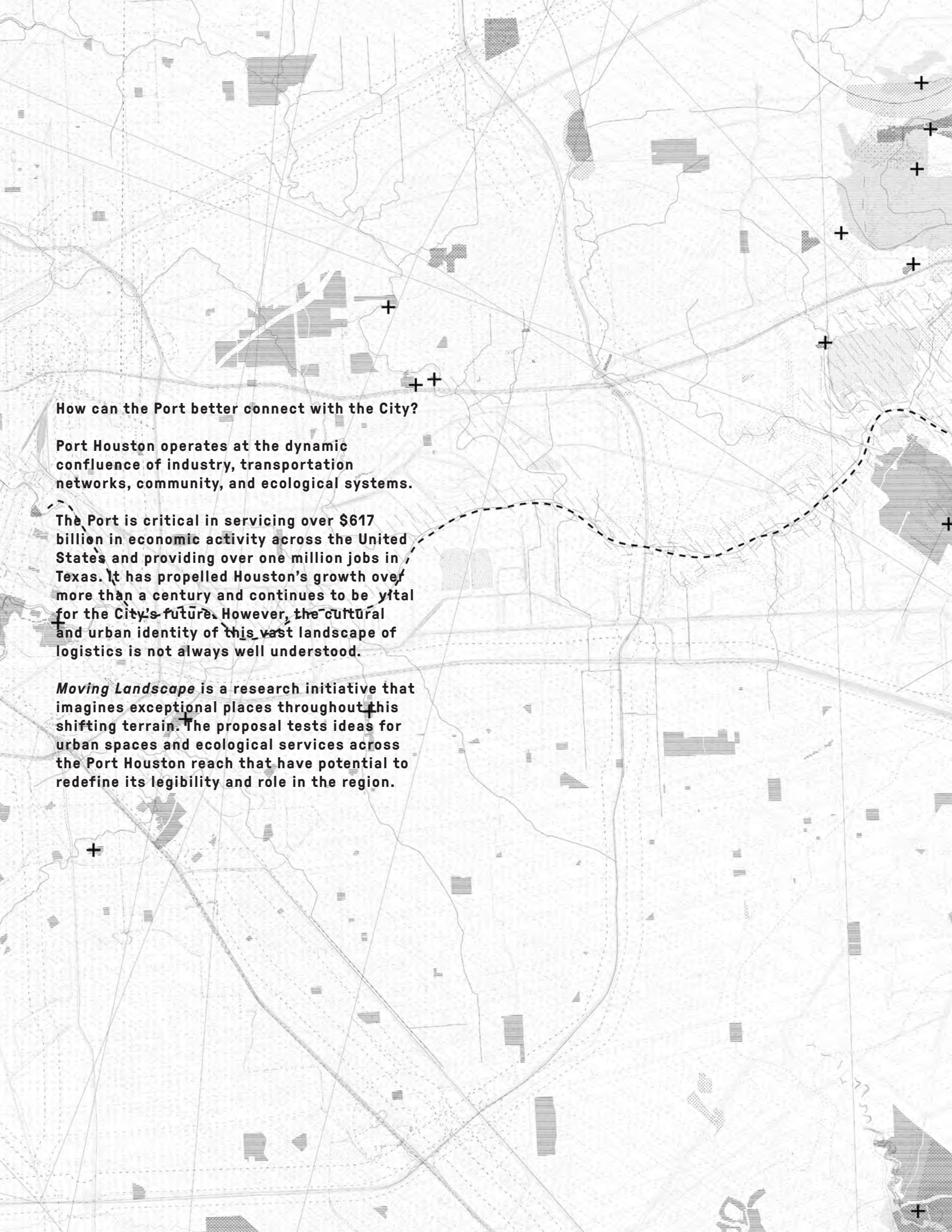


PORT HOUSTON
MOVING LANDSCAPE



How can the Port better connect with the City?

Port Houston operates at the dynamic confluence of industry, transportation networks, community, and ecological systems.

The Port is critical in servicing over \$617 billion in economic activity across the United States and providing over one million jobs in Texas. It has propelled Houston's growth over more than a century and continues to be vital for the City's future. However, the cultural and urban identity of this vast landscape of logistics is not always well understood.

Moving Landscape is a research initiative that imagines exceptional places throughout this shifting terrain. The proposal tests ideas for urban spaces and ecological services across the Port Houston reach that have potential to redefine its legibility and role in the region.



PORT HOUSTON

MOVING LANDSCAPE



PORT HOUSTON: MOVING LANDSCAPE

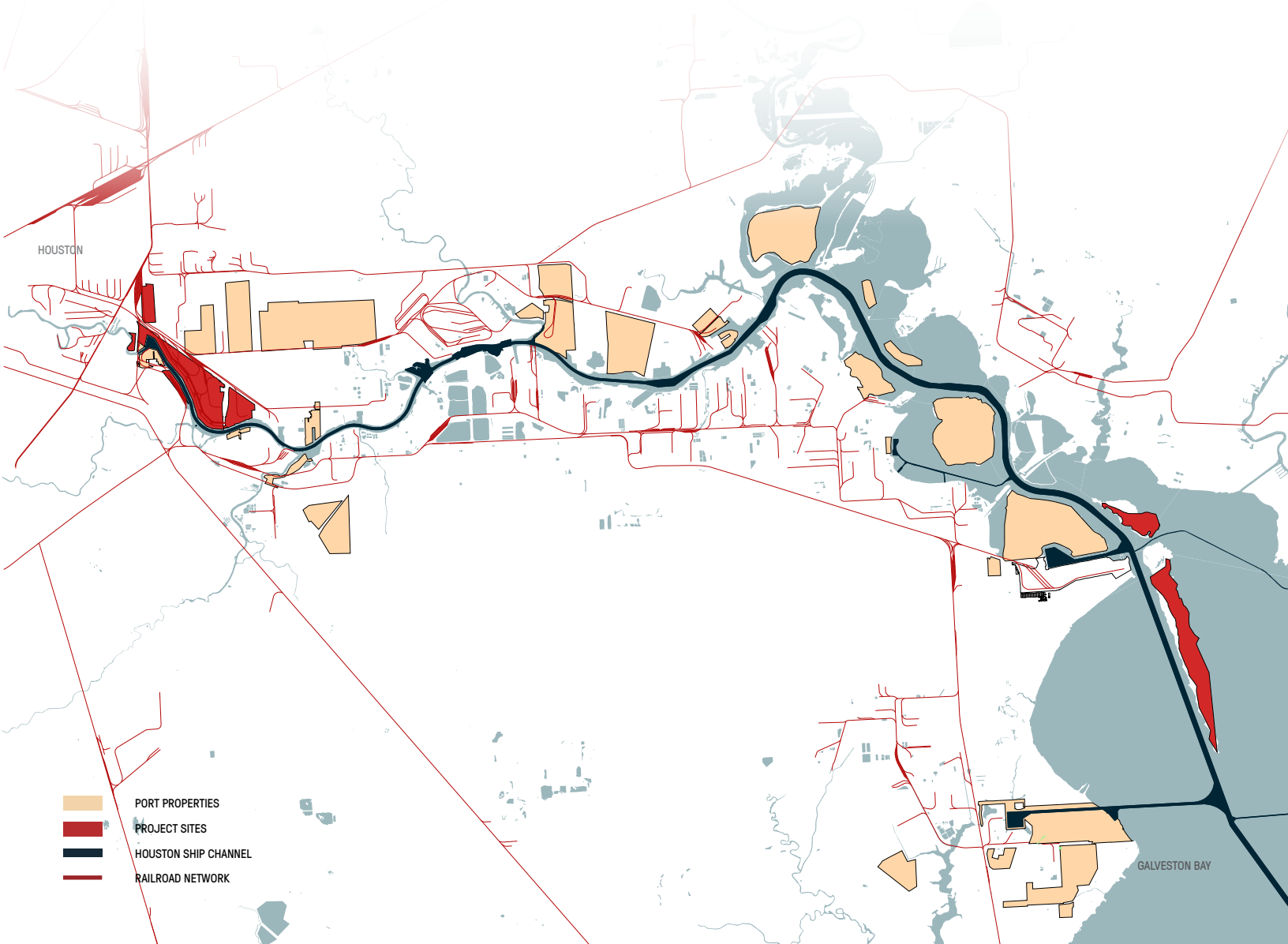
SUMMARY

Port Houston's 25-mile-long channel weaves through Galveston Bay and Buffalo Bayou to service over 150 private and public terminals, bringing with it nearly 1.2 million jobs and \$265 billion in economic impact throughout the state of Texas, which represents nearly 16% of the Texas GDP. In the United States, Port Houston is ranked first in terms of imports, foreign waterborne tonnage, and export tonnage.

As surprising as it may seem, Port Houston is simultaneously vital and invisible to the broader community. Its complex of sites, systems, and associated industries brings the region a significant economic advantage; however, most would underestimate the port's importance and perhaps even be unable to identify its location. Its story is hidden.

Port Houston: Moving Landscape is a vision that aims to create a new Port narrative. Through a distinctive design strategy of syncing cycles of Port routines to the creation of exceptional places, the Port's landscape is framed and revealed. By carefully reworking and retrofitting several Port sites, *Moving Landscape* uses changes in its logistical operations to create community spaces and ecological services across Port Houston reach.

Anticipating a possibility of the Port's gradual retreat East, towards the Bay, the vision is testing the future of sites most affected by that change - The Turning Basin site closest to Houston's urban core, and the chain of islands in Galveston Bay formed by the Port's dredging operations over time.

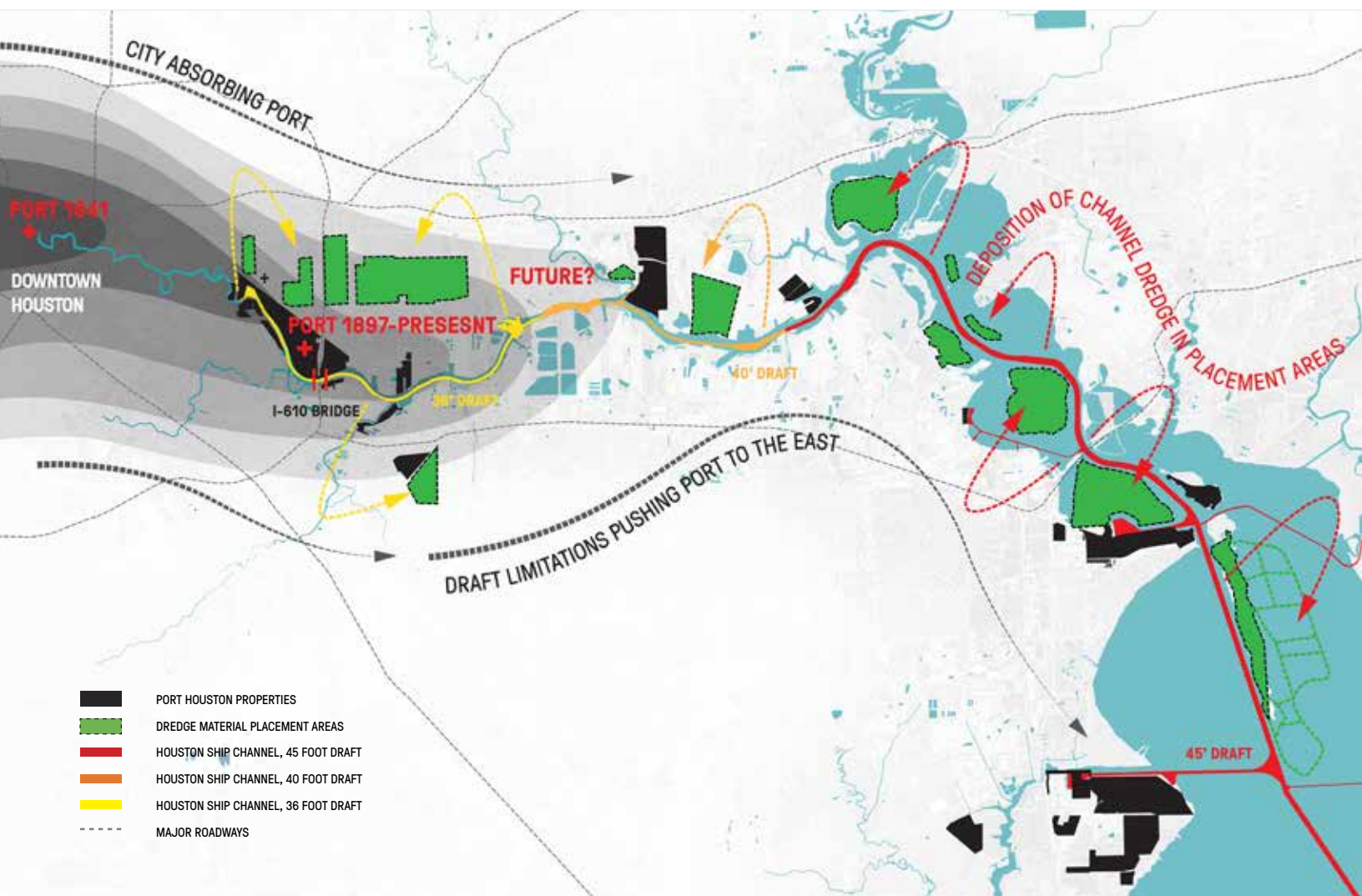


ANTICIPATING THE FUTURE

An eastward movement of the Port away from Houston's downtown core has been a historic trend in response to accessibility needs of increasingly larger ships, dredging depths, and development pressures. Houston's first port was founded at Allen's Landing, also the birthplace of Houston, at the confluence of White Oak and Buffalo Bayous, which formed a natural turning basin, and where the first ship landed in 1837. This location, at the intersection of Commerce and Main Streets in downtown Houston, served as the port until it moved to the current Turning Basin due to the need for increased depth and access by larger ships. This relocation of the Port created opportunities for downtown Houston along Buffalo Bayou to reclaim its waterfront for public use and development with its now iconic bayous serving as a model for resilient green open space.

As the post-Panamax era progresses, the Port will once again face a possibility of moving its operations further east, in response to the need for greater depth that larger ships will require within the channel itself, and also due to the height clearance limitations of the existing I-610 bridge. As the Port transitions its operations from the Turning Basin site, the available parcels can be transformed into publicly accessible districts that provide community connectivity and waterfront destinations for the surrounding neighborhoods. At the same time, new depth requirements will accelerate dredge deposition in Galveston Bay, and increase opportunities for developing rich coastal ecology on the man-made lands. Natural resource conservation and eco-tourism economy will become direct beneficiaries of the Port's new reality.

CHANNEL DREDGING, LAND PRODUCTION, AND EASTWARD MOVEMENT OF PORT OPERATIONS



SHIP STATS



LIMIT FOR
PORT HOUSTON

HOUSTON SHIP CHANNEL 
15' DEEP
530' WIDE

ALLEN'S LANDING, ORIGINAL LOCATION OF PORT AT MAIN STREET, 1910,
(source: The University of Houston Digital Library: <http://digital.lib.uh.edu>)

Houston Ship Channel and Foot of Main Street,
Houston, Texas.



PORT HOUSTON IN CONTEXT OF OTHER NATIONAL PORTS



PORT HOUSTON



PORT OF LOS ANGELES / LONG BEACH

Unlike other large port sites in the country, Port Houston is not compact-its landscape is distributed over a 30-mile-long chain of land areas only partially utilized for storage and active port operations. The majority of its vast open spaces are sites of redeposited dredge material, awaiting their ultimate development fate decades down the line. This unique capacity to actively and continuously make new land sets the Port apart in the way it physically changes its form and builds contextual relationship with the City overtime.



PORT OF NEW YORK / NEW JERSEY



PORT OF SEATTLE

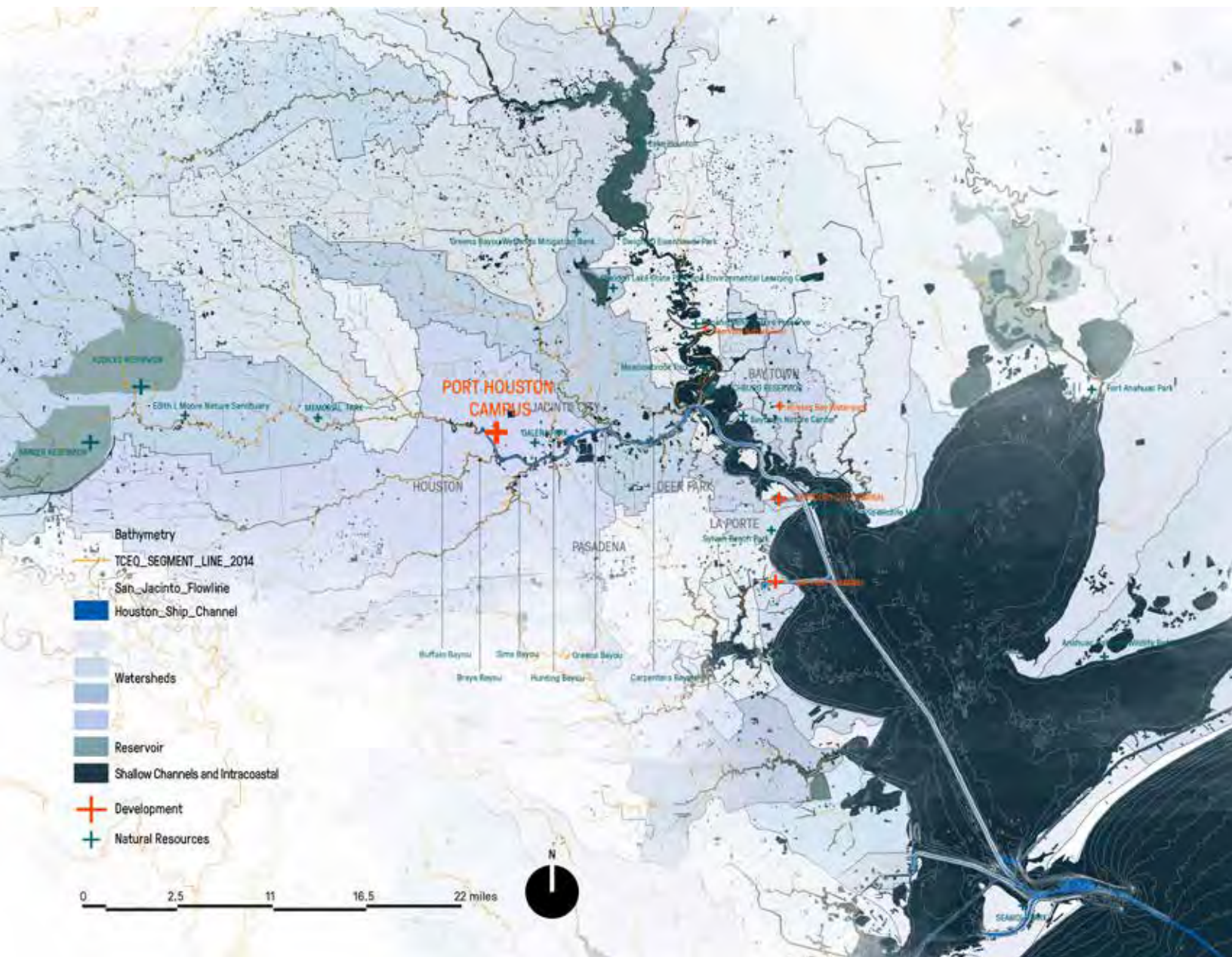
DREDGE CYCLE

The constant dredging of the Ship Channel represents a microcosm of issues related to 21st century development. As cities are founded and grow up along waterfronts, they alter watershed dynamics through urbanization and its associated increased runoff. These new runoff regimes in turn cause rivers to alter their shape and geometries through increased flows and sediment deposition. At the same time, riverine corridors have likely been straitjacketed by development and the encroachment of private property lines into riparian systems, leaving little room for these rivers to naturally adjust their location without severely impacting the adjacent development.

Increased rates of runoff carry greater amounts of sediment that will deposit in the main river body as the velocity slows, which reduces the cross-sectional capacity of the river to transport flood waters away from the city. Hence, ongoing dredge operations must be employed to remove silt deposited by normal rainfall as well as intermittent flood events to create a steady state of flood reduction.

This is evidenced in Buffalo Bayou upstream from Port Houston. Additionally, Port Houston, with its need for large ships to access all the way to the Turning Basin, must also provide

PORT HOUSTON IN THE CONTEXT OF REGIONAL WATERSHEDS



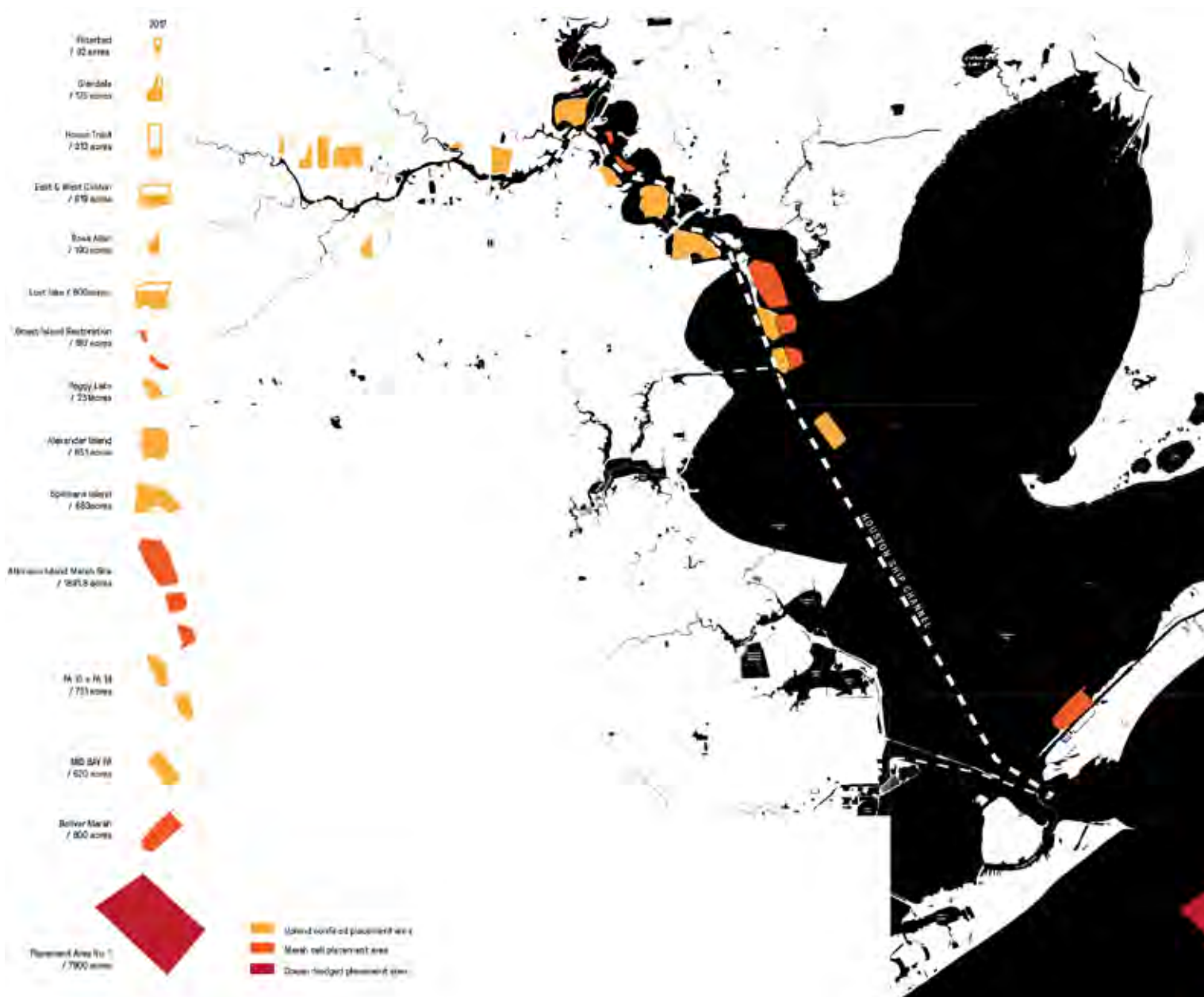
for the maintenance of critical depths to accommodate these ships. The ongoing flow of silt and its gradual deposition within Buffalo Bayou necessitates the need for constant dredging, both for its flood reduction potential upstream, and its infrastructural requirements at the Port downstream.

Port Houston and the Army Corps of Engineers annually spends up to \$50 million on dredging operations in the Houston Ship Channel; a new dredge placement area can cost up to \$60 million to establish. Yet, this dredge operation takes place within an increasingly constrained context: dredge costs could bal-

loon with the increased dredging depths needed for post-Panamax ships while federal/local government funds for these operations are decreasing.

Moving Landscape is looking to reframe dredge as a valuable material that can be re-utilized to assist in achieving some of the Port's main economic, environmental, and community objectives. Highly performative utilization of dredge material on land and in the Bay can achieve multiple layers of ecological enhancement and community development.

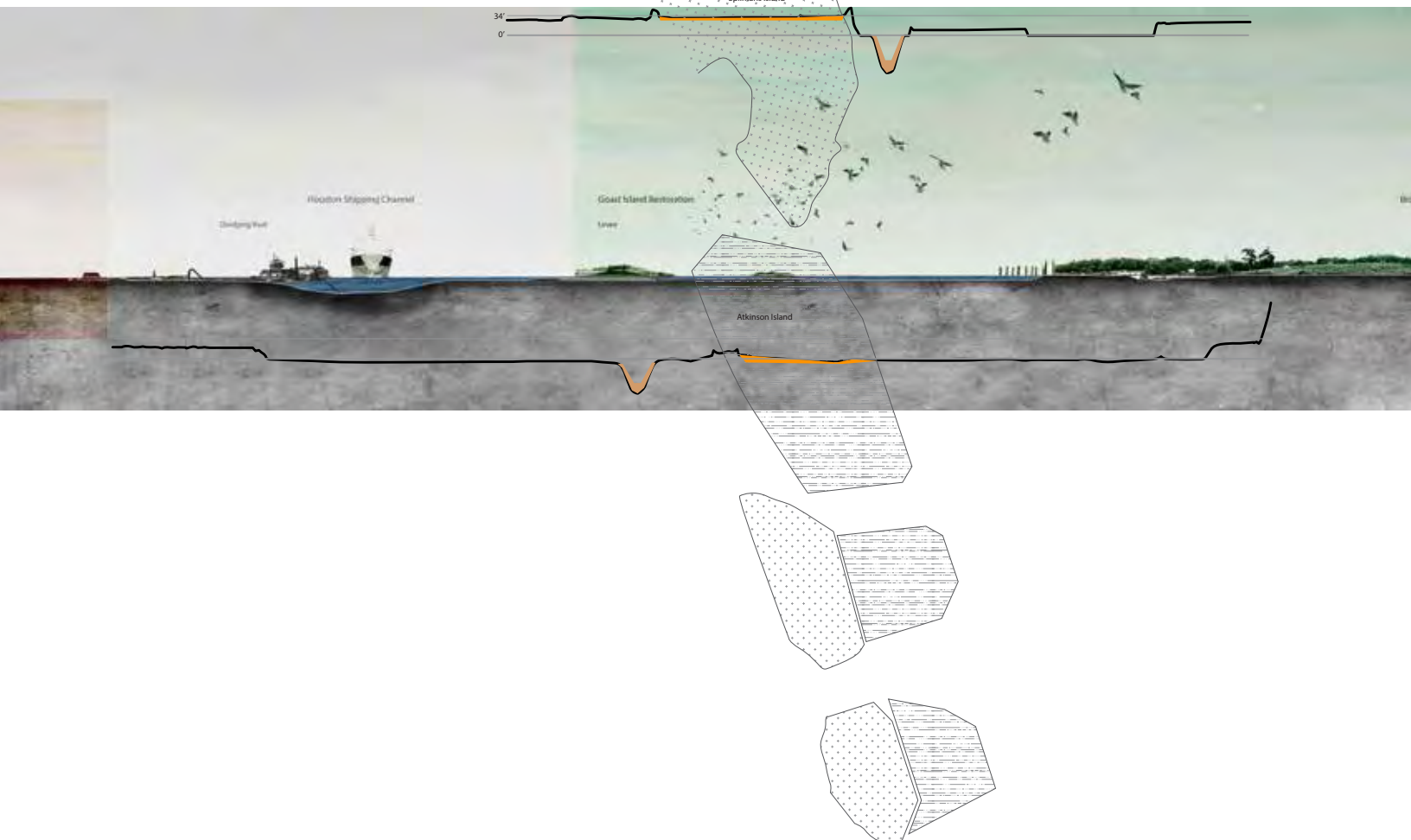
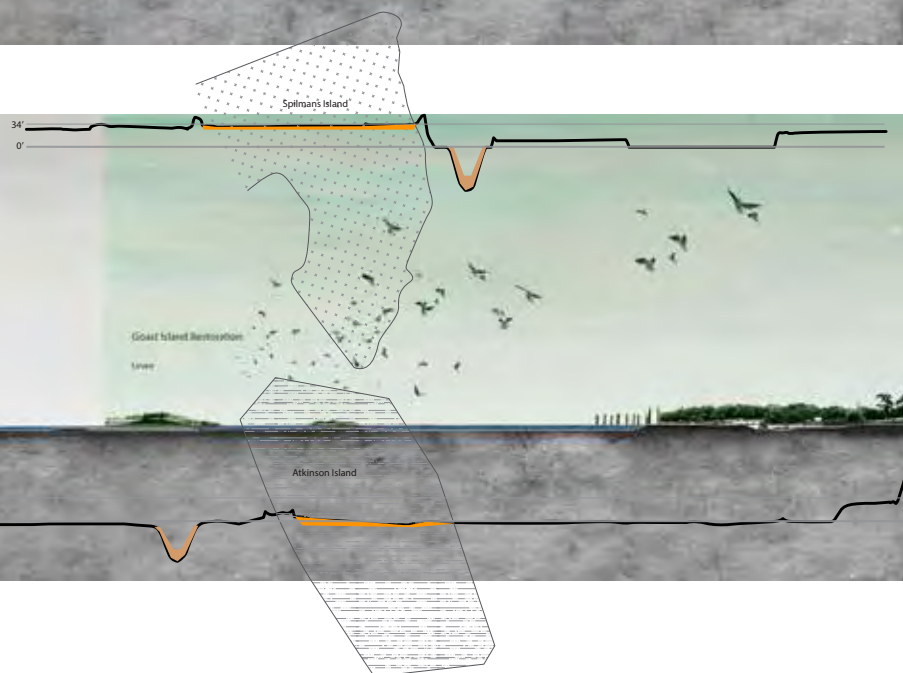
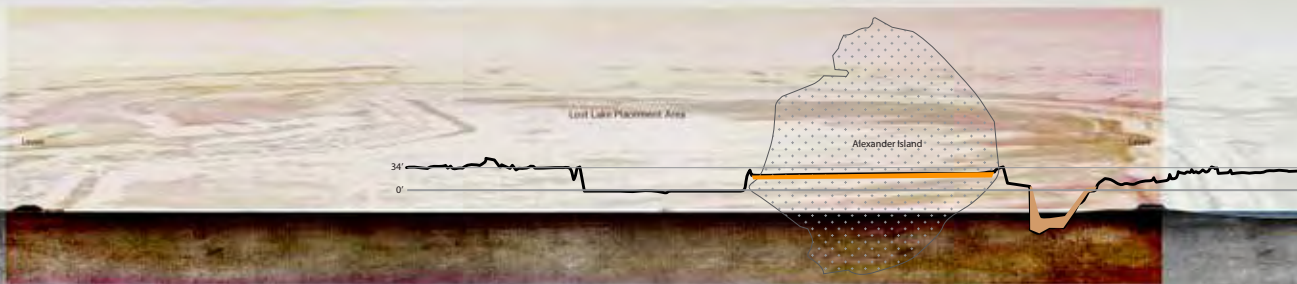
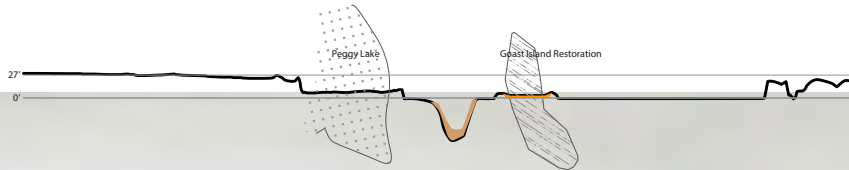
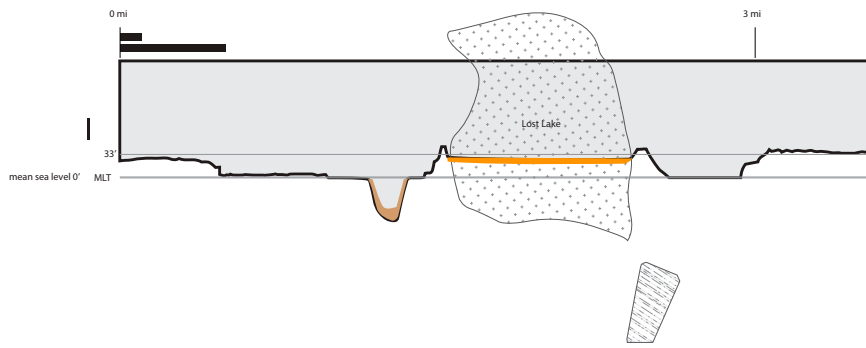
DREDGE PLACEMENT LOCATIONS



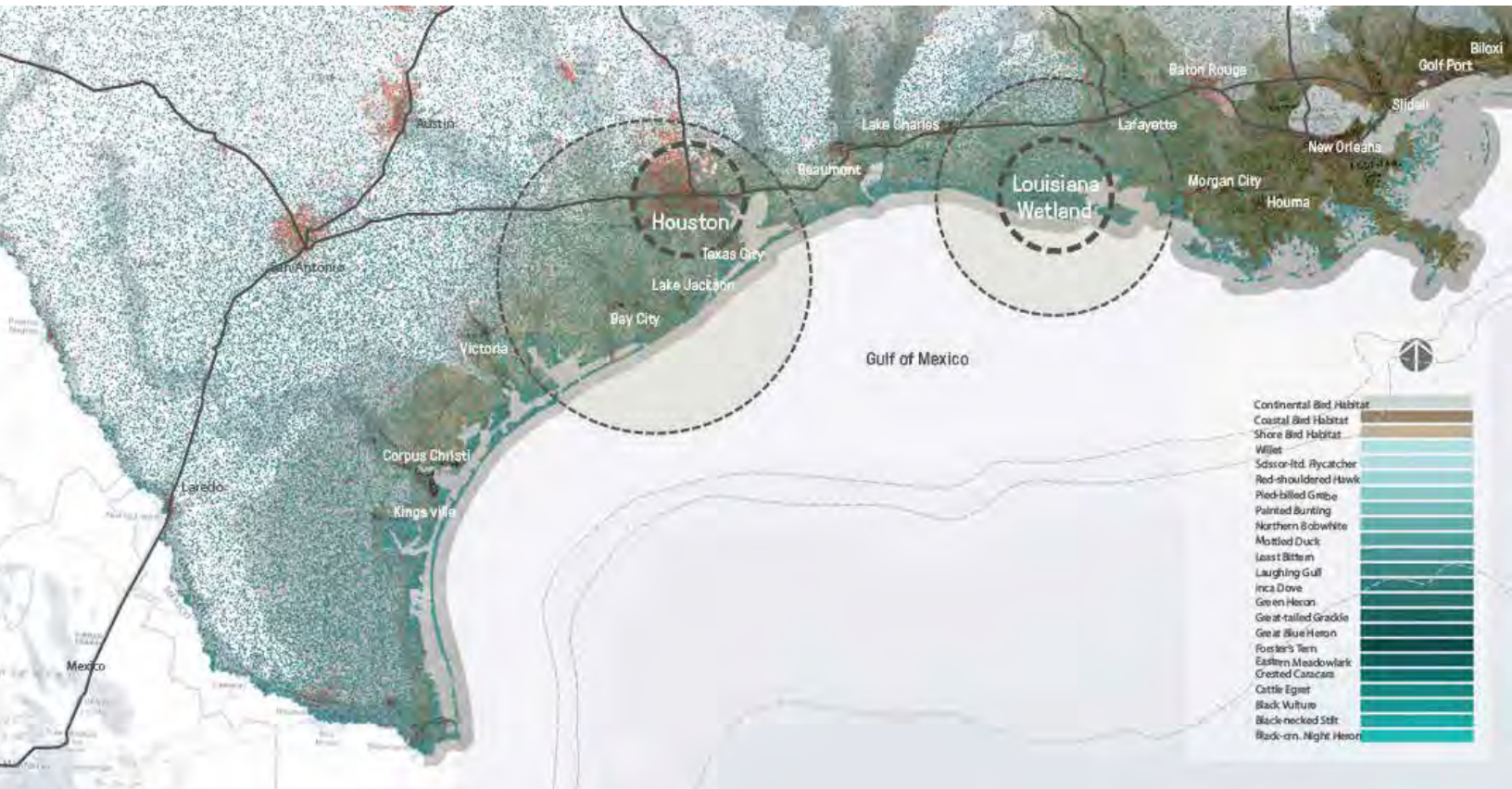
DREDGE CYCLE



SECTIONAL RELATIONSHIPS OF DREDGE DEPOSIT AREAS AND DESIGNATED OPEN SPACE SITES

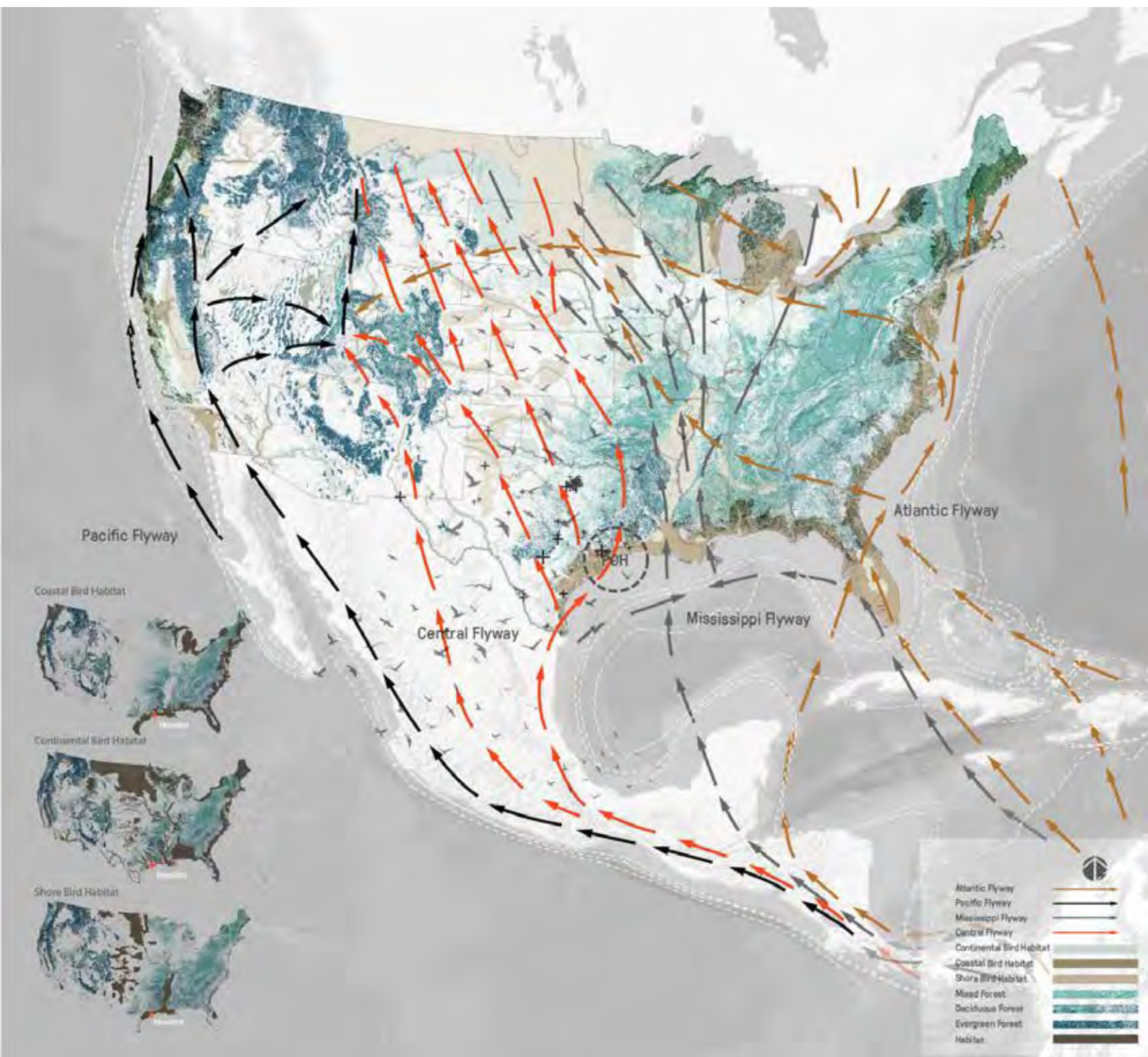


DYNAMIC ECOLOGY



ABOVE, PORT HOUSTON IN THE CONTEXT OF GULF COAST BIRD HABITATS
RIGHT, PORT HOUSTON ALONG THE NORTH AMERICAN CENTRAL FLYWAY

Moving Landscape acknowledges the diverse ecologies of the Gulf Coast, as well as Houston's location along the North American Central Flyway, a major route for migratory birds. Understanding the preferences of these migratory birds can create design parameters informing the dredge placement areas to tune these landscapes for optimizing the birds' local habitats.

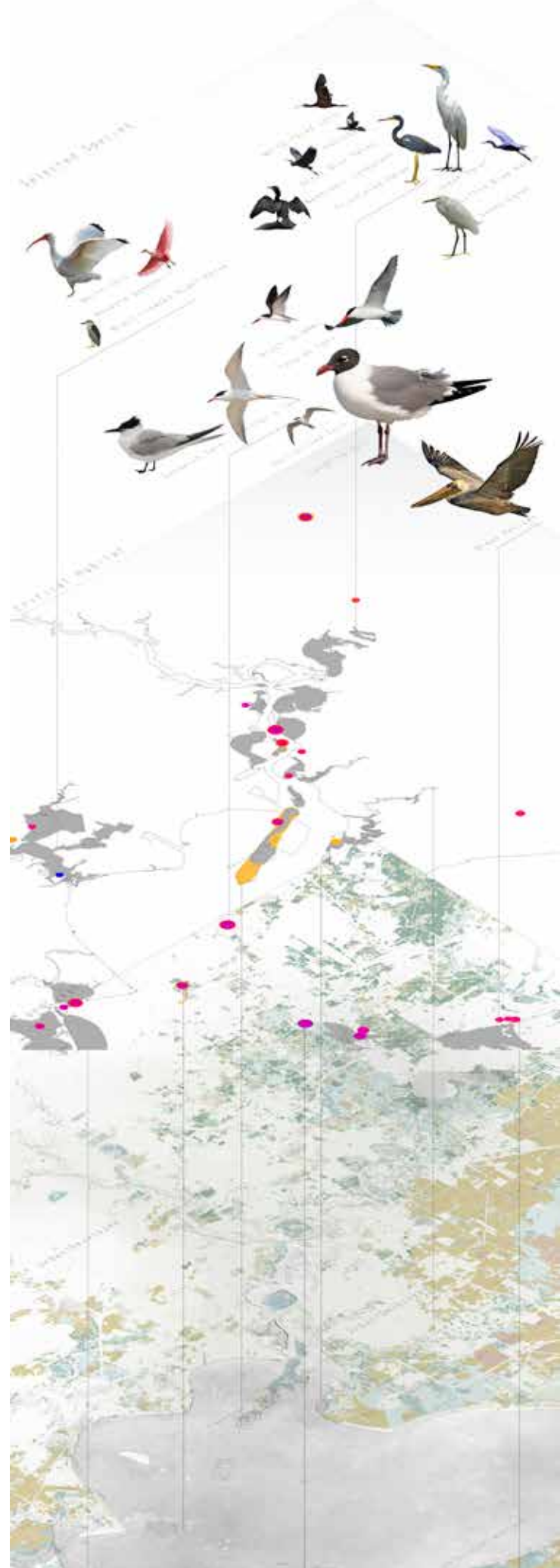


(source: "Bring Back the Birds", Xueying Cao, LSU Masters in Landscape Architecture Studio, 2016)

DYNAMIC ECOLOGY

Moving Landscape looks for opportunities to create habitat for, and synergies between, the non-human users of the Port logistics landscape to enhance the overall health of the Buffalo Bayou, Galveston Bay, and Gulf of Mexico ecosystem.

LEFT, BIRD SPECIES AND CRITICAL HABITAT
MIDDLE, WATER CONDITIONS' IMPACT ON AQUATIC SPECIES
RIGHT, OYSTER POPULATIONS TIMELINE



PROJECT SITES

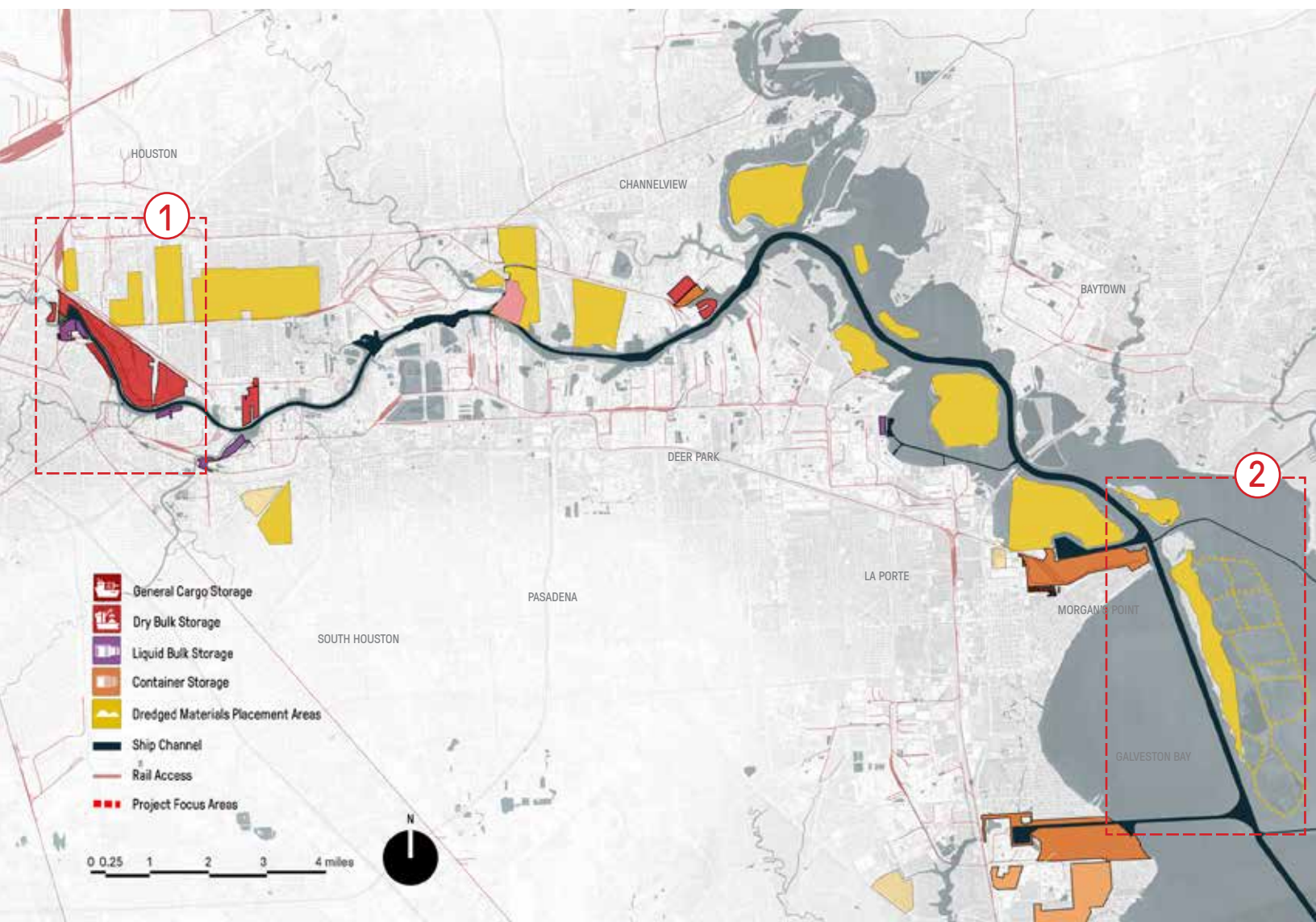
Moving Landscape speculates how future challenges could be linked in order to arrive at novel outcomes for Port Houston.

In particular, post-Panamax opportunities may require the Port to push its operations to sites further east along the Houston Ship Channel; but this requirement will also open up a number of sites closer to the Houston core which could be reimagined and made broadly accessible in order to develop a more meaningful relationship with the City fabric and adjacent communities. In addition, increasing dredging requirements with larger ships will lead to a larger load of sediment material, which could be reutilized to attain critical ecological goals throughout the Houston-Galveston Bay. New dredge habitat islands will create a new environmental identity for

the Port through its intelligent and strategic processes of depositing and dewatering the dredged material. *Moving Landscape's* proposed plans and designs produce a framework to create a flexible approach of reutilizing, reworking, and retrofitting Port materials and spaces, with emphasis on two sites within the Port-owned properties network.

The frameworks and site designs developed in *Moving Landscape* demonstrate how a distinctive story of the Port can be articulated through the operation of its landscape. The vision creates a unique set of processes and opportunities, enabling Port Houston to continuously choreograph a new identity in an increasingly complex and unpredictable future.

OVERALL PORT PROPERTIES MAP WITH PROJECT SITES



PROJECT SITE ONE

1

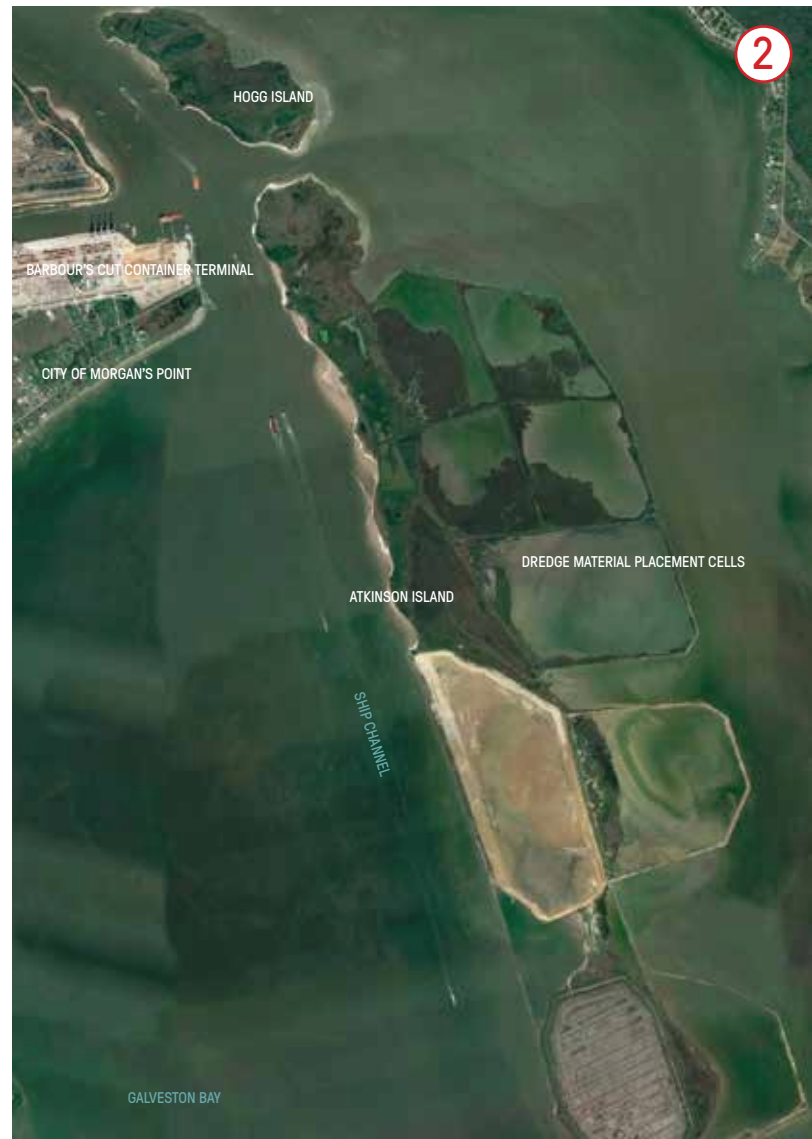
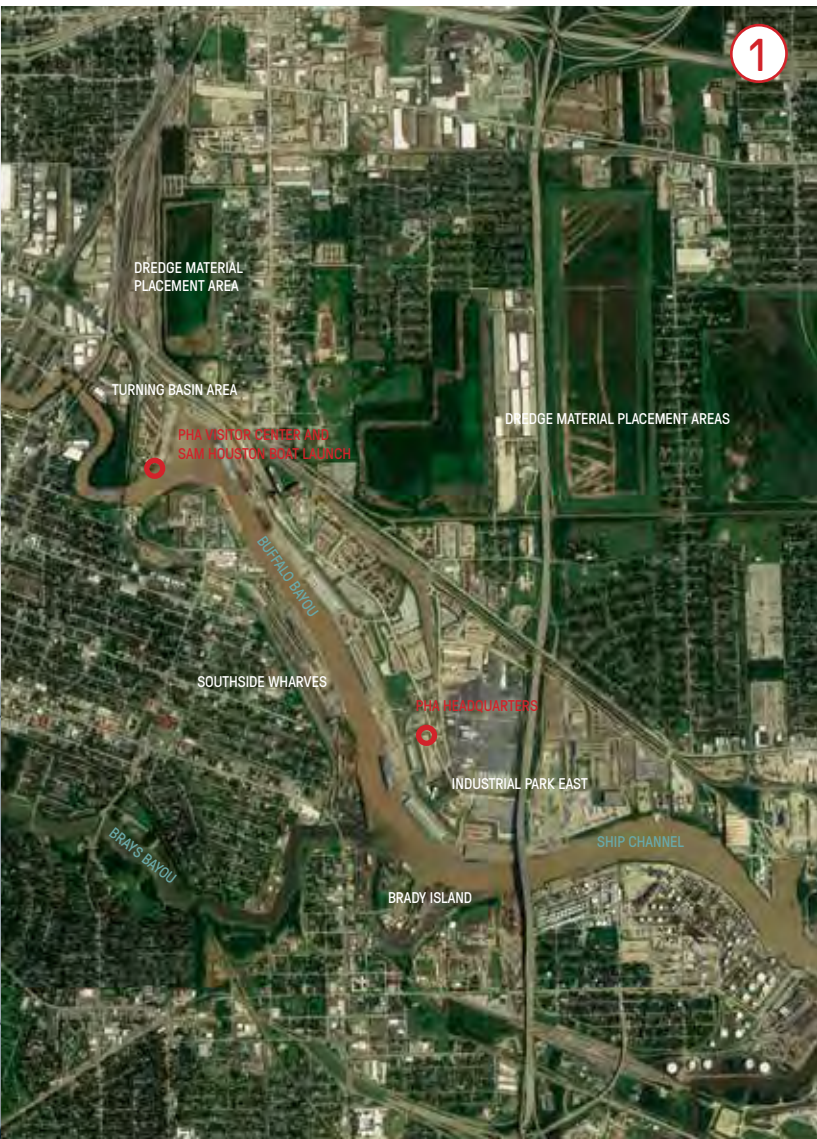
Site One, *URBAN FRAMEWORK: TURNING BASIN TO BRADY ISLAND* focuses on creating new public spaces—for both local and tourist populations—on a series of Port-owned and Port-connected properties; site design focuses on integrating the unique material qualities of the Port to create distinct places. Particular ideas within this framework were tested and developed for a series of sites along the upper portion of the Houston Ship Channel, from the Turning Basin to Brady's Island.

PROJECT SITE TWO

2

Site Two, *ECOLOGICAL FRAMEWORK: HOGG ISLAND TO GALVESTON BAY* emphasizes the re-use of dredge on a series of dredge placement sites—both those already identified as well as new areas—to offer new forms of recreational opportunities, site identity, and protection from storm surge. A specific understanding of this framework was conceived through a site-specific design on a chain of islands originating south of Hogg Island.

AERIAL MAPS OF PROJECT SITE AREAS



PROJECT SITE ONE // URBAN FRAMEWORK

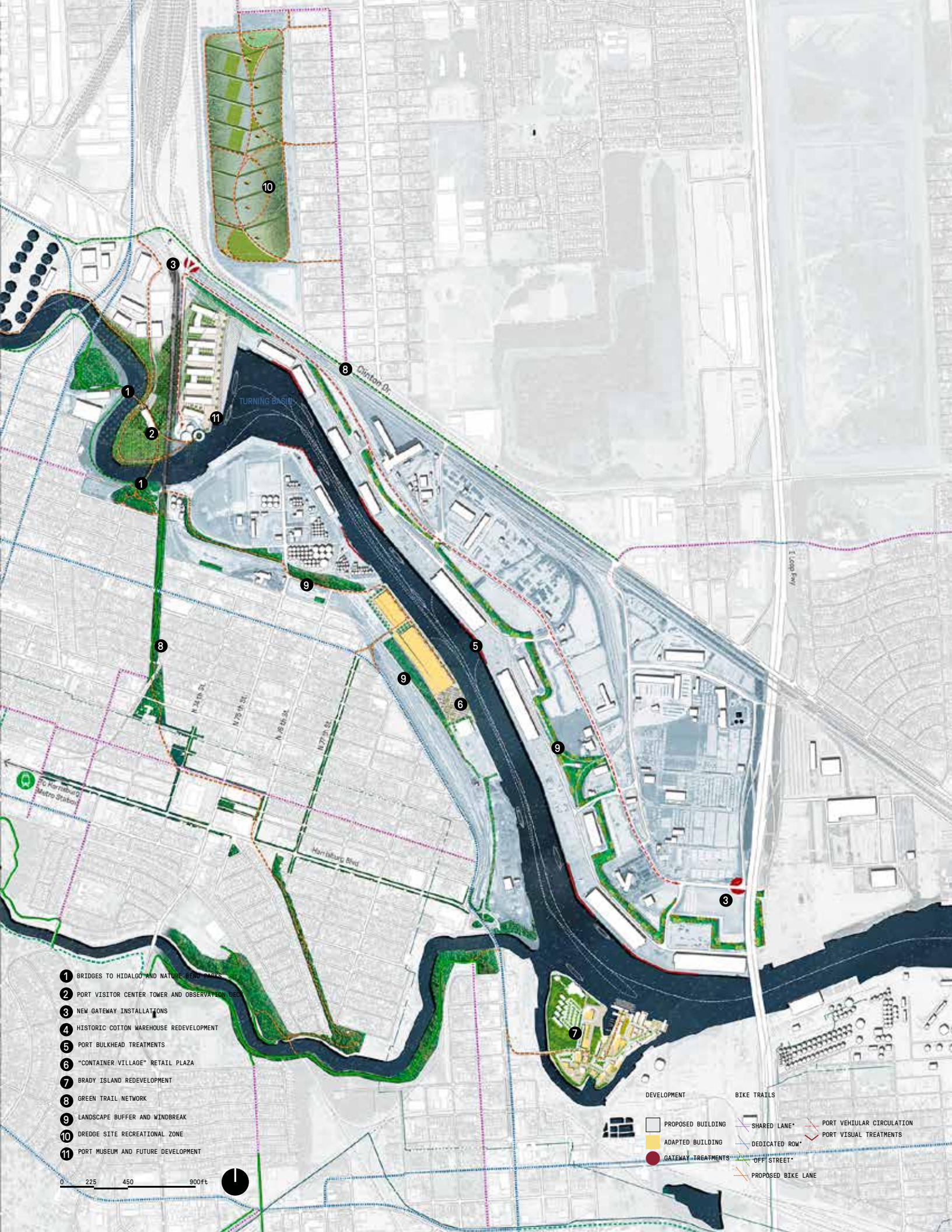
TURNING BASIN TO BRADY ISLAND

The main Port Houston campus at the Turning Basin area has been physically detached from surrounding communities and anonymous to many citizens in Houston. The Urban Framework focuses on Port branding and urban design opportunities along the 2-mile stretch of Ship Channel at this location. The proposal highlights gateway experience to Port headquarters at the I-610 entry and the visitor center off Clinton Drive, coordinates green network and trail connectivity throughout the Port campus and adjacent neighborhoods, looks at development opportunities at several waterfront sites, and introduces improvements of the port edges visible from the water and adjacent roadways. Urban design solutions interweave the lo-

gistical and urban activities, and present public spaces and port experiences on the same stage. The framework maintains secure perimeter for the ongoing Port operations so that the public use can be woven into the fabric of the Port without compromising its strict security protocols. Landscape qualities of the main Port campus are enhanced by virtue of introducing recreational programming around the main visitor center/Port Museum and an adjacent dredge placement site, greenbelt windbreak and buffer along the middle and at the edges of Port's industrial operations, as well as "facade treatment" strategy for bulkhead surfaces derived from the aesthetic qualities of the Port's container yard terminals.



ABOVE, POTENTIAL REGIONAL IMPLEMENTATION OF PORT BRANDING, LANDMARKS, AND TOURISM IDEAS
RIGHT, SITE 1 PLAN SHOWING SITE DEVELOPMENT OPPORTUNITIES AND NEIGHBORHOOD CONNECTIONS



- 1 BRIDGES TO HIDALGO AND NATURE BEND PARKS
- 2 PORT VISITOR CENTER TOWER AND OBSERVATION DECK
- 3 NEW GATEWAY INSTALLATIONS
- 4 HISTORIC COTTON WAREHOUSE REDEVELOPMENT
- 5 PORT BULKHEAD TREATMENTS
- 6 "CONTAINER VILLAGE" RETAIL PLAZA
- 7 BRADY ISLAND REDEVELOPMENT
- 8 GREEN TRAIL NETWORK
- 9 LANDSCAPE BUFFER AND WINDBREAK
- 10 DREDGE SITE RECREATIONAL ZONE
- 11 PORT MUSEUM AND FUTURE DEVELOPMENT



DEVELOPMENT

PROPOSED BUILDING

 ADAPTED BUILDING

 GATEWAY TREATMENTS

BIKE TRAILS

 SHARED LANE*

PORT VEHICULAR CIRCULATION

 PORT VISUAL TREATMENTS





SITE PLAN ENLARGEMENTS WITH DEVELOPMENT PROGRAM

CULTURAL

- firepit
- cafe
- art
- visitor center
- wedding venue
- art studio
- community space
- outdoor market
- community gardens
- parking
- group pavilion
- food truck

ACTIVE

- 5k loop
- multi use trail
- traditional playground
- bike trails
- adventure playground
- soccer

PASSIVE

- creek overlooks
- great lawn
- great hill
- observation tower
- birding center

NATURAL

- forest restoration
- wildflower fields
- wildlife habitat
- nature education
- prairie restoration
- bioswales

0 150 300 600ft



POTENTIAL PHASING STRATEGY

Three potential phases of the project are dictated by land available for conversion to public use and ability to maintain a secure perimeter for the port properties still in use.

PHASE ONE includes a proposed Port Museum at the current location of the Port boat tour with a connection to the forested property west across the railroad tracks to include a boathouse and viewing tower; development of the dredge parcel to the north into a passive park, and landscape improvements including an evergreen wind-break along the grass slope parallel to the docks and embellishment of docks and existing structures with art.

PHASE TWO includes relocating the Port headquarters adjacent to the Port Museum with a corresponding edit of the secure perimeter, transforming the existing warehouses on the south bank into an urban market district and amendment of secure perimeter at this location to allow public access, and upgrade of the west half of Brady's Island.

PHASE THREE continues the buildout of an urban district at the Port Museum and headquarters location with minor relocation of the secure perimeter, expansion of the warehouse district with the buildout of a shipping container plaza, and buildout of the east half of Brady's Landing island.



PORT CAMPUS SECURE PERIMETER





PORT GATEWAY BRIDGE AND OBSERVATION PLATFORM VIEW FROM BUFFALO BAYOU



VIEW OF PORT MUSEUM AND TURNING BASIN FROM THE OBSERVATION PLATFORM

DESIGN LANGUAGE PROTOTYPES

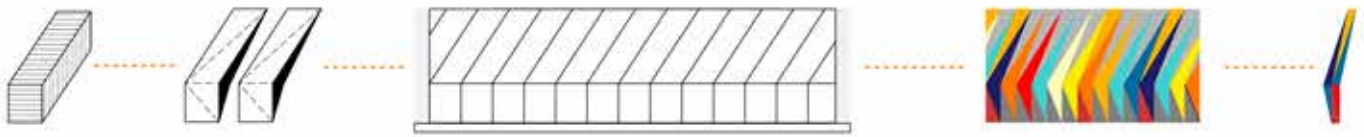
As an important visible dimension of Port Houston, facades are its best advertising boards. Inspired by graphic qualities of shipping containers, the 4 prototypes address different locations and functions of the Port 's facade.



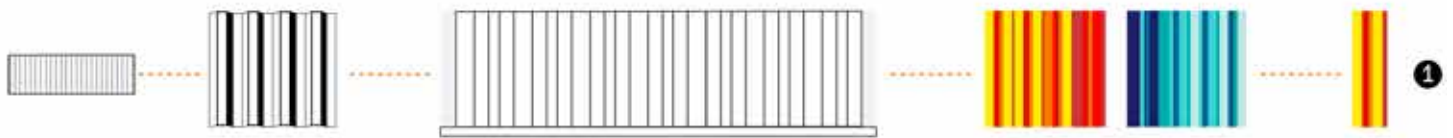
CONCEPT

FRONT DESIGN

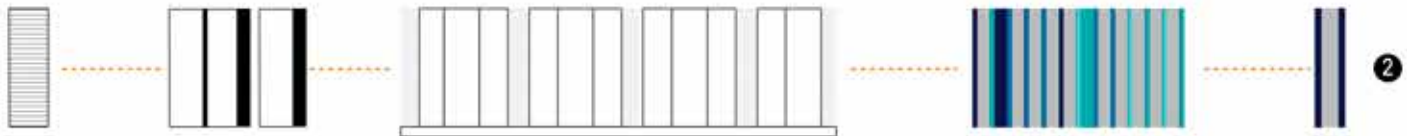
AXON ELEVATION



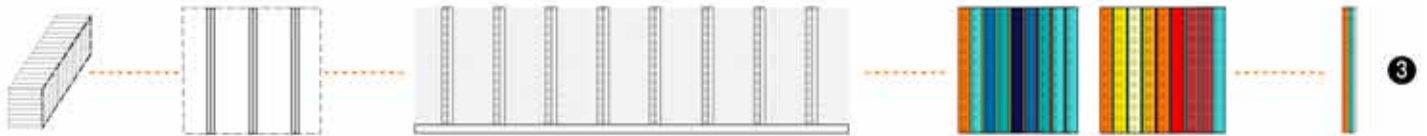
Perspective -Silhouette; Directionality; Facades to Destinations



Side -Texture; Multi-dimension color spectrum & Directionality; Industrial Fences



Aerial - Stacking; Signaling panels with changing interval; Turning Basin Bulkheads



Section - Siits; See-through panels; Gateway



















TURNING BASIN ELEVATION NORTH



TURNING BASIN ELEVATION SOUTH

Facades of the Turning Basin area are enhanced with art and signage. The north elevation shows the implementation of the evergreen windbreak, murals on the grain silos, and color coding at the north dock, still in operation. The south elevation shows the decommissioned cotton warehouses renovated into public urban waterfront with new signage celebrating the transformation.





PORT HOUSTON MAIN ENTRY AT CLINTON DRIVE WITH A GATEWAY LOGO MONUMENT AND “INTERNATIONAL TRADE WALL”



CONTAINER VILLAGE PLAZA AND MARKET PROMENADE



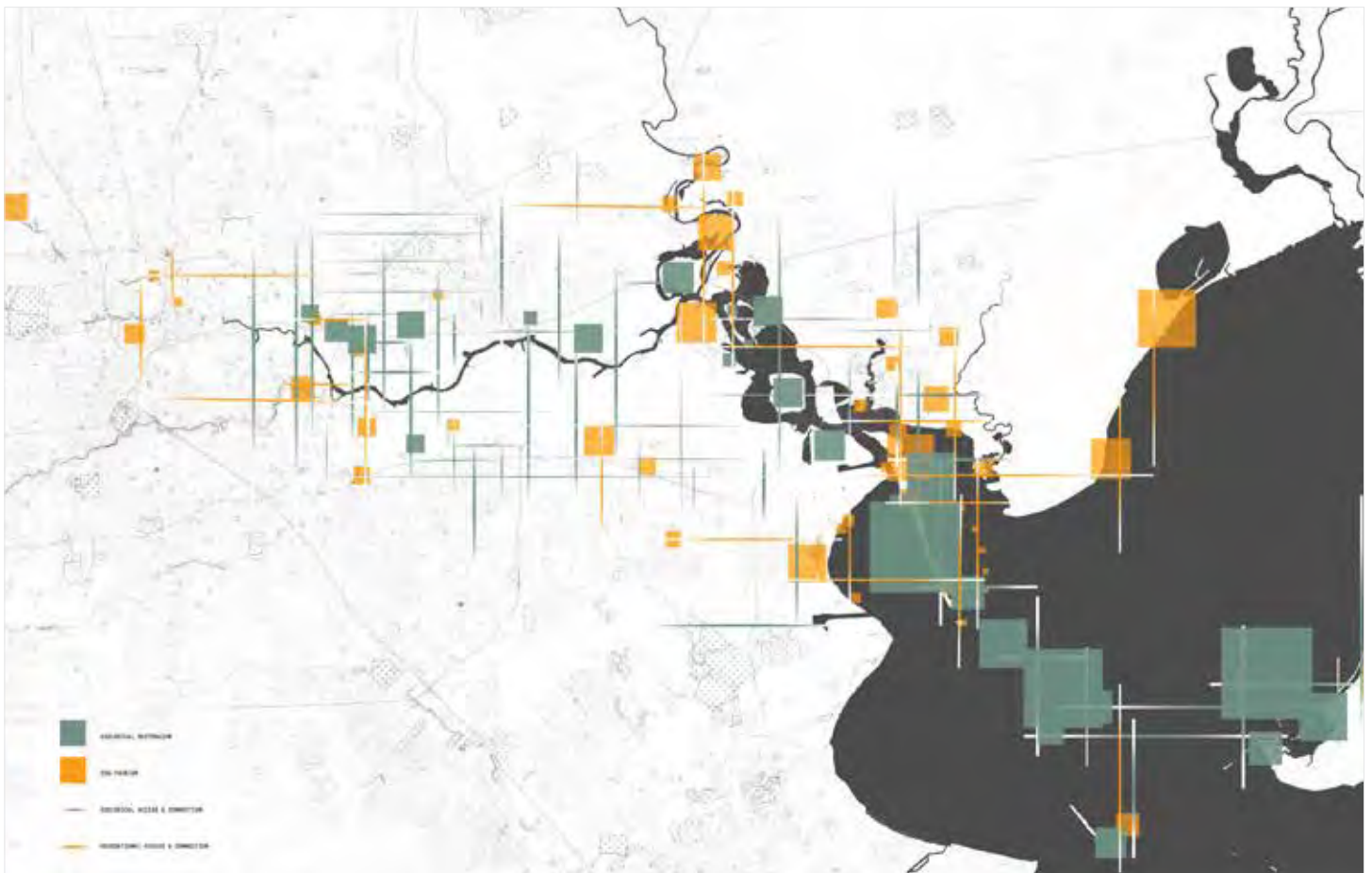
WAREHOUSE RETAIL AND PROMENADE

PROJECT SITE TWO // ECOLOGICAL FRAMEWORK

HOGG ISLAND TO GALVESTON BAY

Serving as a complement to the Urban Framework, the Ecological Framework examines possibilities of working with land creation processes. Framing the Port's dredge placement activities puts a greater emphasis on constructed ecology, and on how to connect people to a more vast and (and thus more difficult to reach) landscape. Port Houston established the Atkinson Island Demonstration Marsh in conjunction with the widening and deepening of the Houston Ship Channel. The constructed marsh is a demonstration of the beneficial use of dredged material. The proposal for Atkinson Island Eco-Tourism program expands on Port Houston's attention to ecological concerns, and on building connections between communities

and the Port. The Logo Bird Island, the Barbours Cut Boulevard improvements, the Ship Channel gateway treatments, and the Panorama Balloon observation site work together as a landmark framework to make Port Houston and its footprint within the region more legible. Habitat restoration, wetland mitigation, and dredging activities result in a unique and a successional changing landscape. Industrial elements associated with the Port are used as inspiration to create a formal definition within the constructed dredge placement cells. Through a series of curated moments the vision frames local ecology and helps develop a regionally significant eco-tourism destination.



ABOVE, POTENTIAL REGIONAL IMPLEMENTATION OF ECOLOGICAL RESTORATION AND ECOTOURISM IDEAS
RIGHT, SITE 2 PLAN SHOWING ATKINSON ISLAND AND PORT HOUSTON LOGO ISLAND



- 1 BARBOURS CUT BLVD GATEWAY
- 2 PANORAMA BALLOON
- 3 SHIP CHANNEL GATEWAY
- 4 POWER INDEX
- 5 FERRY + LAUNCH POINT
- 6 CAMPING + BIRD PERCH CIRCLES
- 7 SHIPPING BOAT VIEW
- 8 SPECTRUM DISPLAY PLANTING
- 9 WETLAND POND
- 10 OYSTER FARM + EDUCATION
- 11 BIRD BLIND
- 12 LOGO ISLAND

0 1000 2000 4000 ft







SITE PLAN ENLARGEMENTS WITH DEVELOPMENT PROGRAM

CULTURAL

- firepit
- art

ACTIVE

- 5k loop
- multi use trail
- bike trails

PASSIVE

- overlooks
- birding center
- observation high point

NATURAL

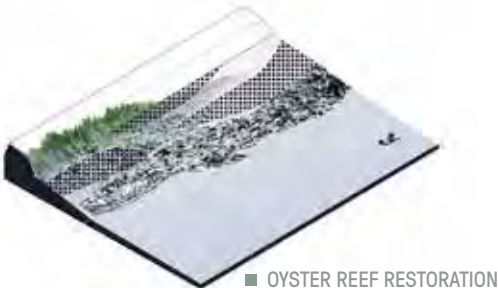
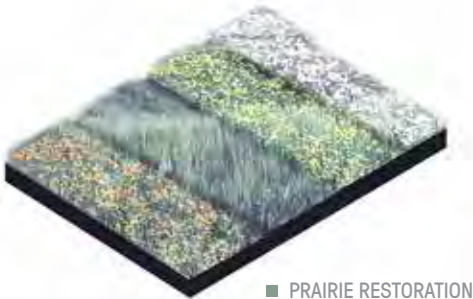
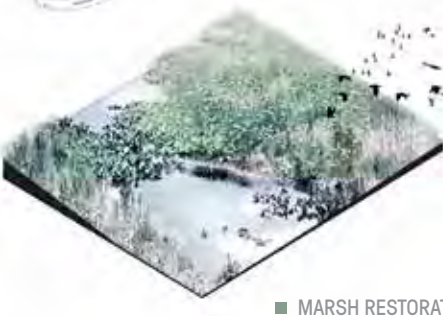
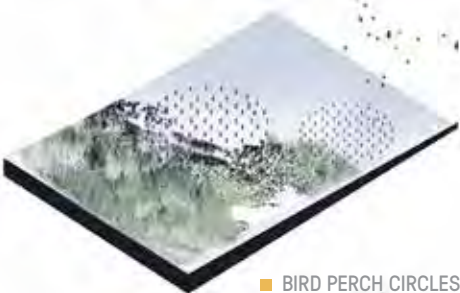
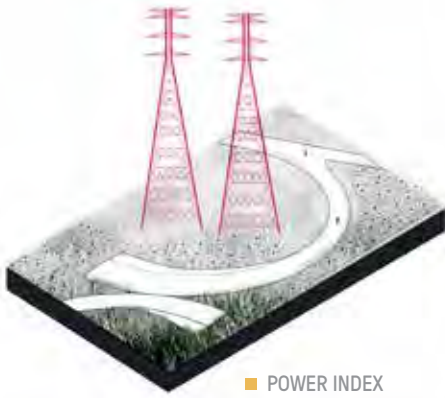
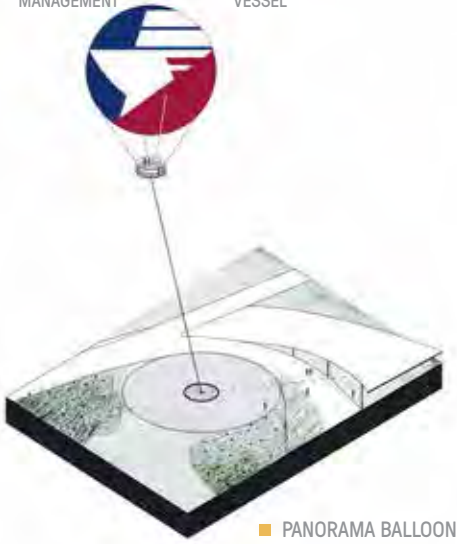
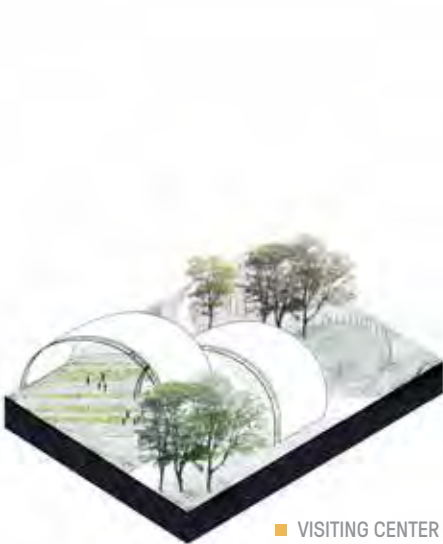
- forestation
- wildflower fields
- wildlife habitat
- nature education
- prairie restoration

0 150 300 600ft



DESIGN LANGUAGE PROTOTYPES

Design prototypes borrow the formal language of industrial forms in the surrounding area, and set up programs that vary from “more maintained” to “less maintained”, from human activity-centric to nature-centric.





LOGO BIRD ISLAND

LOGO ISLAND DEVELOPMENT PRECEDENTS



"THE PALM", DUBAI



"MAPLE LEAF", TORONTO



"SUPER HARBOR", TORONTO

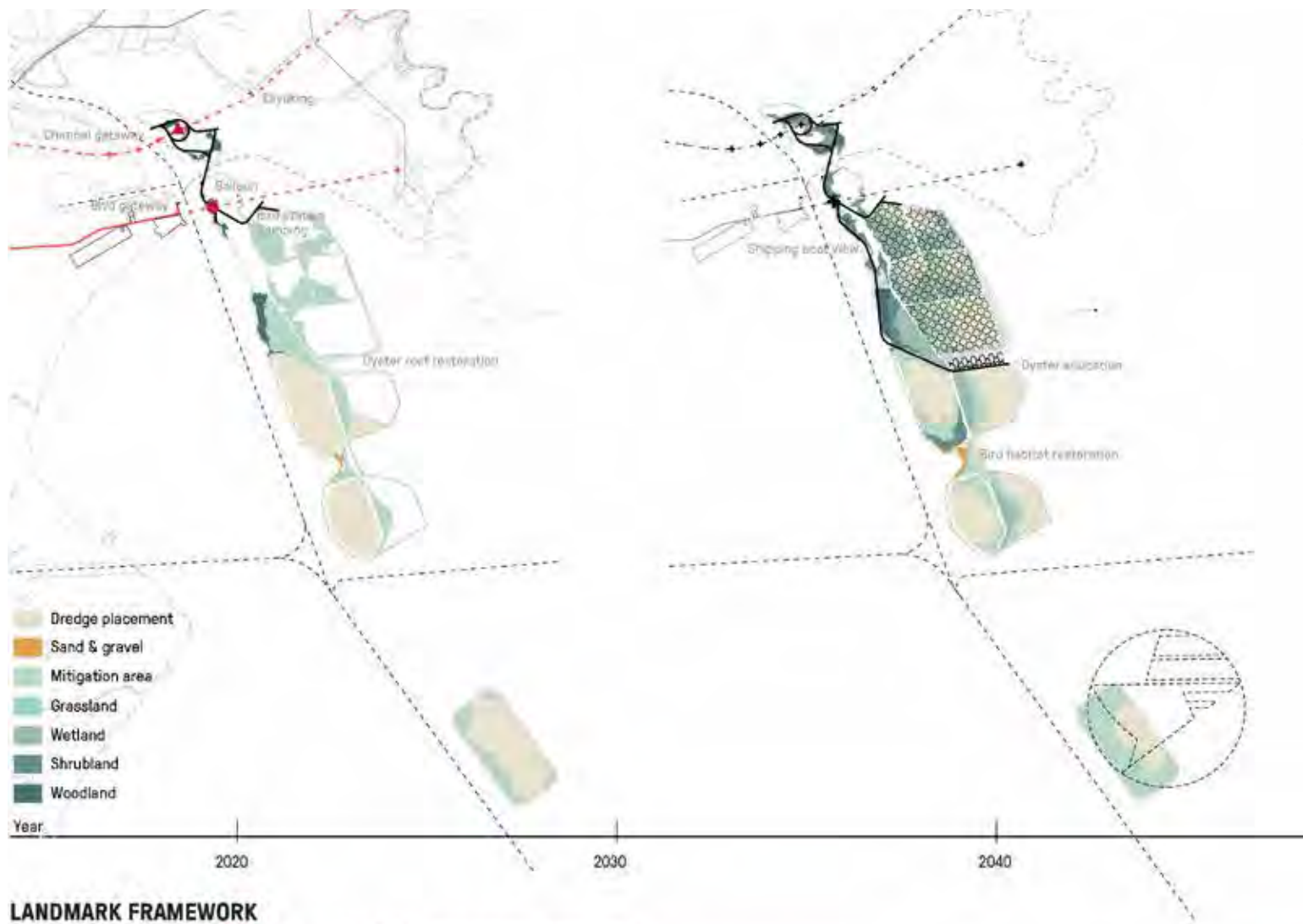


"STHE WORLD", DUBAI



"PORT HOUSTON", HOUSTON

PHASING PLAN



LANDMARK FRAMEWORK

- ▲ Power line connection (Channel gateway - power tower)
- Blvd corridor connection (Blvd gateway - from blvd lighting to tethered balloon, to light tower)

DREDGE PLACEMENT AREA

Dredge PA in use	Levee level up increasing capacity	Reach capacity	New dredge placement area generation

PLANTING PHASING

A. EXISTING SHRUBLAND

Source: <http://www.fishbase.org>. Accessed 10/10/2013.

Establish native shrubland Allow successional shrubland on highland

Establish native grassland Allow successional woodland on highland

B SPECTRUM DISPLAY

Spectrum display establishes different colorful displays seasonally, and it recycles storage tanks as planting structures for establishing planting patterns and stormwater management.

Establish native grassland along ditch pattern

Top soil

Plant

Plant

Plant

Plant

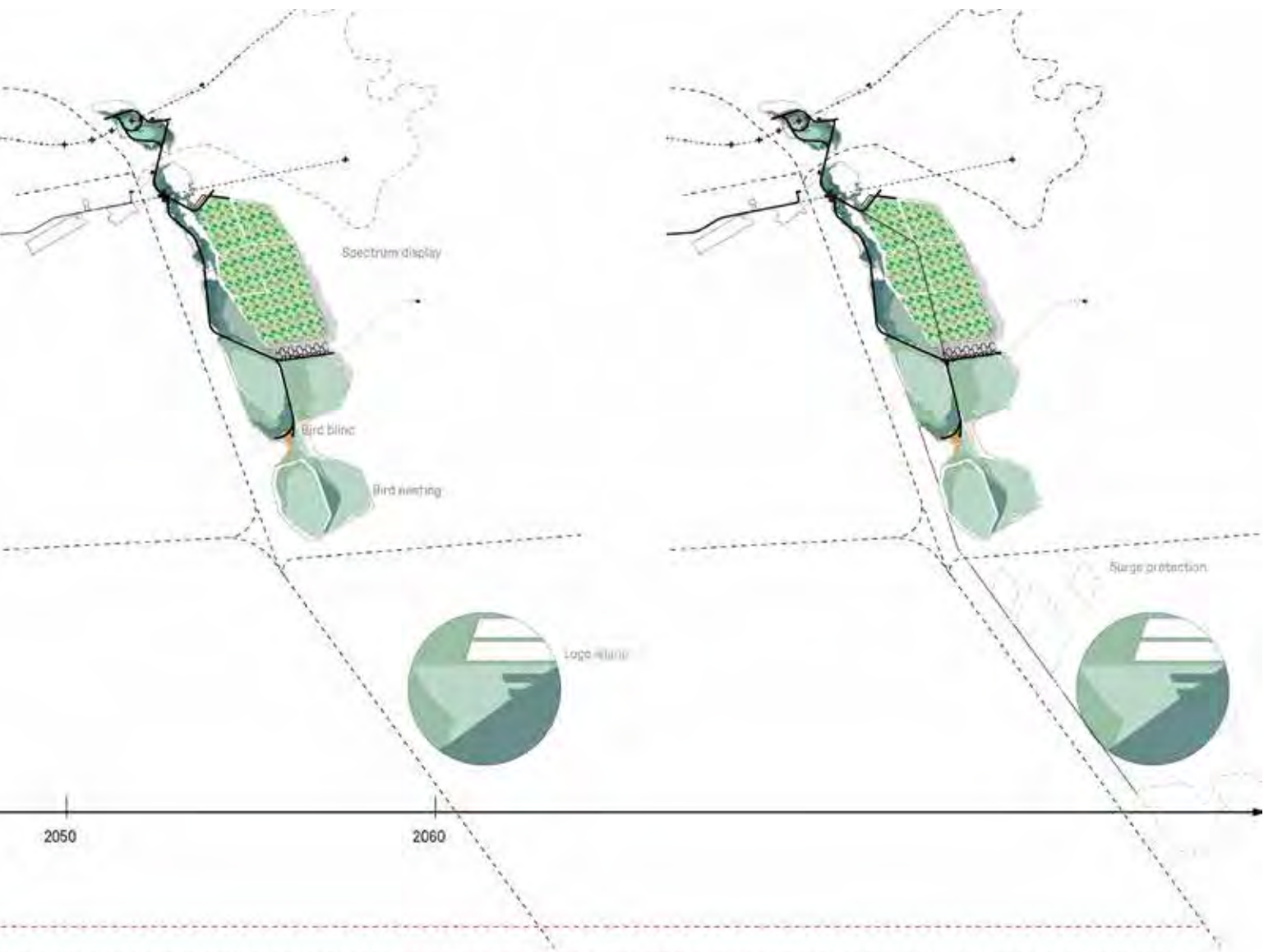
Top soil

Amass www.amass.com and amass@amass.com

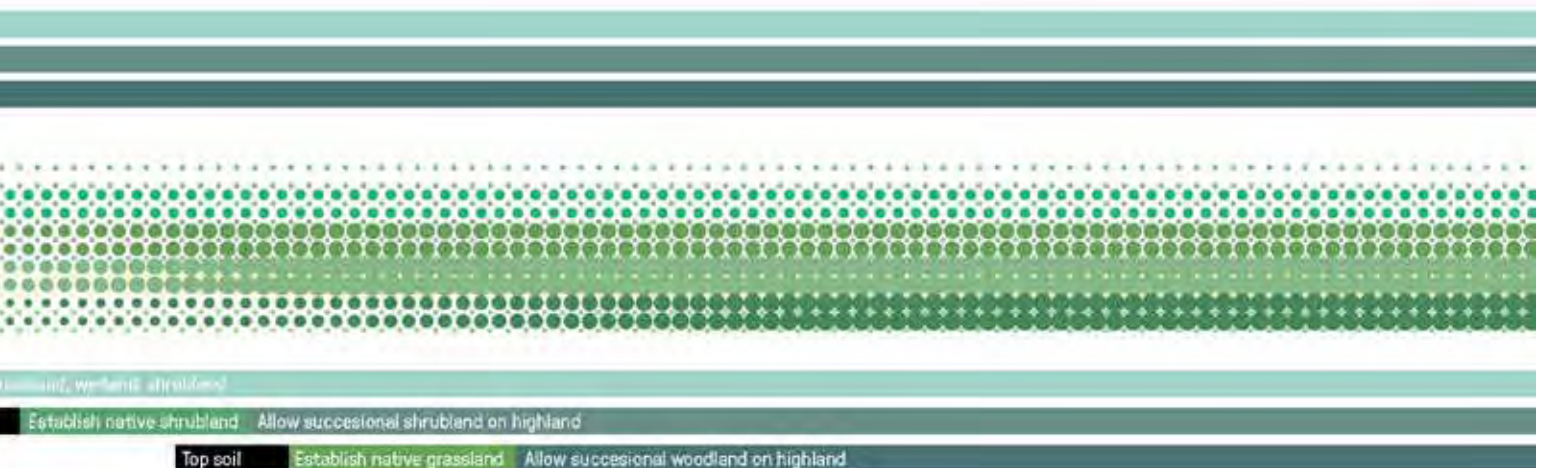
Top soil

C MITIGATION AREA

After the dredge placement reaches its capacity and completes the dewatering process, top soil management proceeds to both remediate and improve soil fertility. The soils then support the establishment of native grasslands and later successional stages.



Dredge island expansion for surge protection









VIEW OF GALVESTON BAY
FROM HOT AIR BALLOON



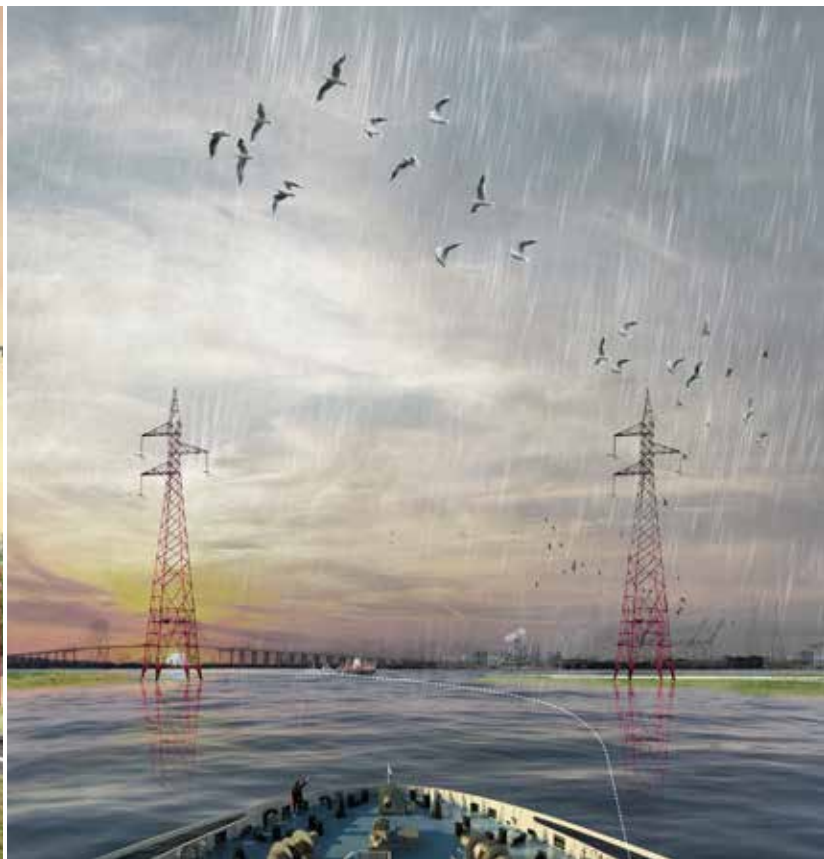
VIEW OF HOUSTON
FROM HOT AIR BALLOON



OYSTER EDUCATION



BARBOURS CUT BLVD GATEWAY AND LOGO BALLOON



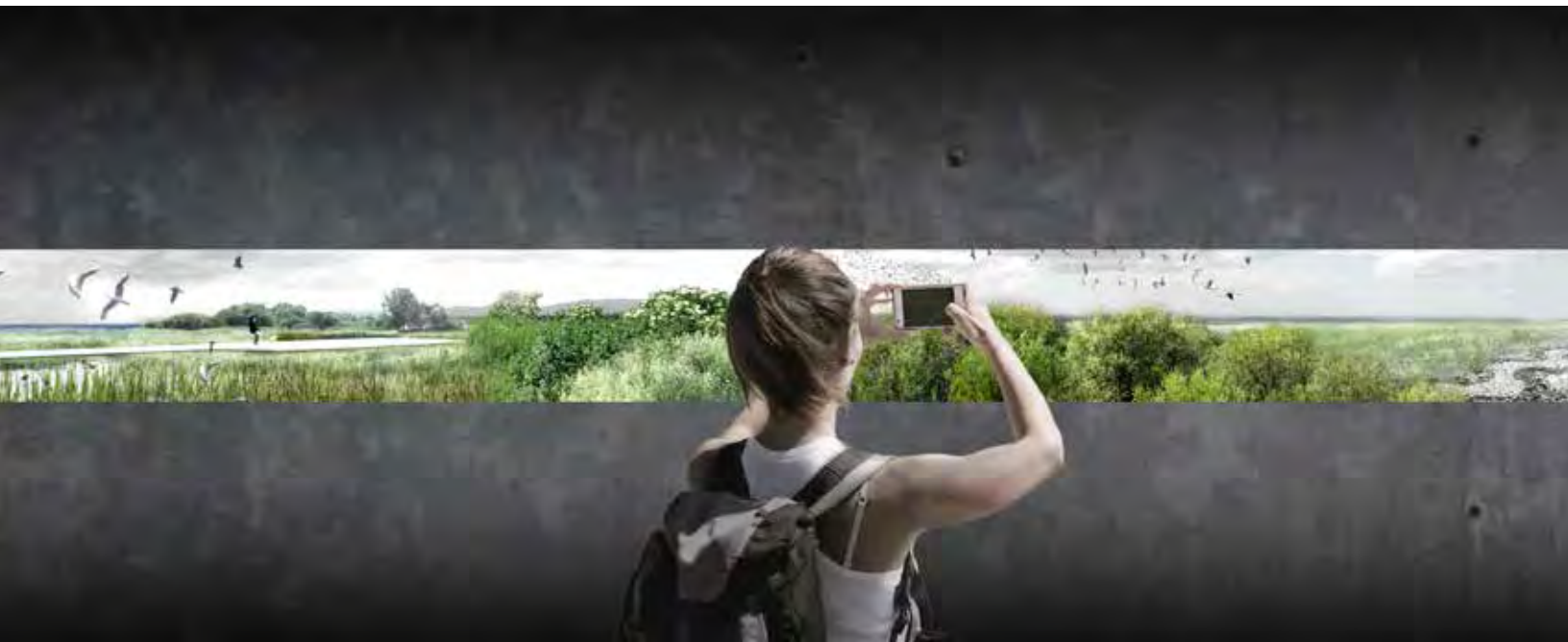
SHIP CHANNEL MARINE GATEWAY



CAMPING AMONGST "BIRD PERCH CIRCLES"



"SPECTRUM DISPLAY" PLANTING BEDS



VIEW OF DREDGE ISLAND NATURALIZED EDGE FROM THE BIRD BLIND



ACKNOWLEDGMENTS

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Commissioner, Precinct 4

Michel Bechtel
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Mayor

Tyler Swanson
Rogers Partners
Associate Partner



How can the Port better connect with the City?

Port Houston operates at the dynamic confluence of industry, transportation networks, community, and ecological systems.

The Port is critical in servicing over \$617 billion in economic activity across the United States and providing over one million jobs in Texas. It has propelled Houston's growth over more than a century and continues to be vital for the City's future. However, the cultural and urban identity of this vast landscape of logistics is not always well understood.

***Moving Landscape* is a research initiative that imagines exceptional places throughout this shifting terrain. The proposal tests ideas for urban spaces and ecological services across the Port Houston reach that have potential to redefine its legibility and role in the region.**

Throughout the summer of 2017, graduate students in Landscape Architecture from across the United States and abroad collaborated with the landscape architecture firm staff to develop this unique vision of Port Houston as a key landscape of the City.



PORT HOUSTON™