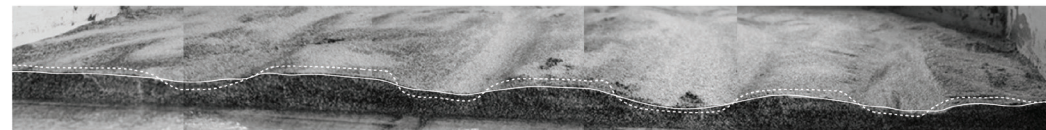
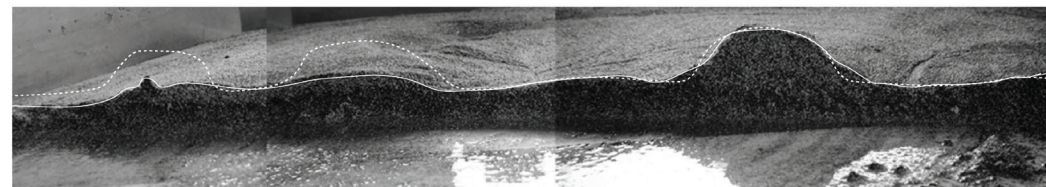


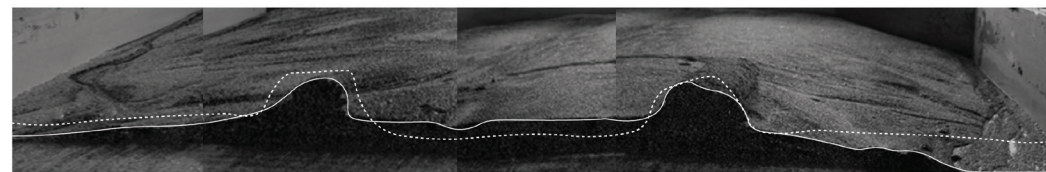
BERMS\_shore parallel



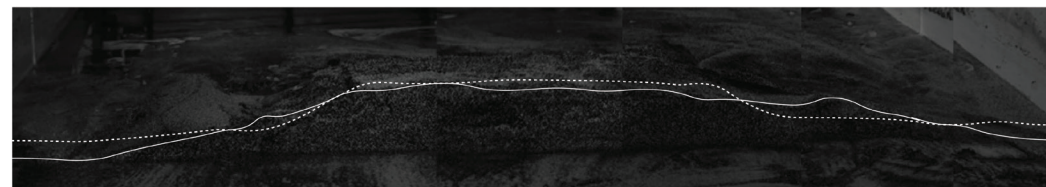
DITCHES\_shore normal



MOUNDS\_sediment



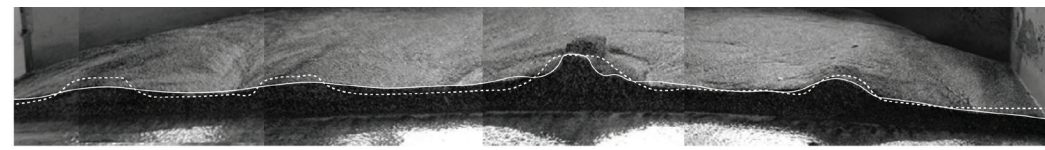
BERMED BASIN



PLATFORM\_wire edge



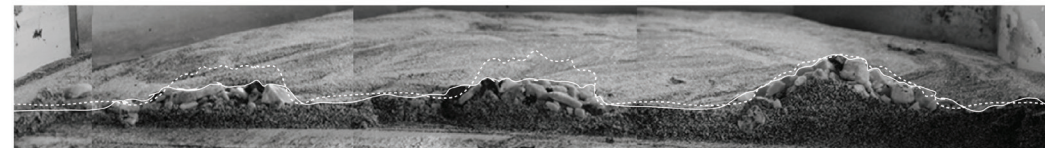
FOURTH SEMESTER LANDSCAPE ARCHITECTURE FOUNDATION STUDIO, LIVE MODELING MODULE



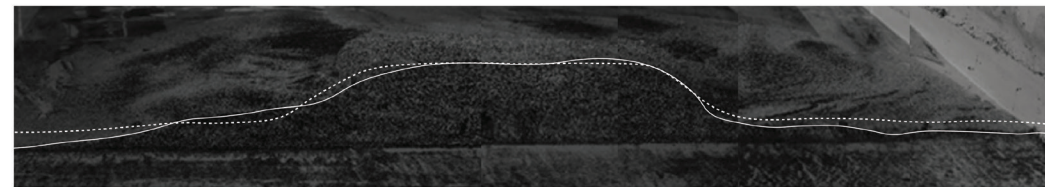
BERMS\_shore normal



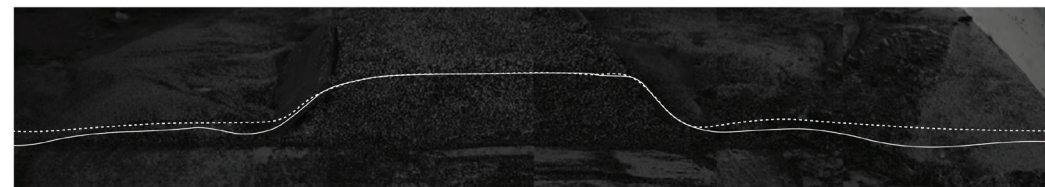
DITCHES\_shore parallel



MOUNDS\_rocks w/sediment core



PLATFORM\_sediment edge



PLATFORM\_tile edge



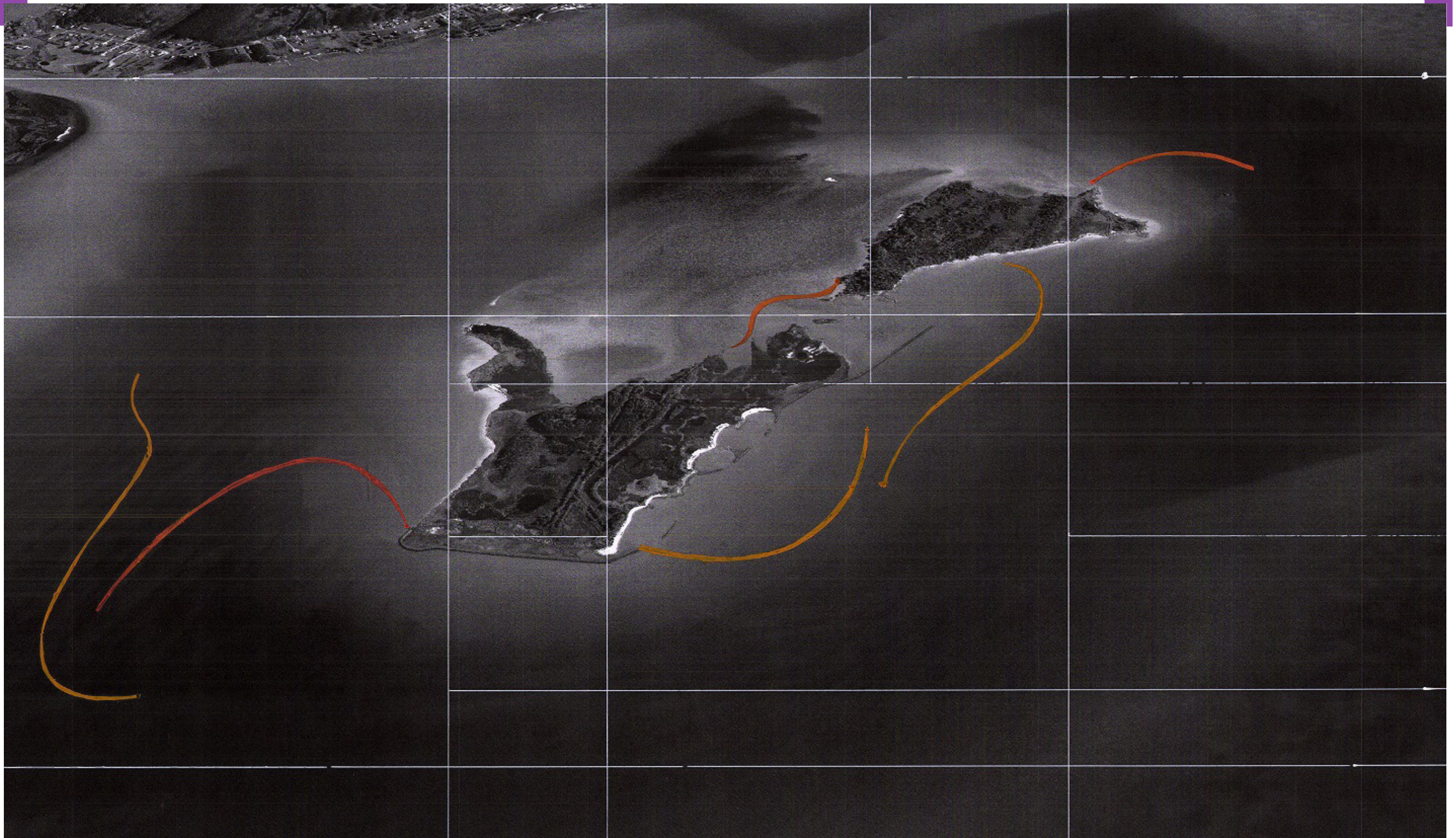
The University of Virginia Department of Landscape Architecture submission was selected from graduate studios that looked at the Chesapeake Bay and the Alaskan North Slope. The landscapes are large and dynamic; they are coastal in some way, and are basically rural. These related preoccupations compose a theme of the program in the last five years. This focus springs from our geographic location in the coastal, largely rural commonwealth of Virginia together with the premise that today, large rural landscapes are most at issue.

The projects selected here are the work of groups of 3-4 students. Our core curriculum pushes students to develop their voice and articulate their values, and the semester-long collaborations these projects represent require both friction and cohesion, often through both debate and coordination of responsibilities. These

are critical skills for large landscape work and help the students develop and test landscape ideas through abstraction and precision.

We have identified projects that construe landscape along a continuum of tradition and innovation. The commitment to history—of places, of ideas, and practices—has long been a preoccupation at UVA. History's relationship to innovation forms the backbone of the best work we see around the program. Recently, this approach has developed into a portfolio of natural infrastructure concepts and new ideas on preservation and restoration of very large landscapes that are changing fast. The aim is to resolve these propositions at the level of the detail, with an interest in the tools, humans, and machines that comprise the technical approach.



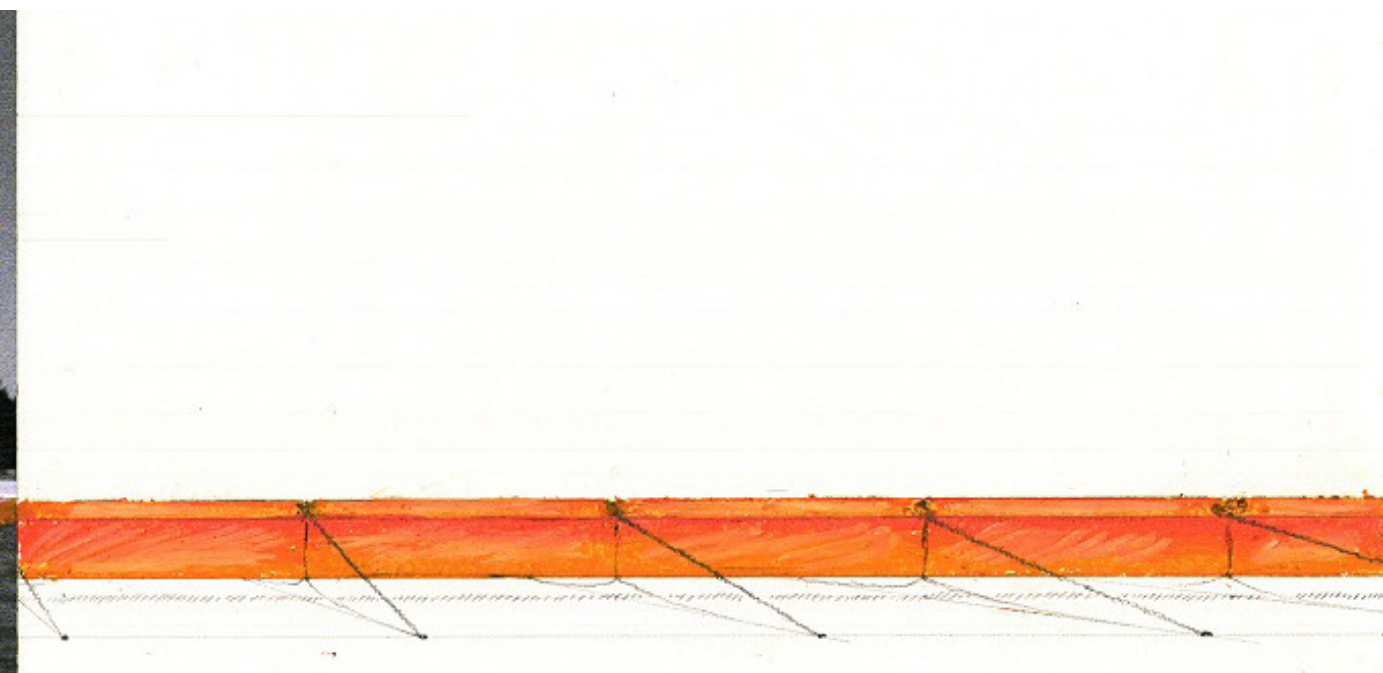
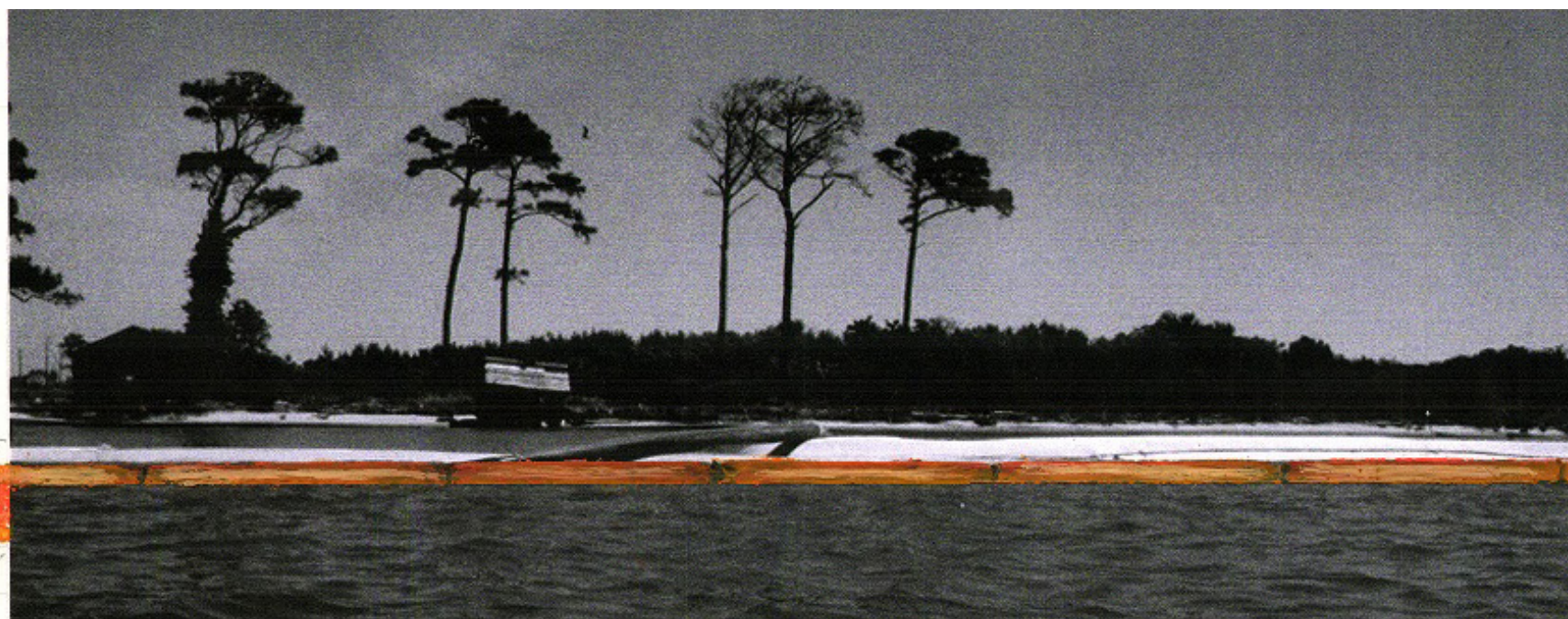


**Country/City** Chesapeake Bay, Virginia, USA  
**University / School** University of Virginia School of Architecture, Department of Landscape Architecture  
**Academic year** 2023-2024  
**Title of the project** Bay Datum: Weaving the Littoral Line  
**Authors** Ailsa Thai, Andre Grospe, Judy Chen



**Title of the project** Bay Datum: Weaving the Littoral Line  
**Authors** Ailsa Thai, Andre Grospe, Judy Chen  
**Title of the course** LAR 7020 Prototyping the Bay: Landscape as Medium  
**Academic year** 2023-2024  
**Teaching Staff** Bradley Cantrell, Brian Davis, and William Shivers  
**Department / Section / Program of belonging** Department of Landscape Architecture

**University / School** University of Virginia School of Architecture



Within the dynamics of the Chesapeake Bay, the project merges fluvial geomorphology with the traditional knowledge of local watermen. The collaboration uses sediment fences to form large-scale installations that act as land-building infrastructure.

Harnessing the understanding of the Bay's currents and moods known by the watermen, the project strategically places arrays of fences in areas identified as optimal for sediment deposition. The sediment fences are seeded with dredge over time, situating fluvial earthworks within the currents and stabilized by the installation of the fencing. The knowledge of the watermen guides the placement to work in harmony with the currents of Bay, maximizing the capture of suspended silt and sand carried by the tides. The fences are designed as visual markers in the vast expanse of the Bay. Arranged in sweeping arcs they create a stark contrast against the mutable shorelines, acting as a datum that registers the immense and often invisible changes that are unfolding.

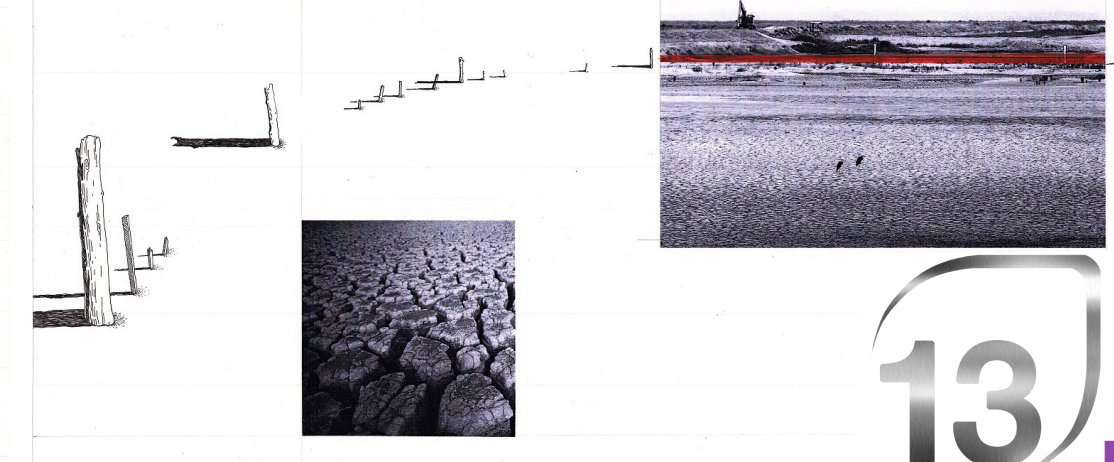
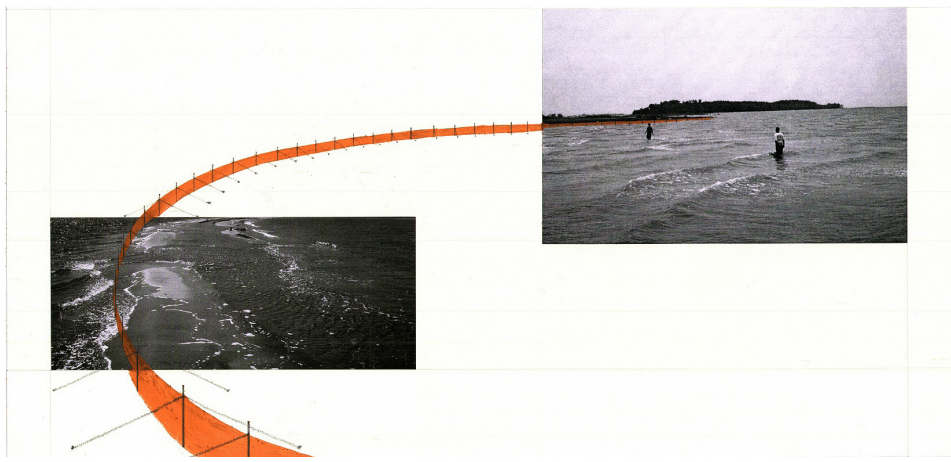
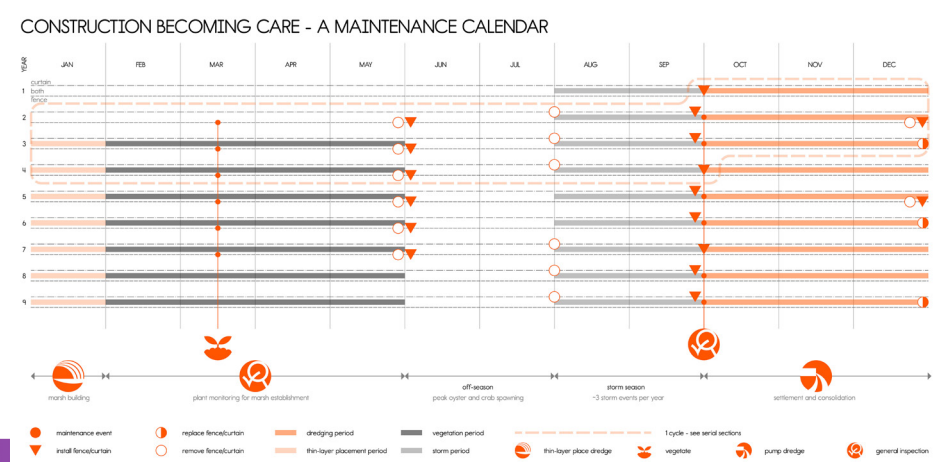
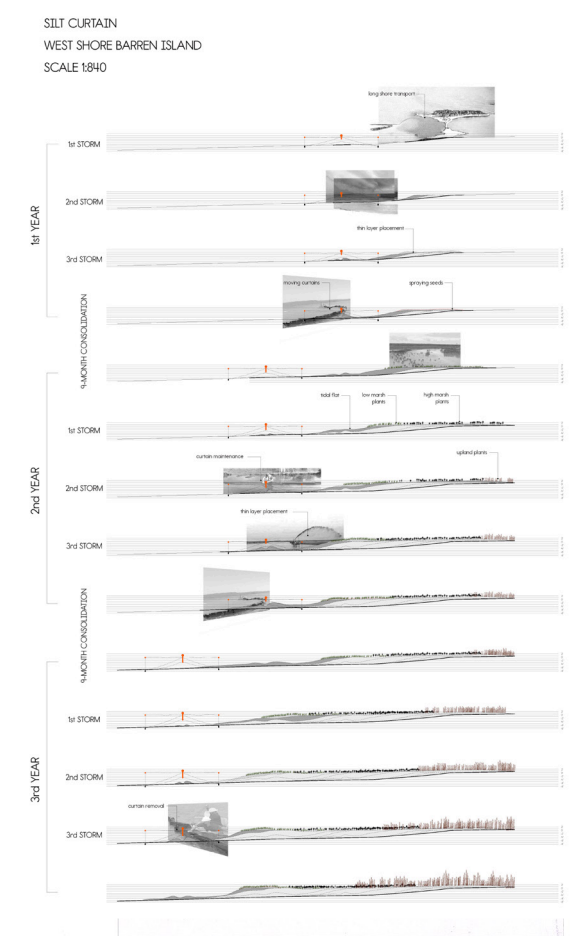
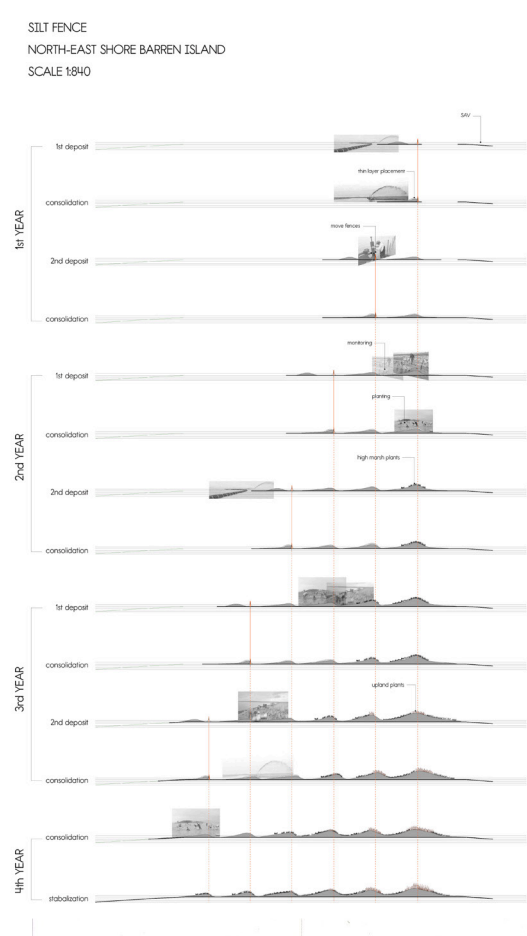
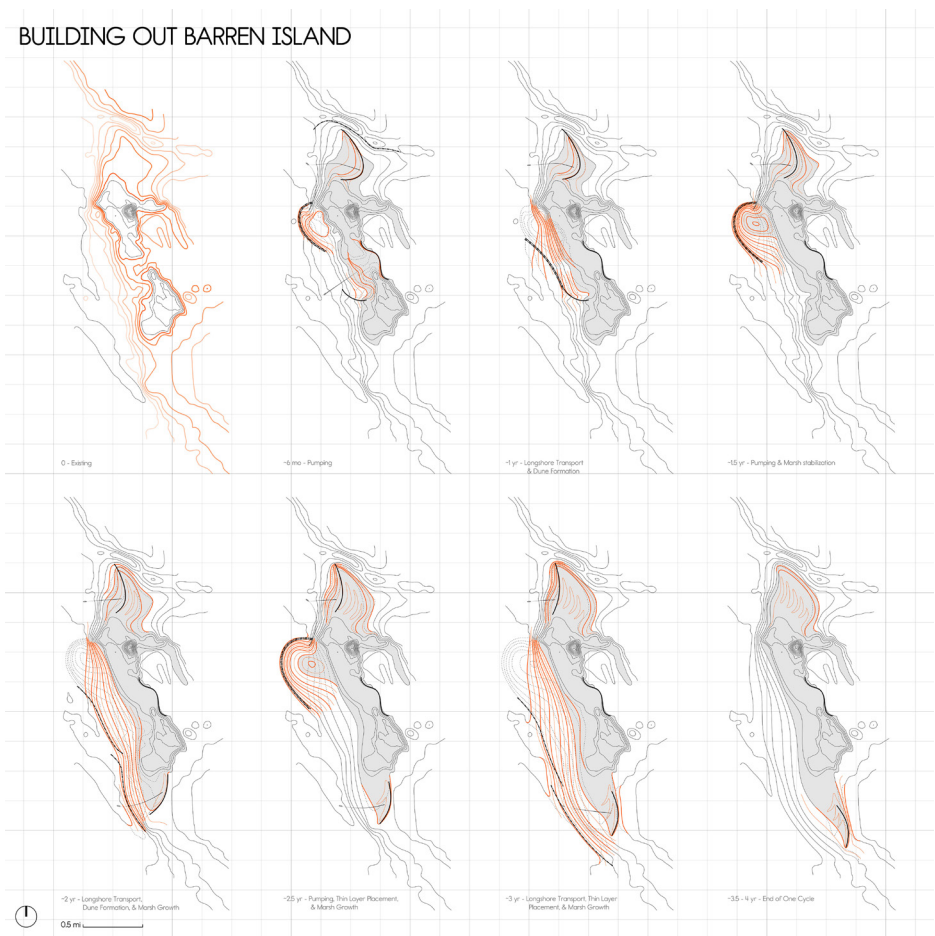
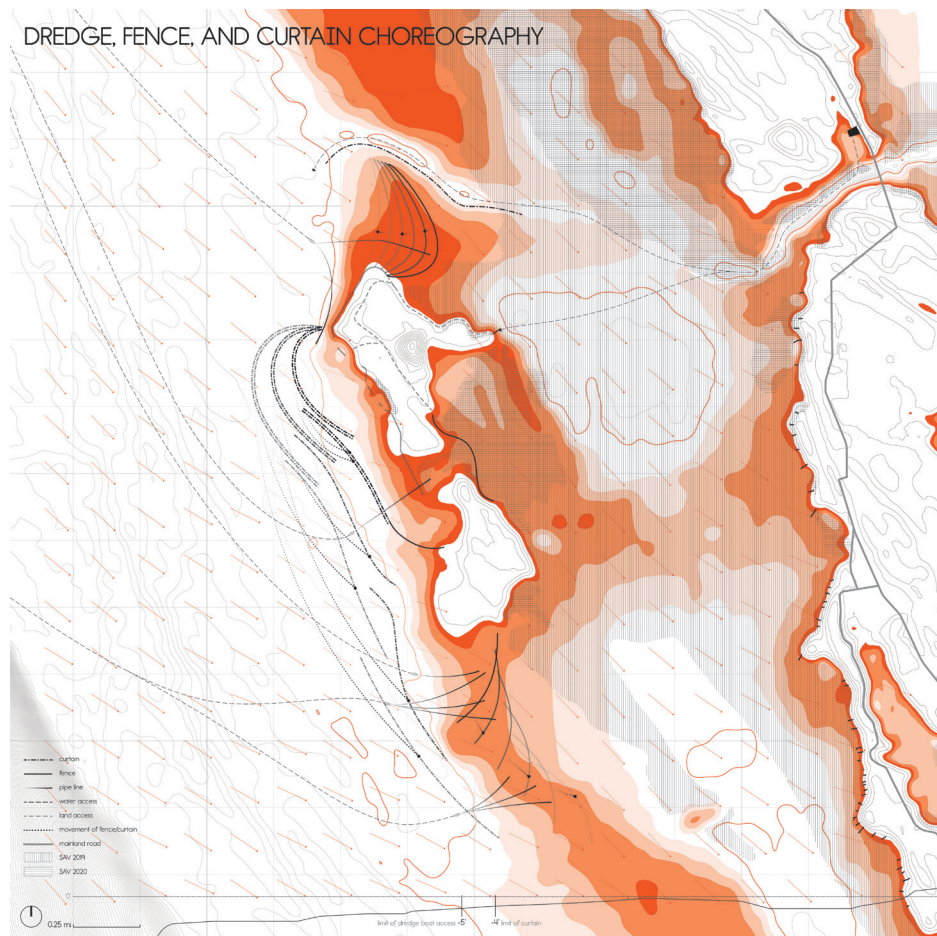
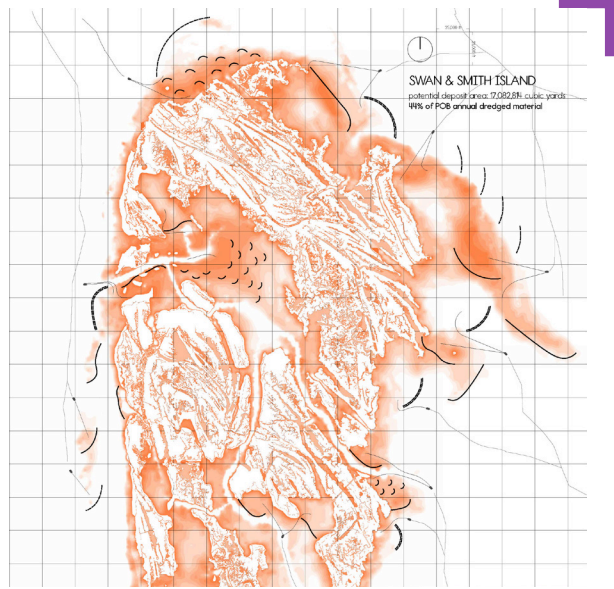
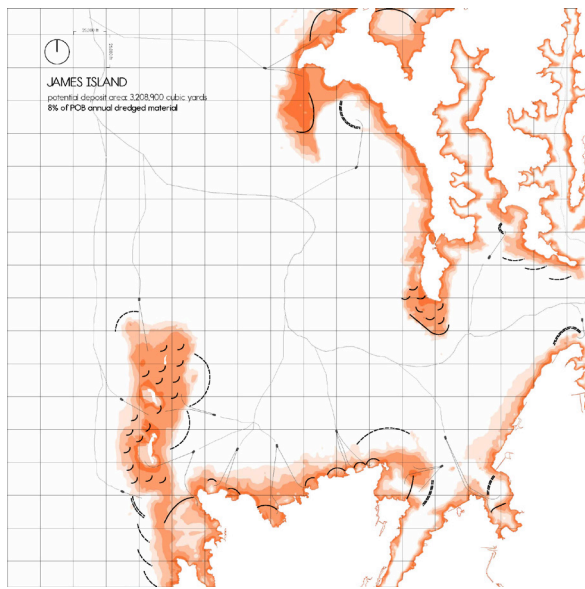
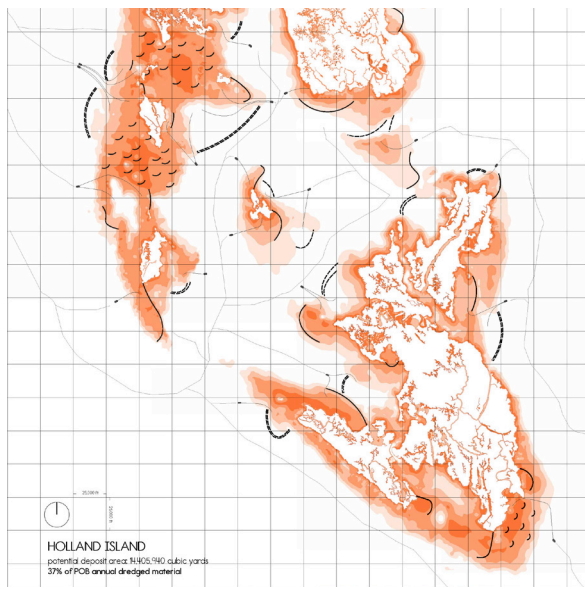
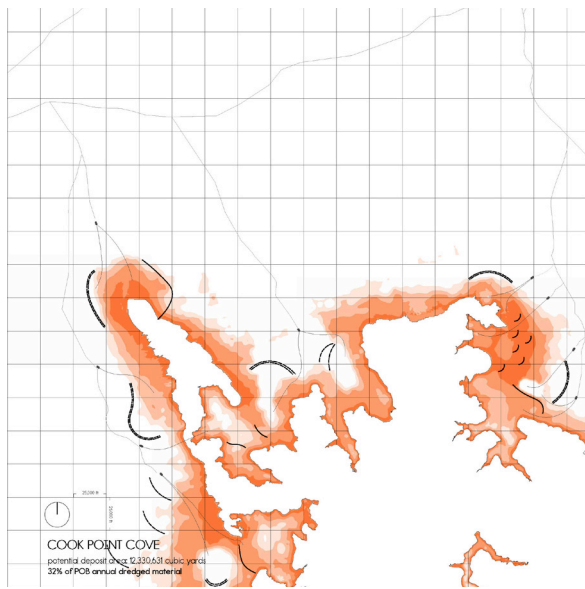
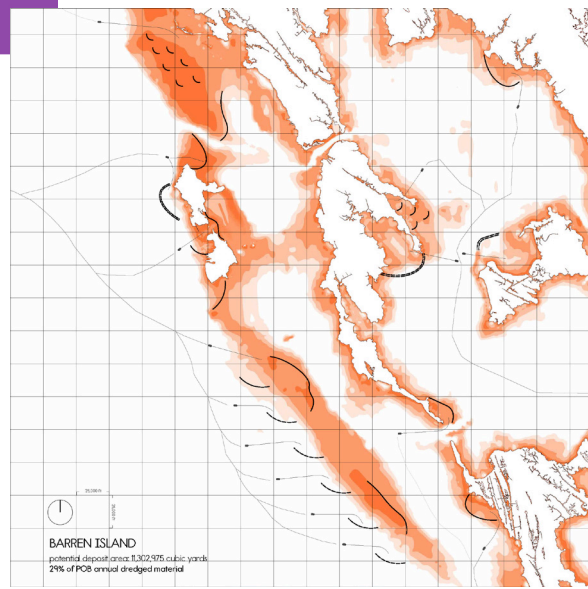
Over time, this process of deposition builds new land. What begins as subtle shoaling around the fences gradually grows into nascent mudflats and the foundations for new salt marshes. These emerging landforms provide critical habitat for wildlife and help buffer coastal communities from storm surge. This novel form of earthwork is a tangible record of change, revealing the forces of erosion and deposition while sculpting an adaptable future for the Chesapeake Bay.

## Barcelona International Landscape Biennial

Contact via email:  
biennialadm@coac.net

Venue:  
COAC - Col·legi Oficial d'Arquitectes de Catalunya  
Carrer Arcs 1-3, 08002 Barcelona - Spain



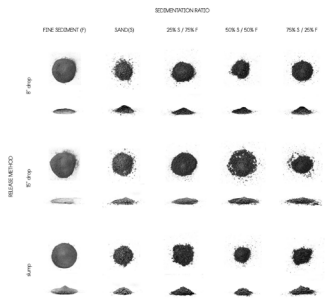




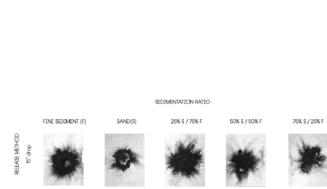
SEDIMENT EXPERIMENTS

DROPPING & SLUMPING

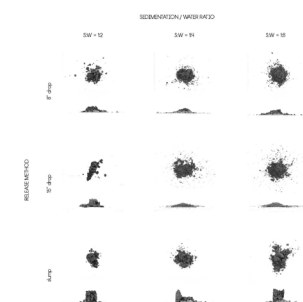
DRY DUMPS



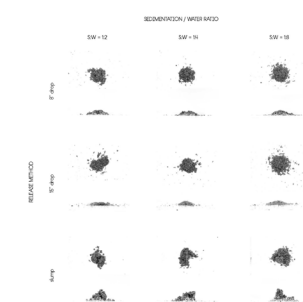
WATER DUMPS



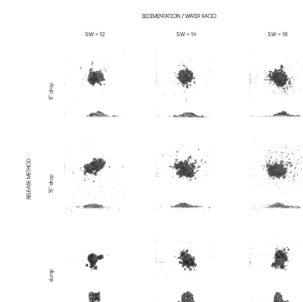
WET DUMPS - FINE SEDIMENT



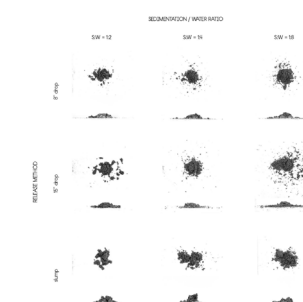
WET DUMPS - SAND



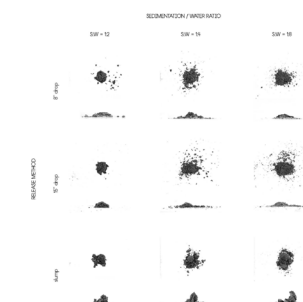
WET DUMPS - 75% FINE, 25% SAND



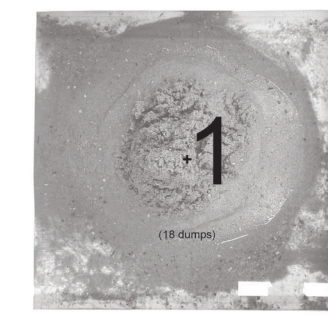
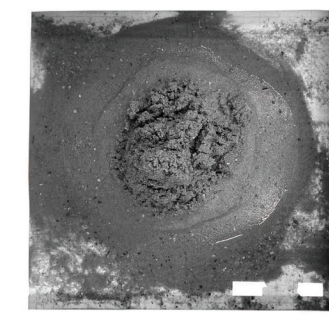
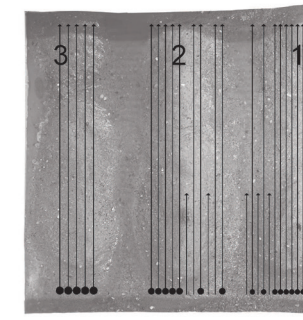
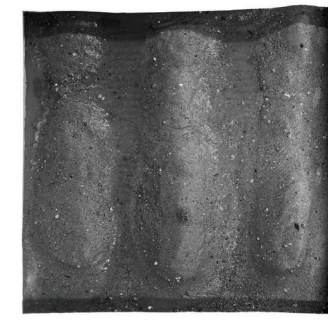
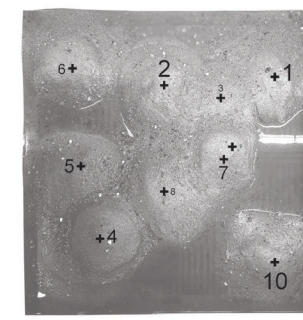
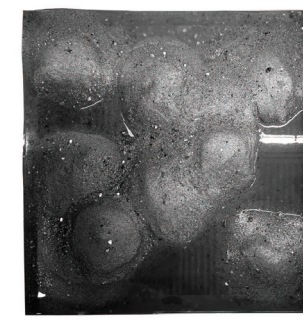
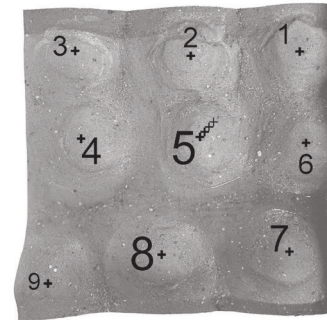
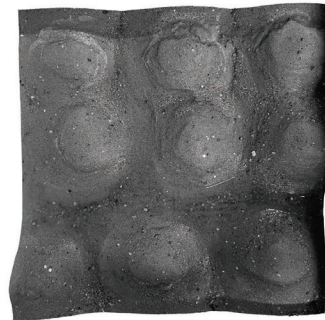
WET DUMPS - 50% FINE, 50% SAND



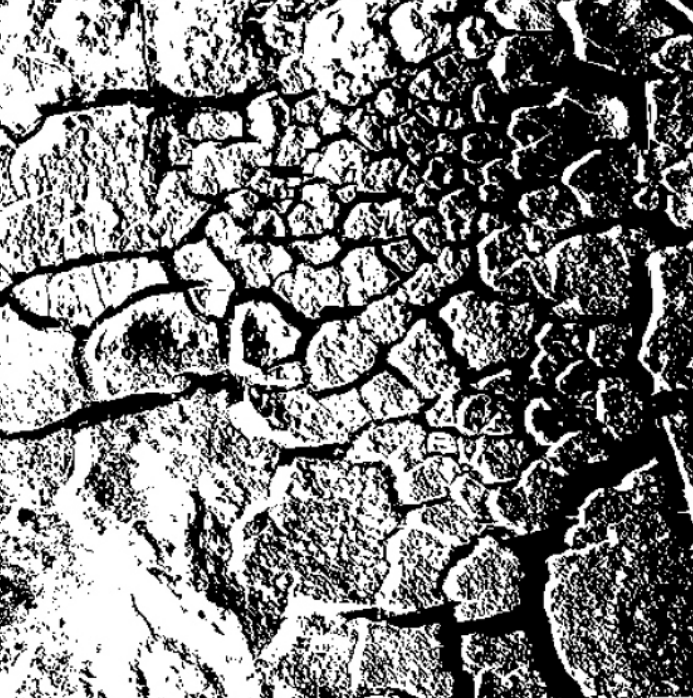
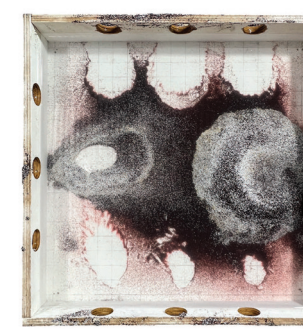
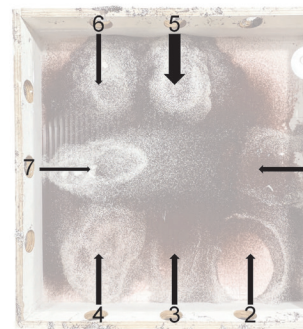
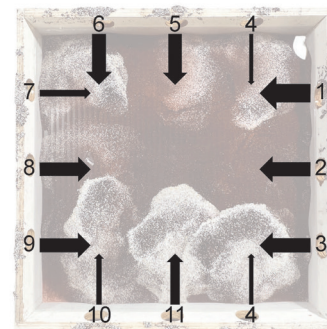
WET DUMPS - 75% FINE, 25% SAND



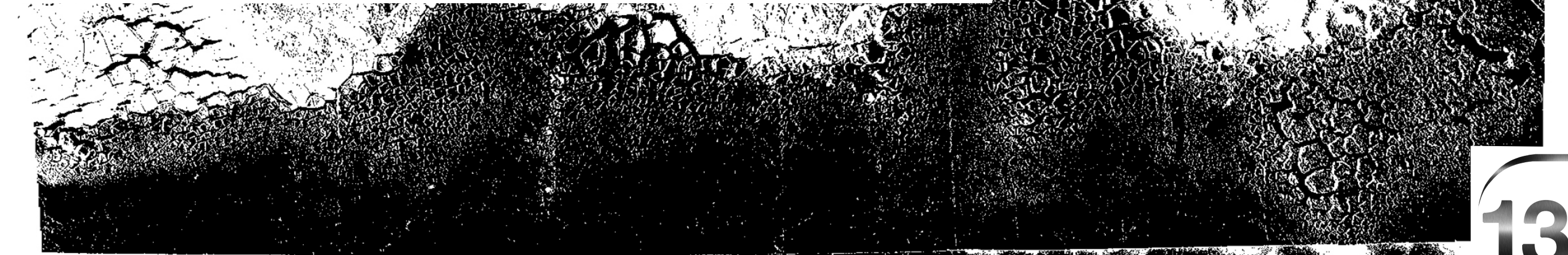
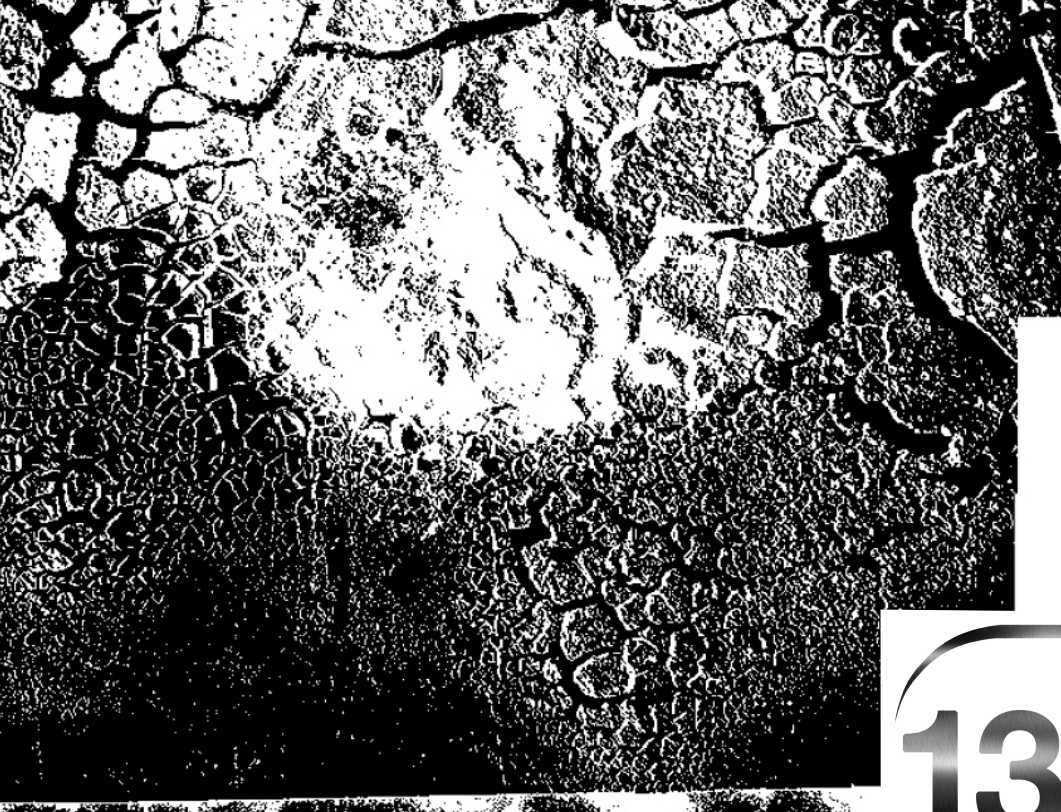
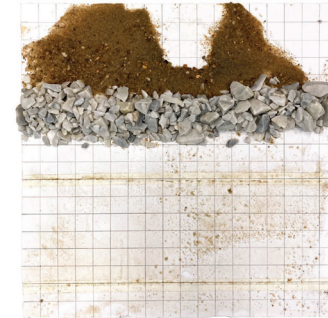
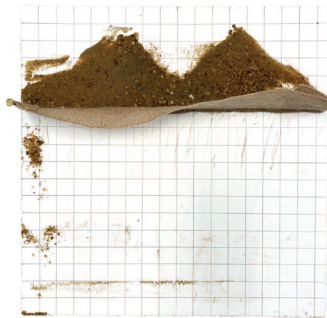
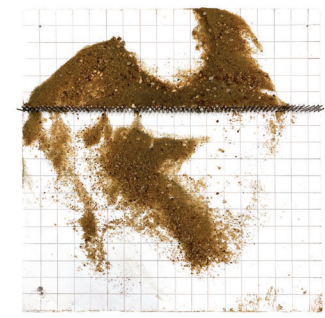
MOUND BUILDING



PUMPING & INFILLING



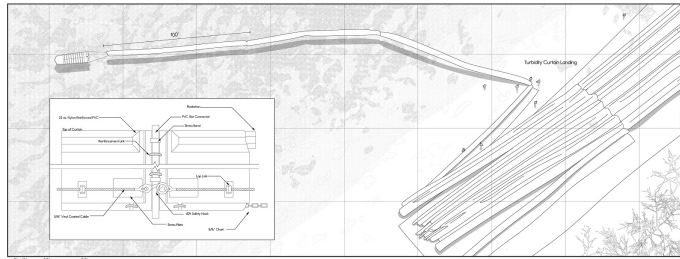
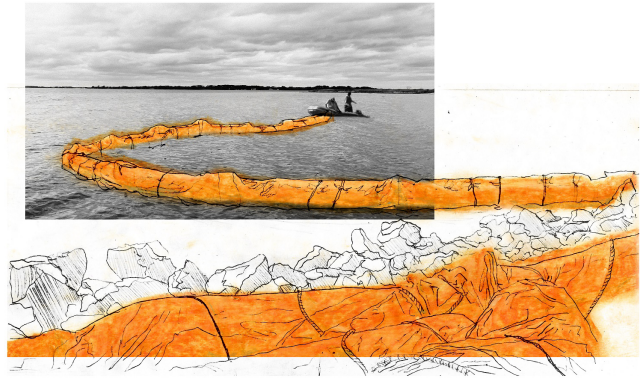
CONTAINING & FILTERING



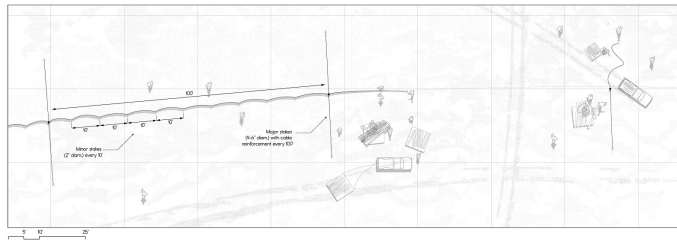
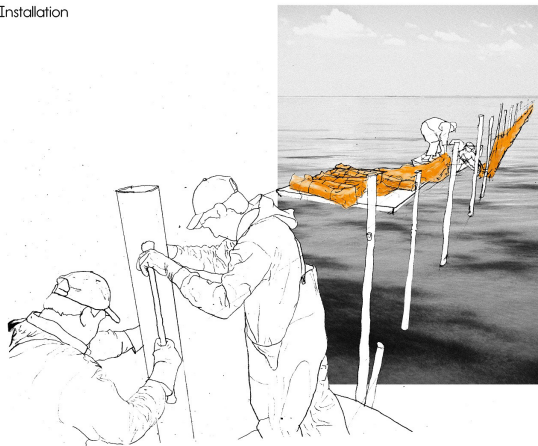
DRYING & CRACKING



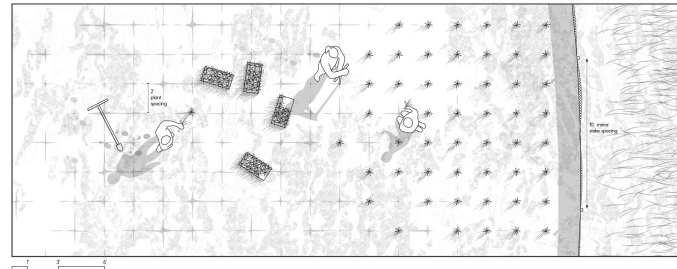
## Curtain Installation



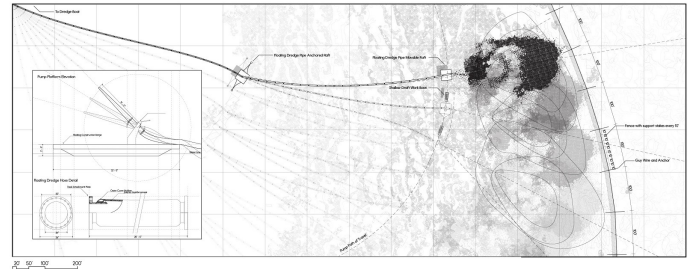
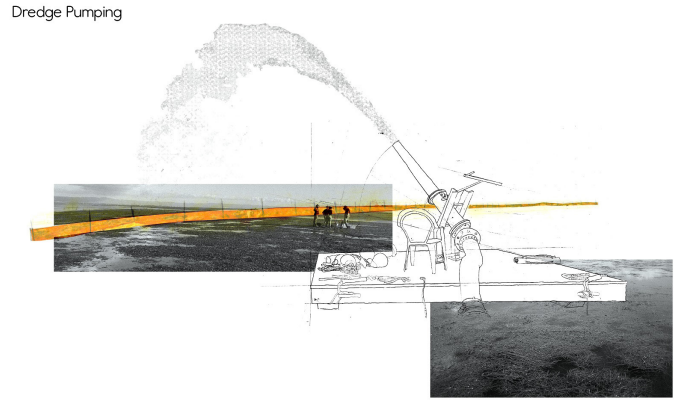
## Fence Installation



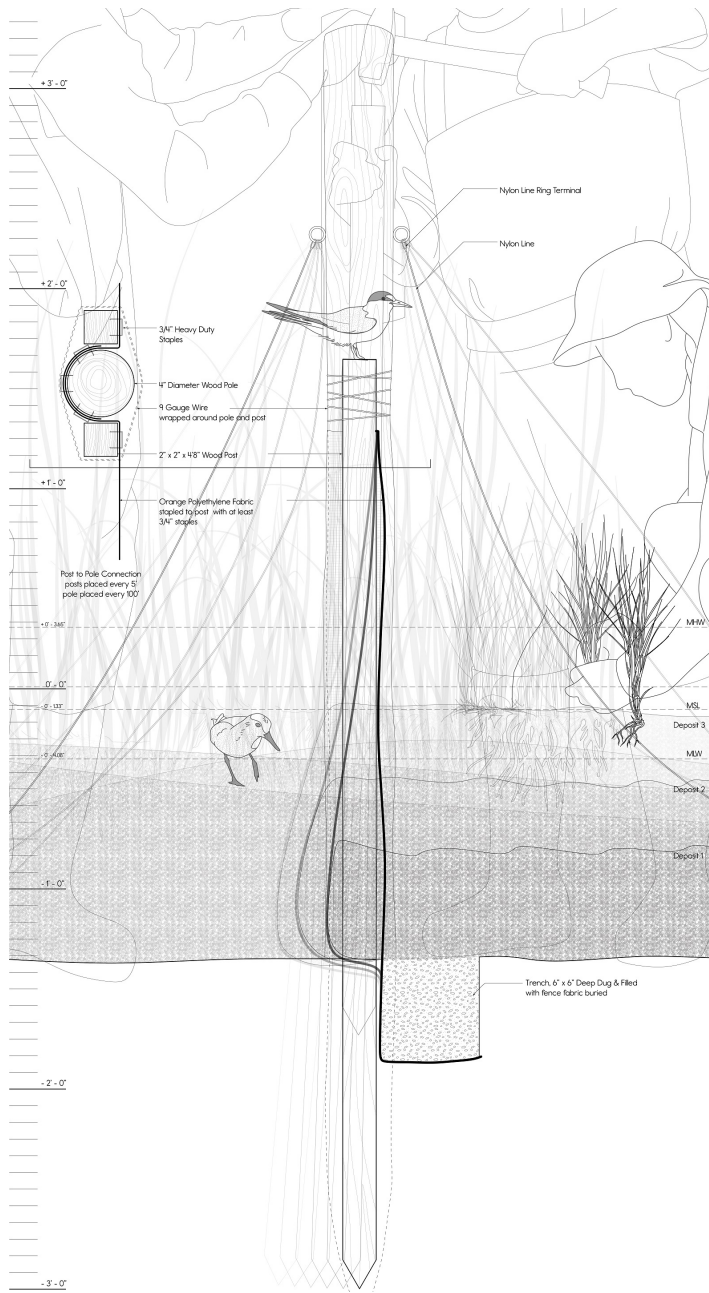
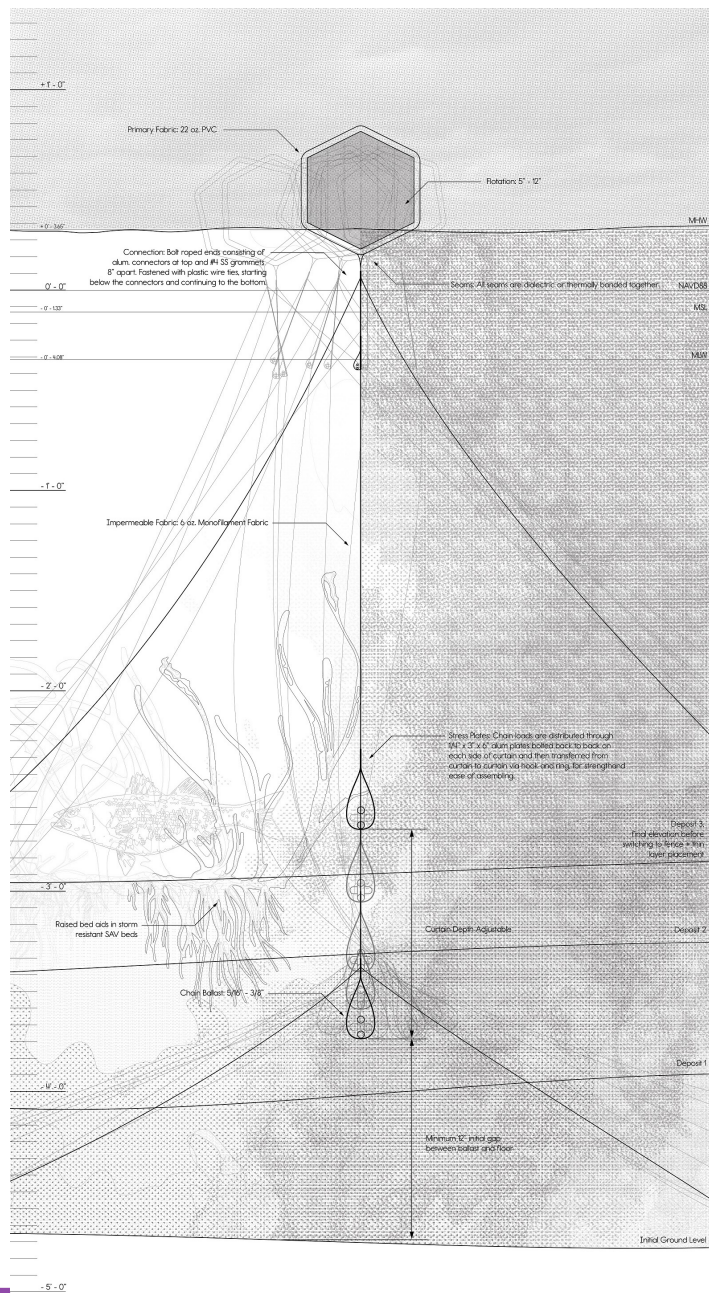
## Planting



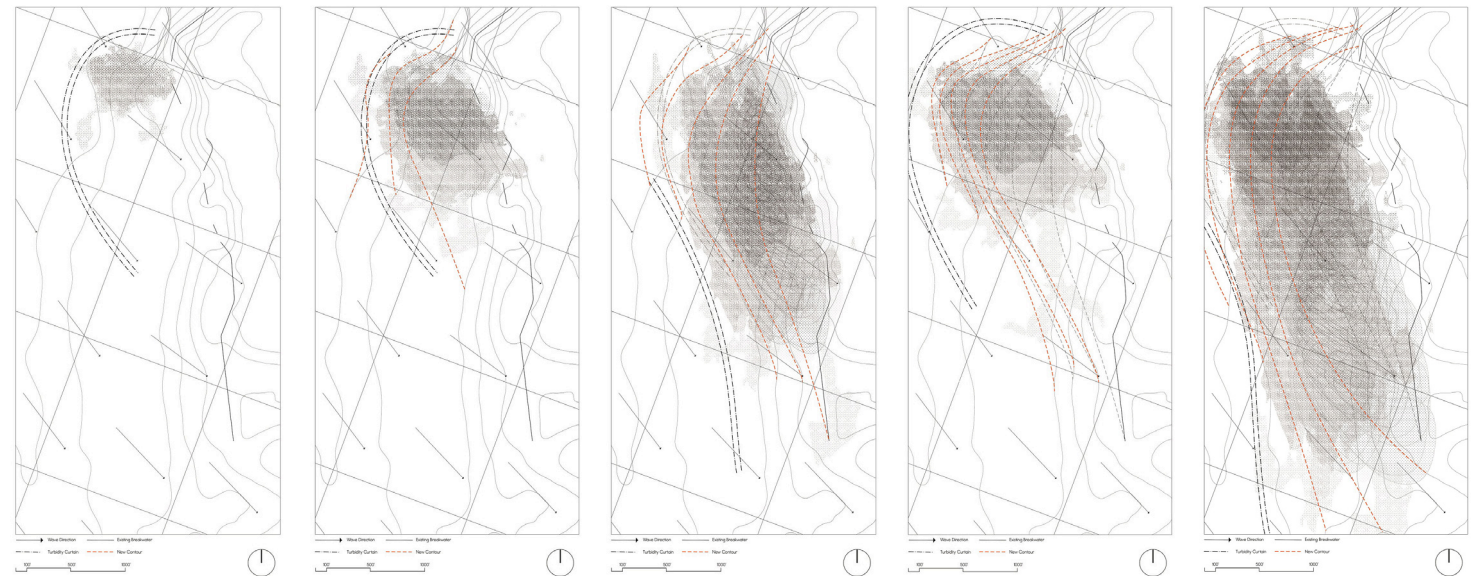
## Dredge Pumping



## INSTALLATION PHASES



## DREDGE PLACEMENT AND TEMPORAL DRIFT



## LAND FORMATION



## FENCING INSTALLATION DETAILS



## Grounding Crisfield.

This is a thin place. Its flatness means that even the smallest topographic changes matter a great deal. In Crisfield and the surrounding landscape, people have been working with and manipulating the ground for centuries. The range of strategies and ground manipulations indicate ways people have and will continue to live with and respond to this wet, ever-changing place.

*delmarva bay*

*shell midden*

*elevated road*

*dredge mound*

*dredge channel*

*drainage ditches*

Country/City	Crisfield, Maryland, Pocomoke Sound, Chesapeake Bay, USA
University / School	University of Virginia School of Architecture, Department of Landscape Architecture
Academic year	2024-2025
Title of the project	Marsh Rhythms
Authors	Alexander Heald, Alex Fry, Alexandra Daley, Ruth Shatkay



**Title of the project** Marsh Rhythms  
**Authors** Alexander Heald, Alex Fry, Alexandra Daley, Ruth Shatkay  
**Title of the course** LAR 7020 Prototyping the Bay: Landscape as Medium  
**Academic year** 2024-2025  
**Teaching Staff** Bradley Cantrell and Leena Cho  
**Department / Section / Program of belonging** Department of Landscape Architecture

**University / School** University of Virginia School of Architecture



In response to the threat of sea level rise in Crisfield, Maryland, the project builds upon an existing proposal to elevate roadways and seawall edges, transforming infrastructure into a catalyst for a future imaginary. The project envisions a Crisfield that embraces its shifting coastline, creating landscape typologies that stitch the elevated barrier, forming a connection between the town and the evolving tidal landscape.

A component of this vision is the adaptation of decommissioned buildings, breathing life into vacancy as hubs for community experiences and ecological education. The sites are woven into the town's fabric through a network of pathways and boardwalks. The circulation system is designed as a sensory experience; the texture of the pathways and ground surfaces vary, providing a tactility for people to engage with the evolving landscapes. Materials like weathered wood, oyster shells, and vegetation differentiate the isolated interior from the transitional zones and the wilder, shifting marshlands outside the barrier, creating a connection to the environment.

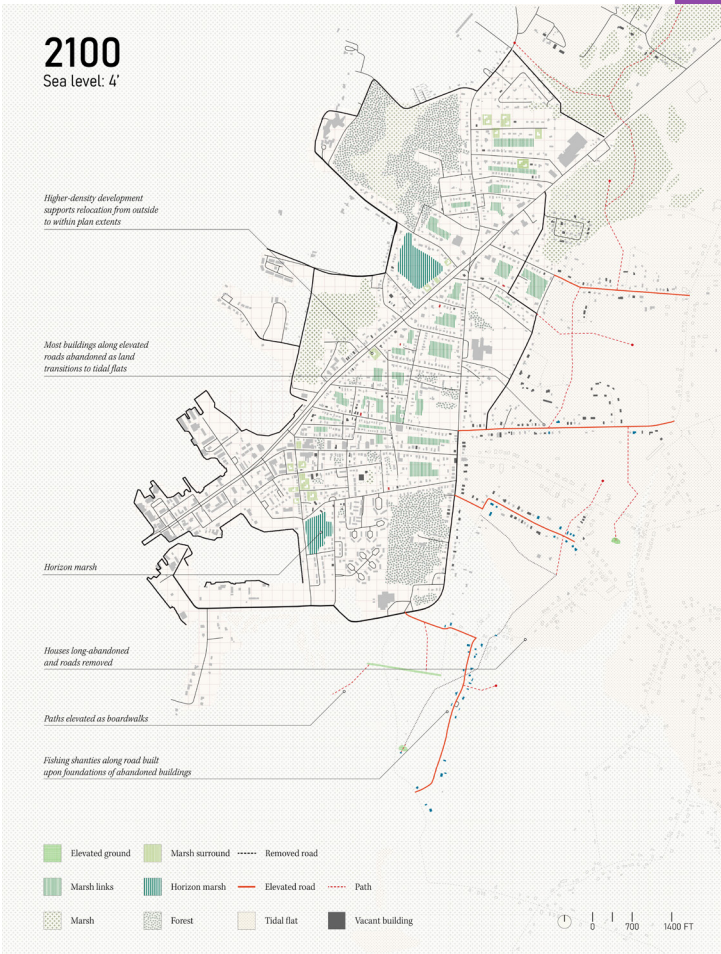
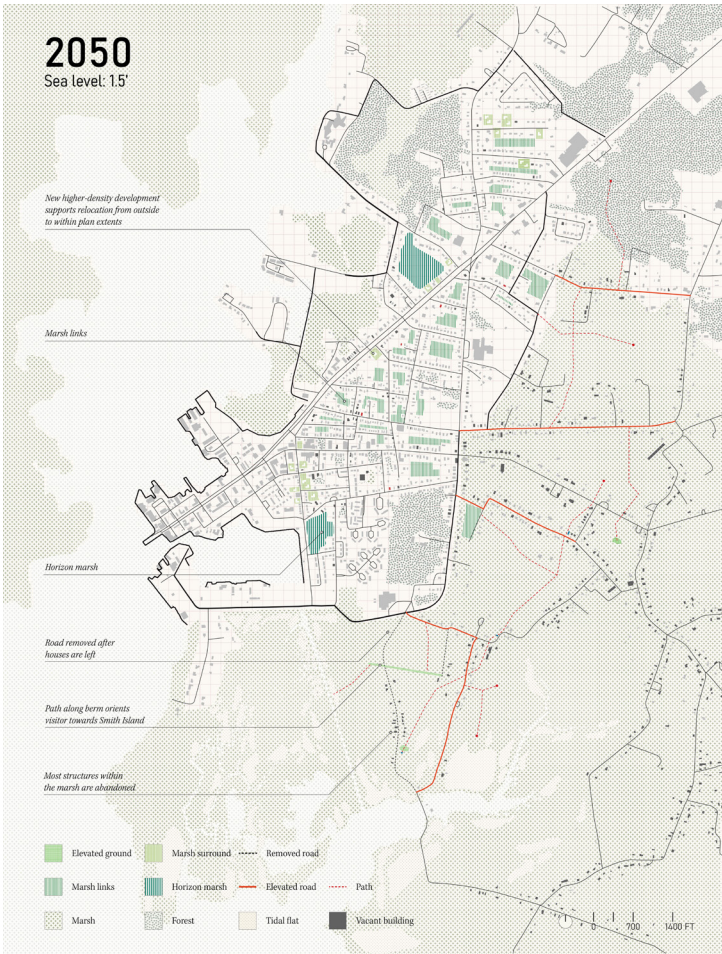
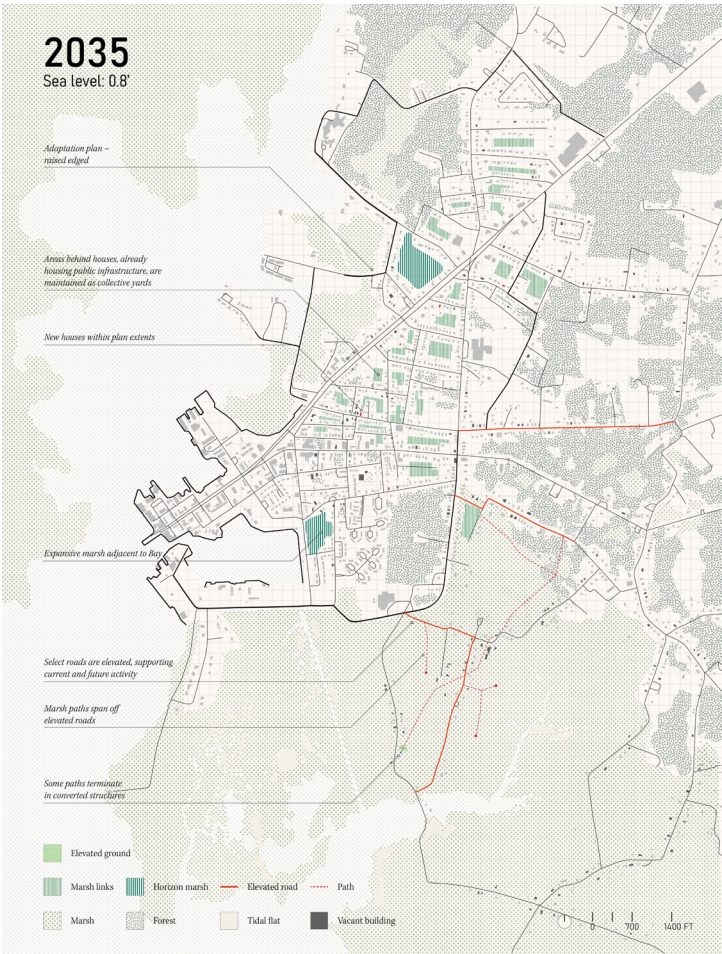
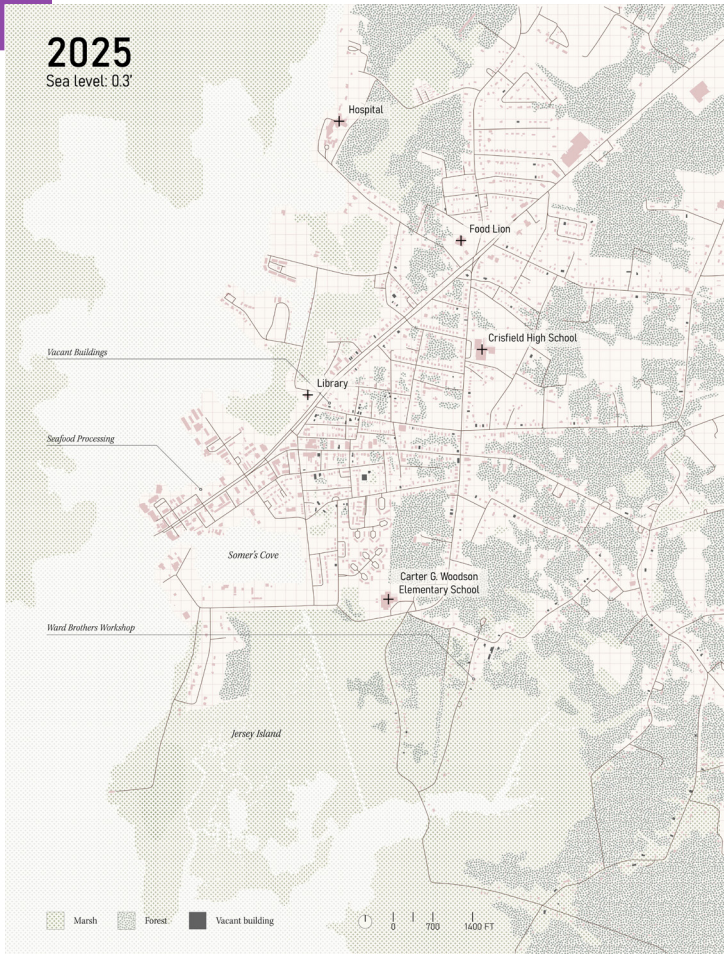
Within the barrier, the project proposes a series of interconnected stormwater management parks. The landscapes are designed not just as infrastructure but as community amenities. Capturing and filtering stormwater, these parks mitigate flooding in the interior while providing new recreational spaces, habitat for local flora and fauna, and educational opportunities for residents. The approach to adaptation recasts the challenge of sea level rise as an opportunity to forge a stronger, more diverse, and connected community fabric for the future of Crisfield.

## Barcelona International Landscape Biennial

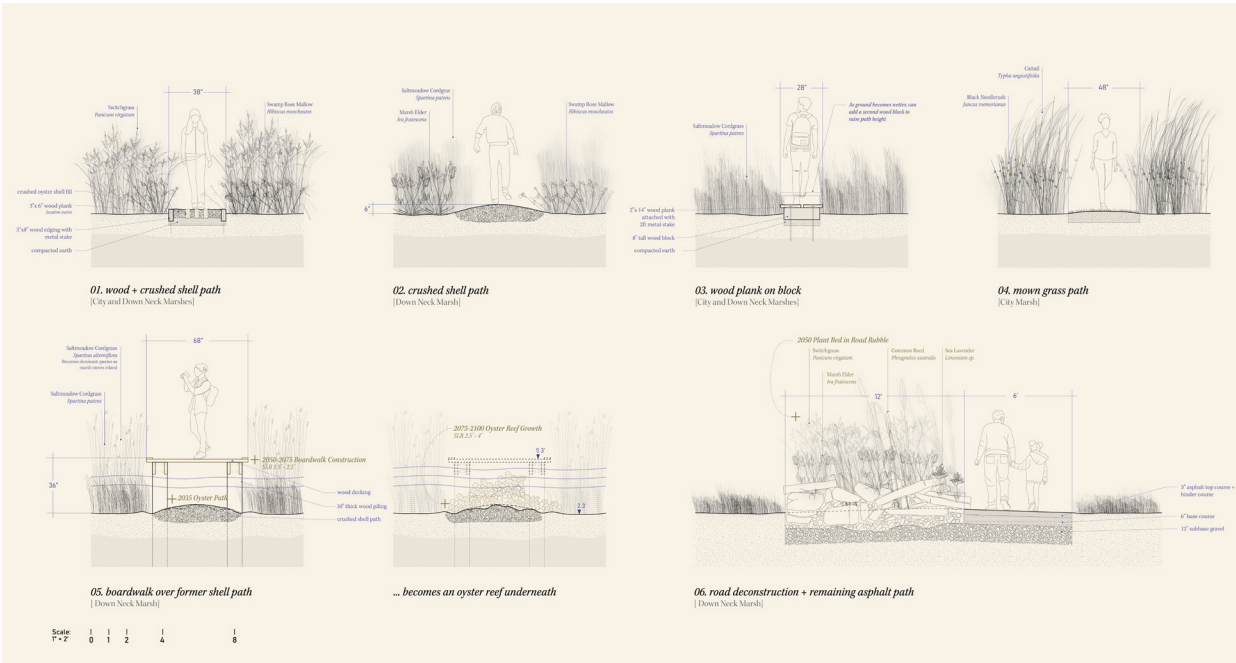
Contact via email:  
biennialadm@coac.net

Venue:  
COAC - Col·legi Oficial d'Arquitectes de Catalunya  
Carrer Arcs 1-3, 08002 Barcelona - Spain

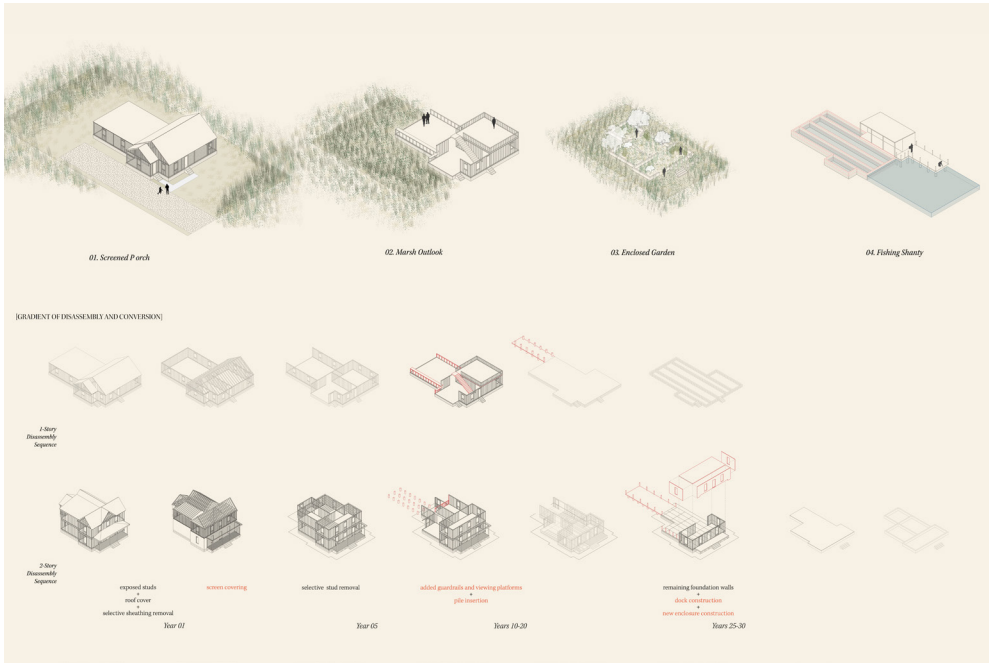




SITE EVOLUTION WITH SLR PREDICTIONS



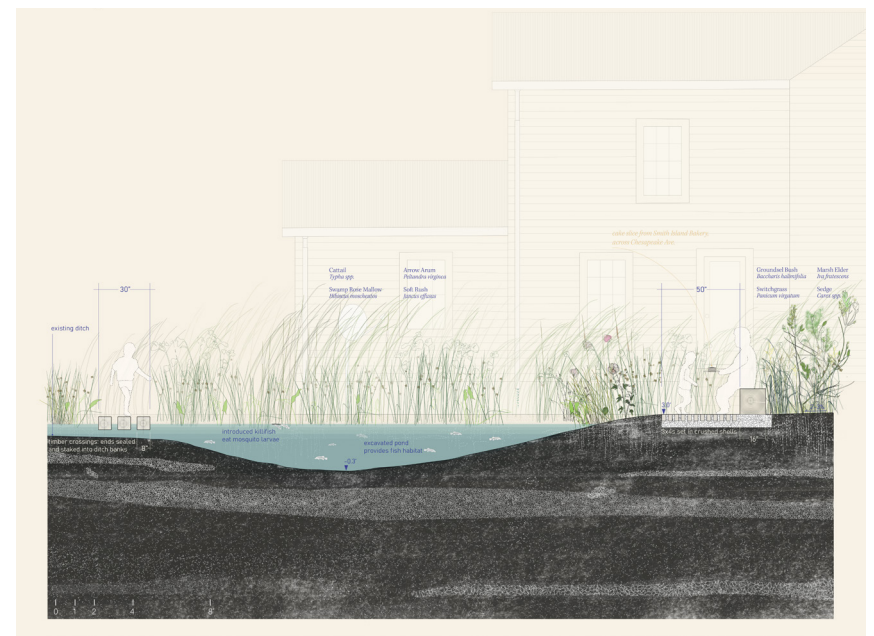
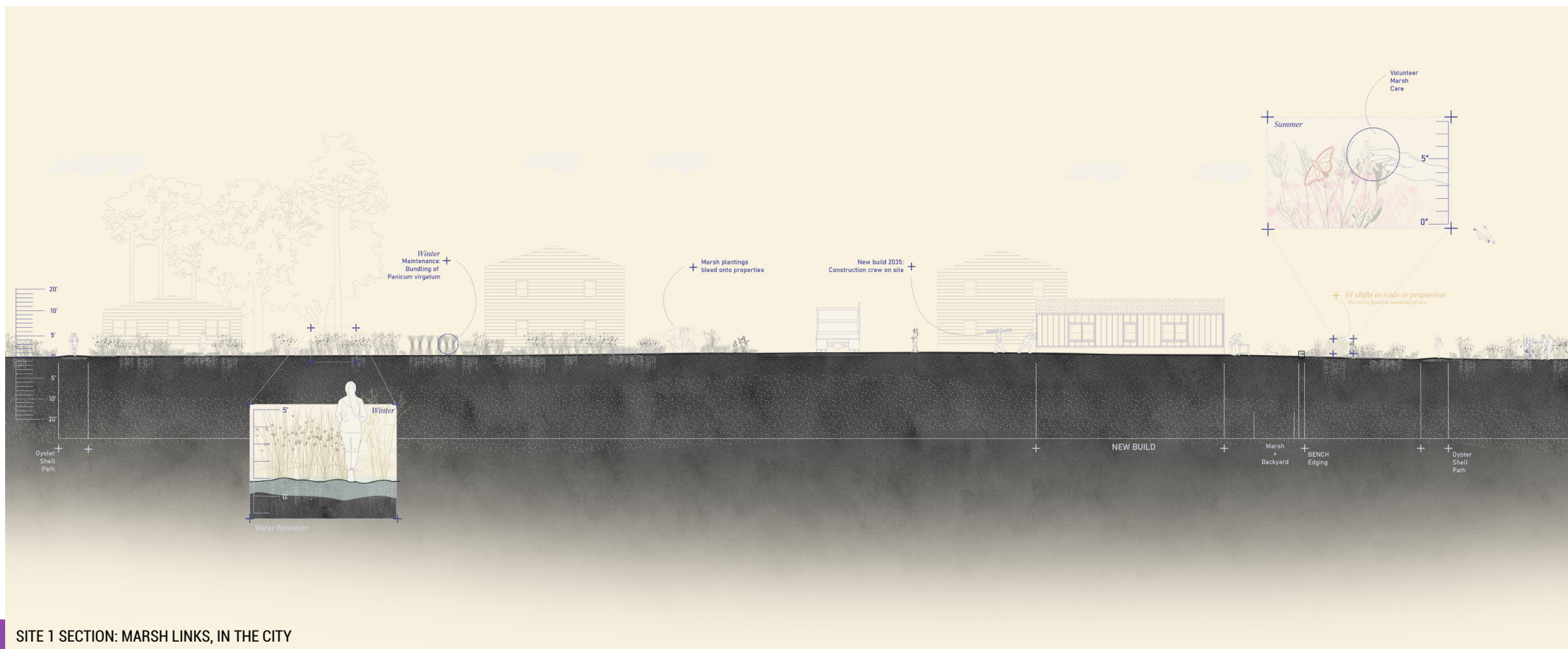
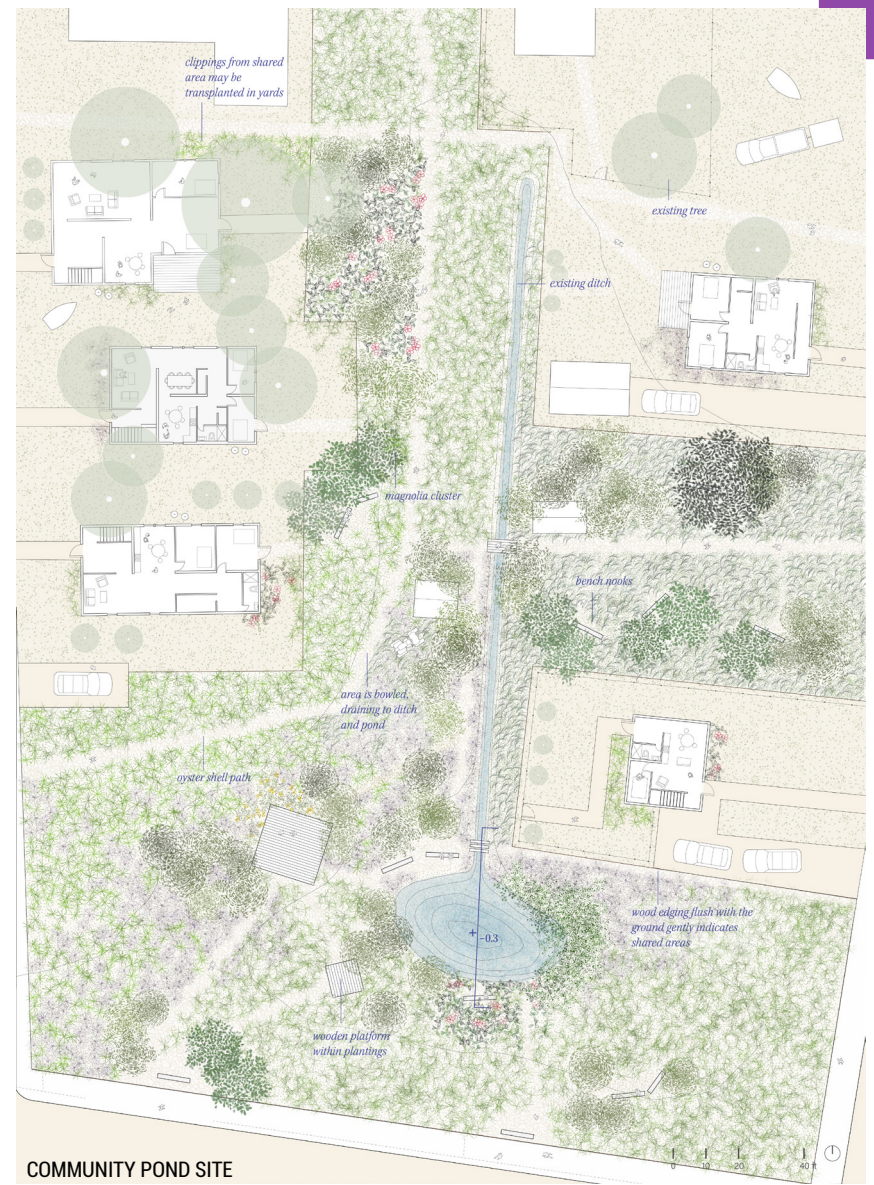
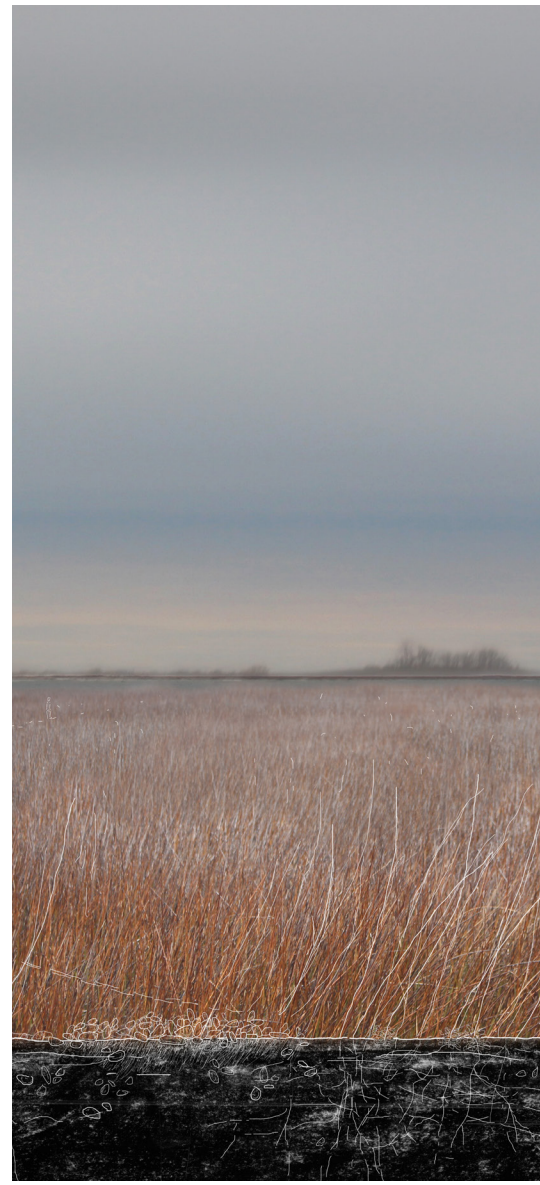
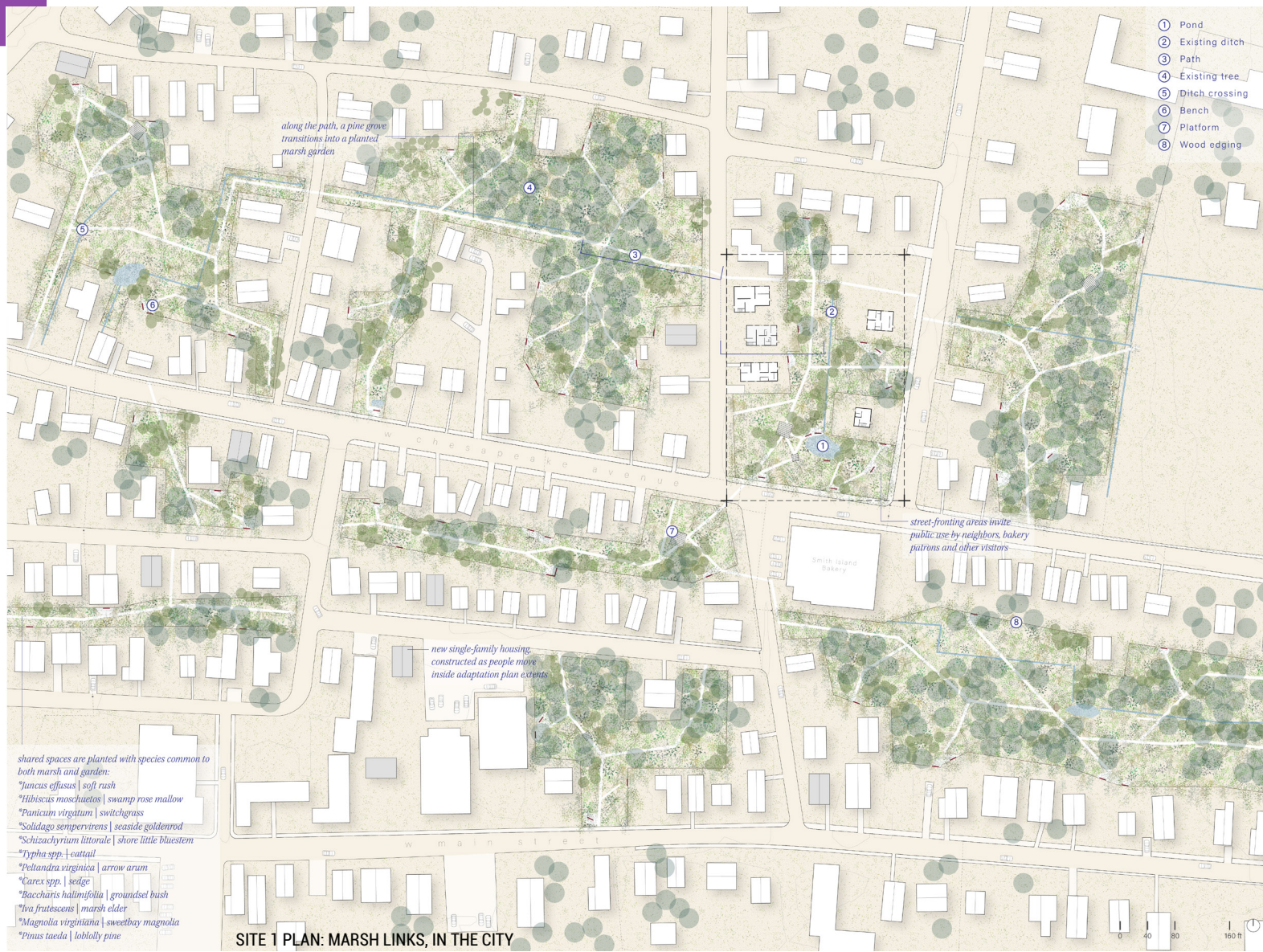
PATH DETAIL AND MATERIAL STUDIES



DECOMMISSIONING STUDIES AND PHASING



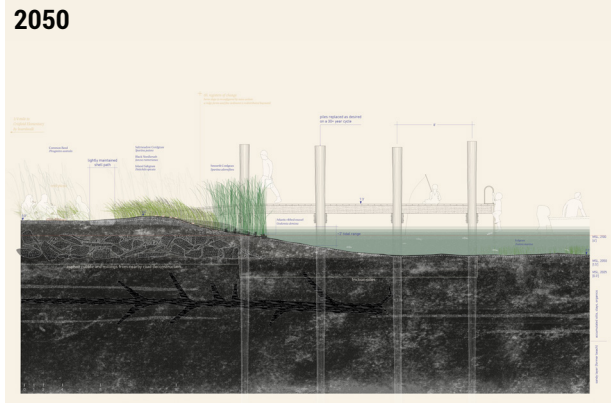
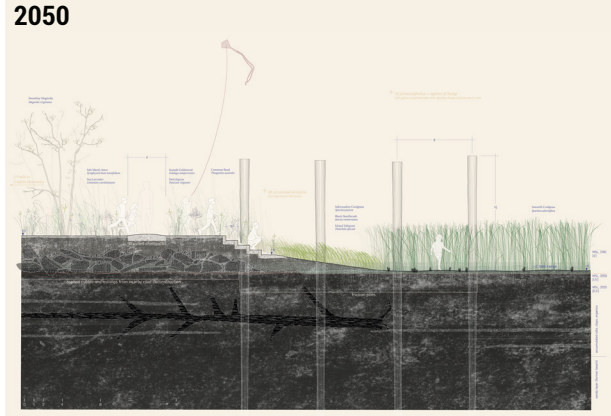
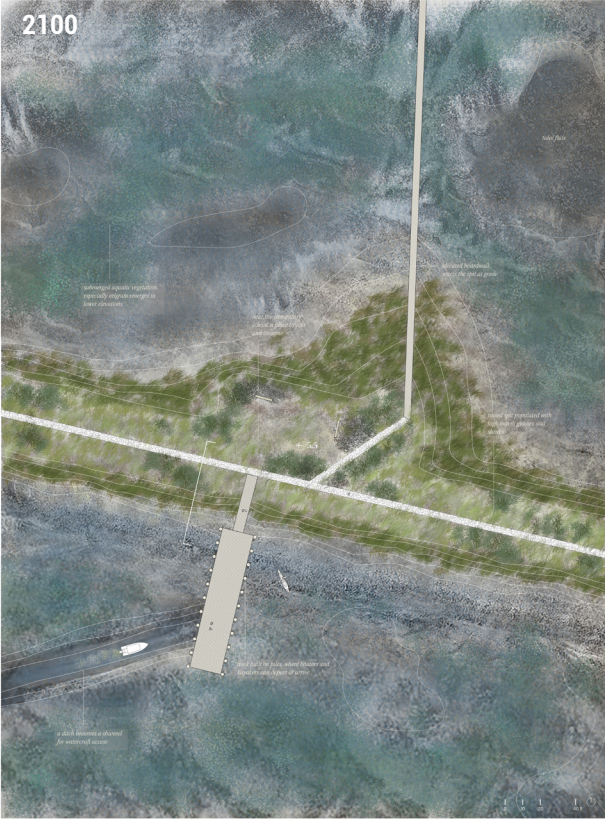




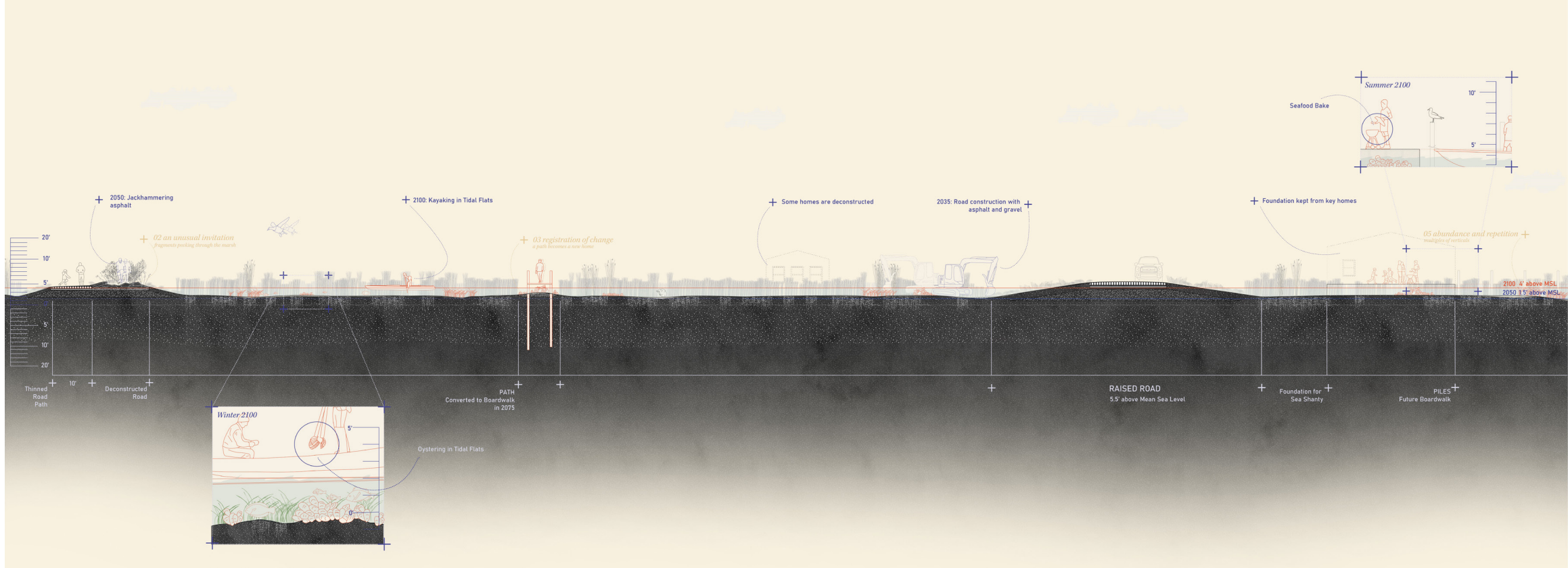




SITE 2 ACCESS POINTS CHANGE TO SEA LEVEL RISE

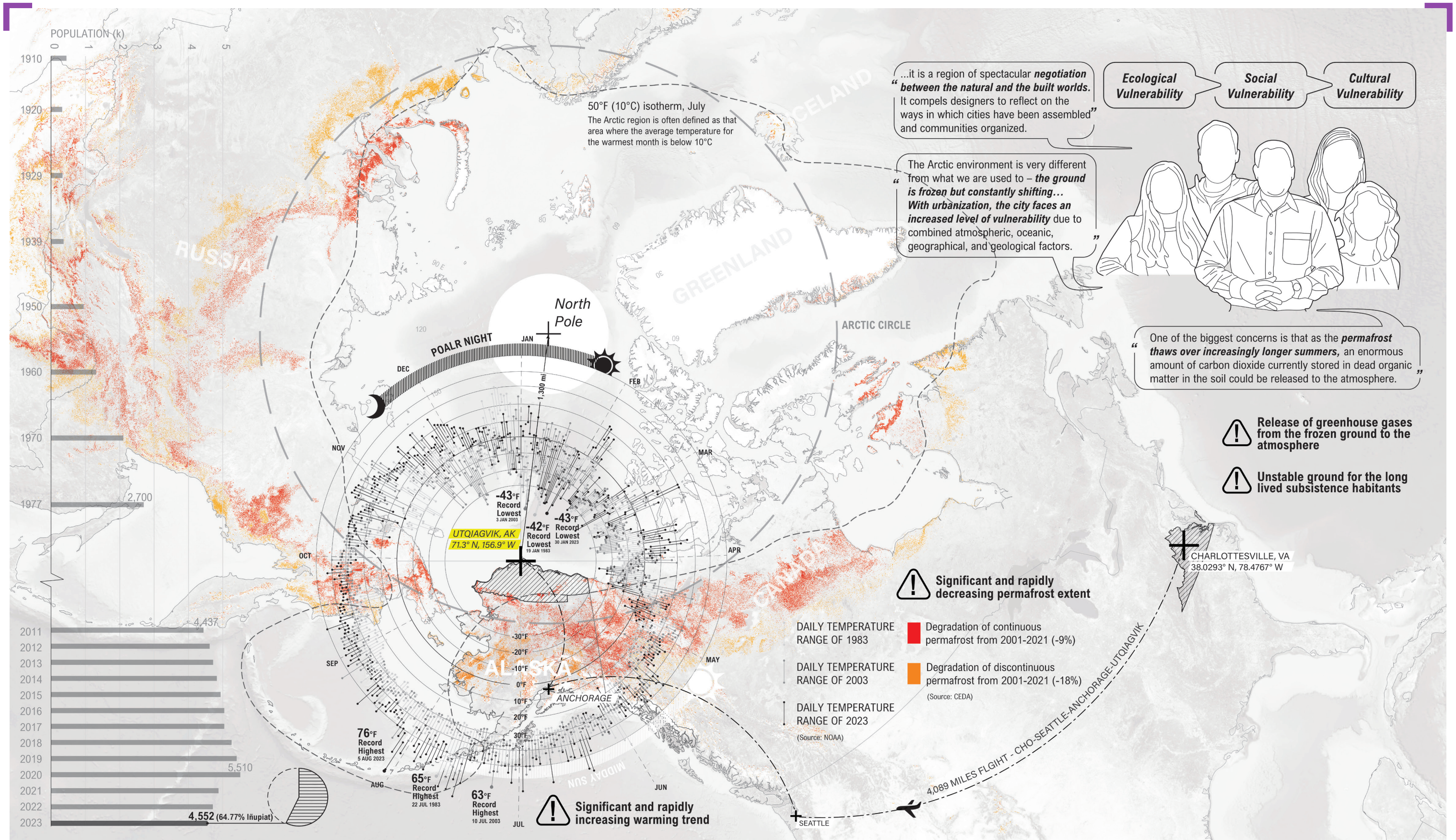


RESPONSIVE ACCESS WITH SLR



SITE 2 SECTION: DOWN NECK, OUTSIDE OF PROTECTION AREA





**Country/City** Utqiagvik, Alaska, USA

**University / School** University of Virginia School of Architecture, Department of Landscape Architecture

**Academic year** 2024-2025

**Title of the project** Cultivating Permafrost: Snow and Meltwater Management in Utqiagvik, Alaska

**Authors** Ari Bell, Joyce Fong, Shuai Yuan



Title of the project	Cultivating Permafrost: Snow and Meltwater Management in Utqiagvik, Alaska
Authors	Ari Bell, Joyce Fong, Shuai Yuan
Title of the course	ALAR 8010 City Built on Thawing Ground
Academic year	2024-2025
Teaching Staff	Leena Cho and Matthew Jull
Department / Section / Program of belonging	Department of Landscape Architecture & Department of Architecture
University / School	University of Virginia School of Architecture



Image: Alexandra Daley

Located 330 miles north of the Arctic Circle, Utqiagvik, Alaska (71.29° N, 156.79° W) is the largest Iñupiat community in the U.S. (~4,930 residents) and lies at the forefront of climate change. Rising temperatures, increased precipitation, altered freeze-thaw cycles, and urban heat island effects are accelerating permafrost degradation—undermining infrastructure and threatening ecological and cultural systems. In particular, growing volumes of snow and meltwater contribute to frequent flooding, overwhelming limited drainage infrastructure and mobilizing contaminants across the tundra and subsistence food systems. Current responses to snow and water management remain improvised and unsustainable.

This project proposes a watershed-block framework as a zoning and maintenance strategy rooted in both thermodynamic principles and community empowerment. Each watershed block reflects localized conditions such as land use and microtopography, enabling more responsive snow and meltwater management. The approach links residents with Public Works across hydrologic units, using existing equipment, local knowledge, and social structures to choreograph snow movement and mitigate water-

related risks. In residential zones, the design allows homeowners to manage runoff, stabilize foundations, and engage with tundra ecologies. In areas near contaminated sites, such as the airport, runoff is slowed and filtered to prevent pollutants from reaching vital water supplies. Watershed blocks offer a scalable, community-based model for landscape management—supporting long-term permafrost preservation and the resilience of both ecological systems and Iñupiat cultural heritage.

### Barcelona International Landscape Biennial

Contact via email:  
biennialadm@coac.net

Venue:  
COAC - Col·legi Oficial d'Arquitectes de Catalunya  
Carrer Arcs 1-3, 08002 Barcelona - Spain



## SNOWCOVER & SNOWMELT PATTERN ANALYSIS

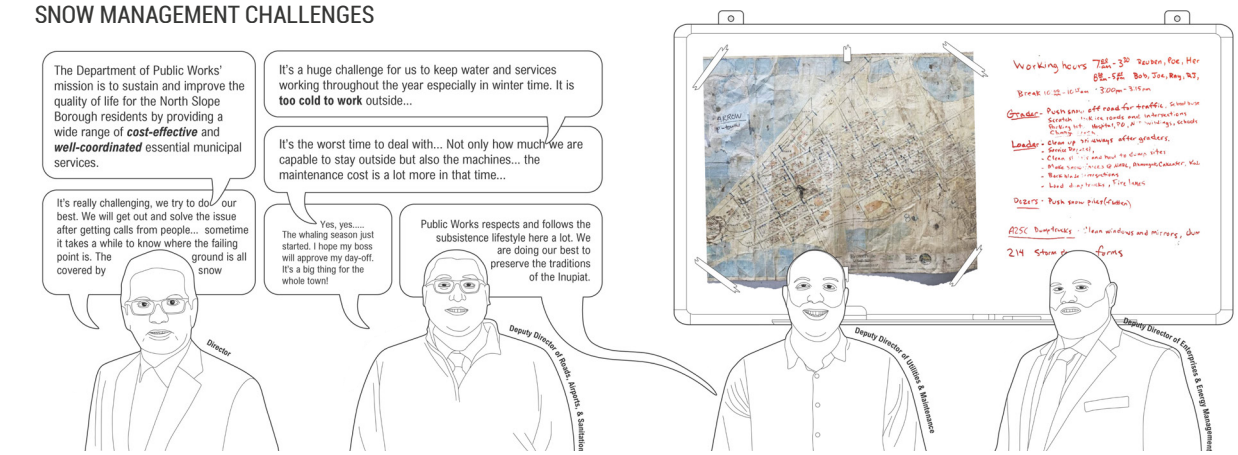
Snowcover change comparison via remote sensing: 2022-23

The figure displays a vertical timeline on the left, showing the progression of snow cover and melt patterns over time. The timeline is labeled with months from September to October, and a temperature scale in degrees Fahrenheit (°F) is provided at the bottom, ranging from -40 to 60. The timeline shows a transition from predominantly snow-covered areas in the winter months to predominantly snow-free areas in the summer months, with a significant melt period occurring in late spring and early summer.

To the right of the timeline, a grid of 20 satellite images illustrates the snowcover change comparison via remote sensing for the 2022-23 season. The images are arranged in four rows and five columns, showing the progression of snow cover and melt patterns over time. The dates for the images are as follows:

- Row 1: 2022/09/07, 2022/10/06, 2023/03/13, 2023/03/17, 2023/03/21
- Row 2: 2023/03/24, 2023/04/05, 2023/04/13, 2023/04/14, 2023/04/22
- Row 3: 2023/05/19, 2023/05/22, 2023/05/23, 2023/06/03, 2023/06/04
- Row 4: 2023/06/05, 2023/06/14, 2023/06/17, 2023/06/18, 2023/07/01

The images show a clear progression from snow-covered areas in the winter months to predominantly snow-free areas in the summer months, with a significant melt period occurring in late spring and early summer. The images also show the presence of water bodies and other features, providing a comprehensive view of the snowcover and melt patterns over the season.



**SNOW AND MELTWATER CHALLENGES IN PERMAFROST LANDSCAPE**

The diagram illustrates the challenges of snow and meltwater in permafrost landscapes, showing the interaction between the ground surface, active layer, and permafrost.

**Key Features and Challenges:**

- Gravel road compaction:** Shown on the left, where a road surface is compacted under a vehicle.
- Frozen and blocked culvert:** A culvert is shown frozen, leading to water pooling on the surface.
- Snow piling, blocking drainage, and suffocating tundra:** Snow accumulation blocks drainage paths and suffocates the tundra.
- Potholes/road degradation from rain and/or freeze-thaw:** Road surfaces degrade due to repeated freezing and thawing cycles.
- Meltwater pooling near infrastructure:** Meltwater pools near buildings and roads, leading to saturation.
- Saturated ground:** Ground becomes saturated with meltwater, leading to instability.
- Culvert shifting:** Saturated ground causes culverts to shift or sink.
- Heat from utilities speed up melting and lead to pooling:** Heat from buildings or utilities accelerates permafrost melting.
- Disturbed runoff by storage:** Storage of meltwater disrupts natural runoff patterns.
- Permafrost:** The permanently frozen ground layer, shown with varying thicknesses.
- Active Layer:** The top layer of ground that thaws during the summer.
- Ice Wedges:** Large blocks of ice that form within the permafrost.
- Ice Lens:** Smaller lenses of ice within the permafrost.
- Talks:** A section showing the thickness of the active layer over time (1960-2007).
- Tundra degradation:** The process of tundra degradation due to permafrost melting.
- Water expansion forces in freezing process push up building piles:** Water expansion during freezing pushes up building foundations.

**Timeline (Months):** May, Jun, Jul, Aug, Sep, Oct, Nov, Dec, Jan, Feb, Mar, Apr.

**Scale:** 500% (indicated for the ground surface profile).

**Legend:**

- Active Layer
- Permafrost
- Ice Wedges
- Ice Lens
- Talks
- Tundra degradation
- Water expansion forces in freezing process push up building piles
- Disturbed runoff by storage
- Heat from utilities speed up melting and lead to pooling
- Saturated ground
- Culvert shifting
- Meltwater pooling near infrastructure
- Snow piling, blocking drainage, and suffocating tundra
- Frozen and blocked culvert
- Icy slippery roads
- Potholes/road degradation from rain and/or freeze-thaw

**INUPIAT SEASONS**

Month	Seasonal Period	Description
January	Sunny, cold days are common. Land and sea are now completely frozen and the ice continues to thicken over these months. The extreme cold causes ice fog.	
February		
March	Uprisingaag (Early Spring)	Longer days, the sun thaws snow-covered areas. In some areas, snow melts to expose prominent landforms. There is occasional snow and fog. This is the time when ice is at its thickest and greatest extent.
April	Uprisingaag (Spring)	
May		Days are long and weather is at its best. Warm air over cold water creates occasional fog. Lake and sea ice breaks up and begins to melt.
June	Aujag (Summer)	
July		The sun warms the land, which results in plenty of fog and rain with occasional thunderstorms. Wind blows across the exposed water creating large waves.
August	Ukiassag (Early Fall)	
September		Rain comes more frequently. Rain changes to ice pellets showers as air temperature drops. Flurries and light blowing snow further indicate that fall is on its way. In towns and on the tundra meltwater pools and ponds begin to freeze. Days become shorter.
October	Ukiag (Fall)	
November		Days continue to shorten. It snows often, and blowing snow is frequent. There is occasional mild weather and fog. The sea ice begins to freeze, first within inlets and along shorelines. The ice is new, thin and weak.
December	Ukiug (Winter)	

## MELTWERter FLOW ANALYSIS

0 0.25 0.5 1 Mile

N  
W E  
S

Water moves circuitously through the city, except where ditches and culverts reshape its path.

- Watershed analysis outflow point
- Meltwater flow test point
- Meltwater flow path
- First order meltwater stream
- Second order meltwater stream
- Third order meltwater stream
- Fourth order meltwater stream
- Culvert
- 1' contour
- Structure

13

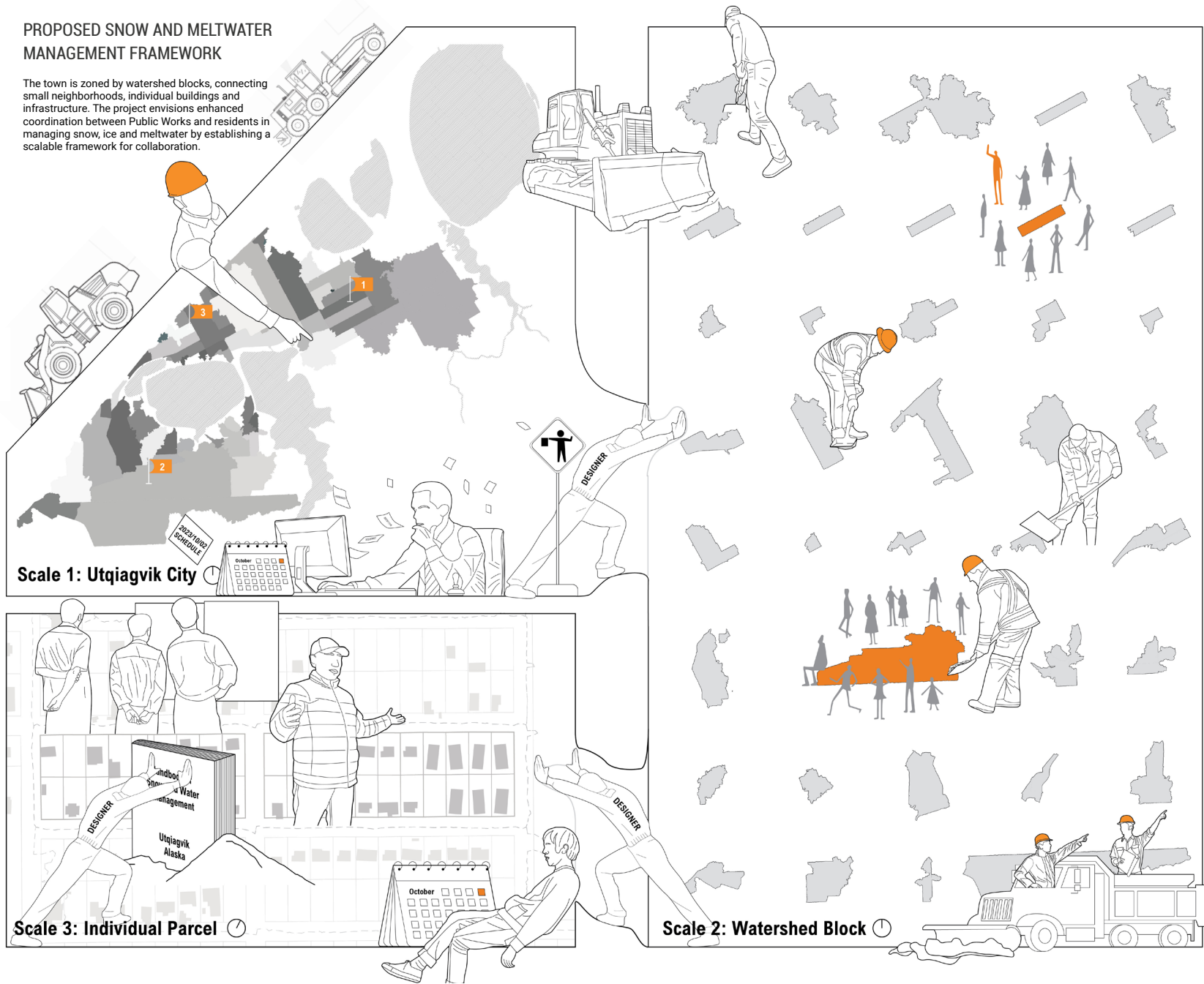




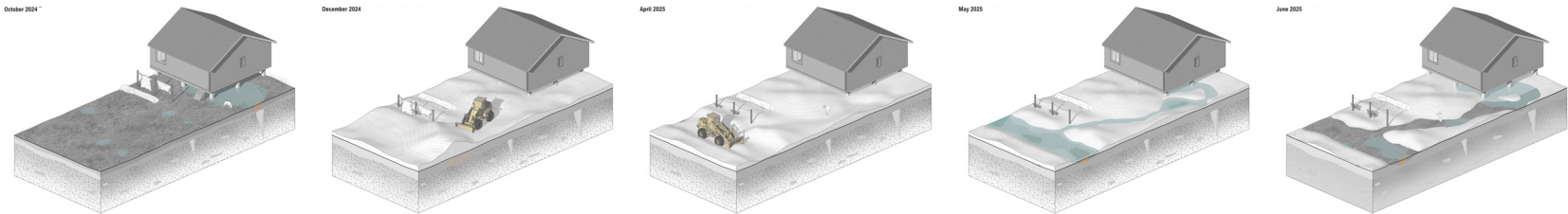
Image: Phoebe Tamminen

### PROPOSED SNOW AND MELTWATER MANAGEMENT FRAMEWORK

The town is zoned by watershed blocks, connecting small neighborhoods, individual buildings and infrastructure. The project envisions enhanced coordination between Public Works and residents in managing snow, ice and meltwater by establishing a scalable framework for collaboration.



### ESTABLISHING MELTWATER CHANNEL

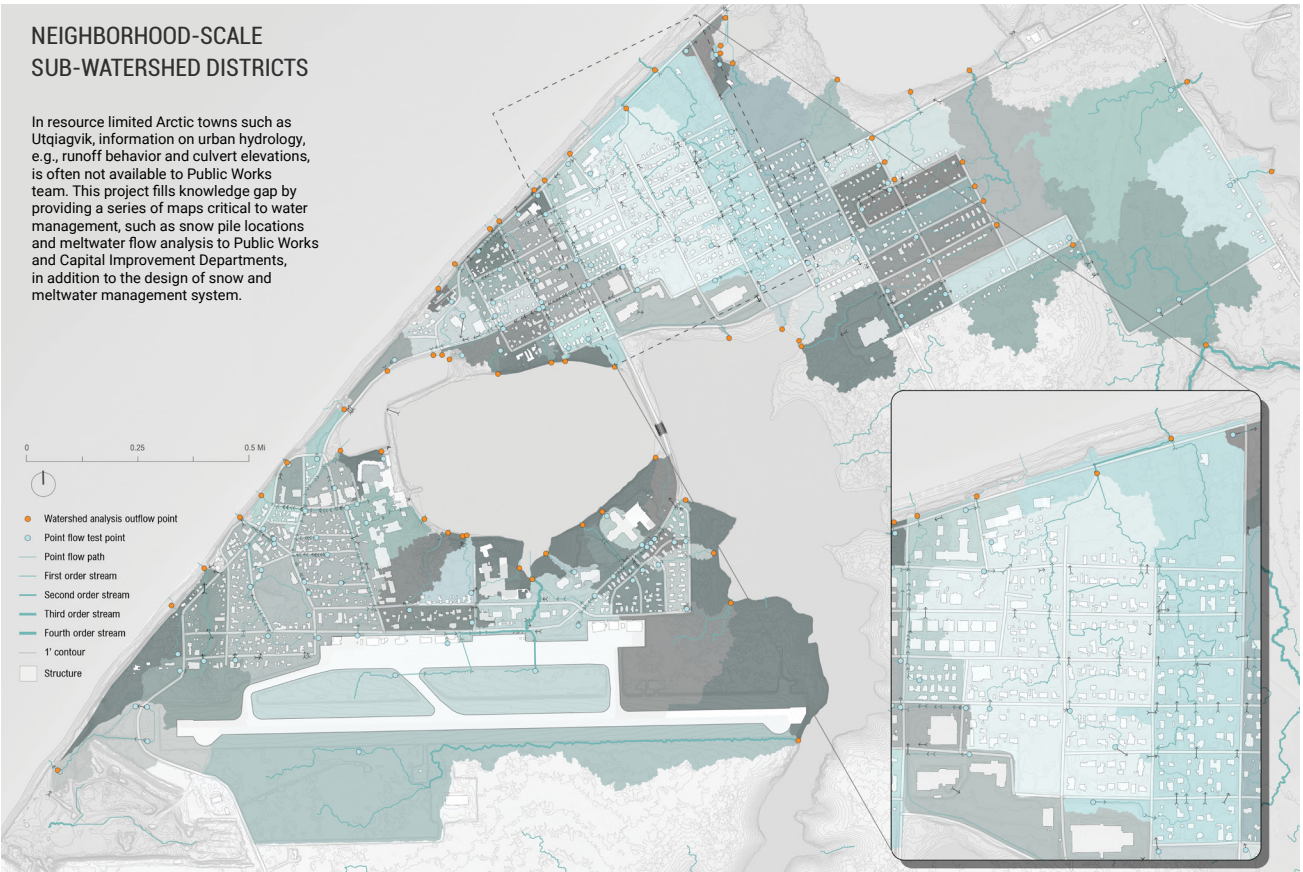


### PRIMARY URBAN WATERSHED DISTRICTS



### NEIGHBORHOOD-SCALE SUB-WATERSHED DISTRICTS

In resource limited Arctic towns such as Utqiagvik, information on urban hydrology, e.g., runoff behavior and culvert elevations, is often not available to Public Works team. This project fills knowledge gap by providing a series of maps critical to water management, such as snow pile locations and meltwater flow analysis to Public Works and Capital Improvement Departments, in addition to the design of snow and meltwater management system.







## SNOW & MELTWATER MANAGEMENT STRATEGIES

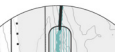


## CHUKCHI NORTH RESIDENTIAL

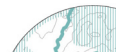
## SITE STRATEGY

The map illustrates the site strategy for the North Shore Energy Hub. It shows a network of streets including Highway 101, Highway 28, Highway 102, and Highway 103. Key locations marked include the North Shore Energy Hub, Church, Gas Station, Playground, Multiplex, Single Family Homes, and Shopping (Supermarket). A blue line indicates a proposed route or boundary. A scale bar at the bottom right shows distances from 0 to 100 feet.


## DESIGN & MANAGEMENT STRATEGIES




**Vegetated Ditches**



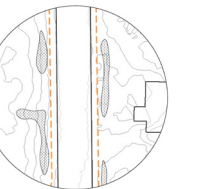
**Vegetated Basins**



**Handmade Ditches**



**Deep Ditches**



**Permanent**

Ensure that the catchments on both sides of the road are continuous, directing water to culverts located at low points. If the gradient is insufficient, installing a new culvert should be considered.

**Graded Road**

Regular grading is the most effective means of redistributing ridges of road material that has either been washed to the road edge or has been pushed to the edge by vehicle traffic.

During dry periods, applying calcium chloride is an effective method to prevent the loss of soil fines, which are crucial for maintaining the integrity of a road surface.

Monitor roads on a regular basis. The best time to inspect roads is on rainy days, when problems are more apparent.

Ensure that the catchments on both sides of the road are continuous, directing water to culverts located at low points. Timely removal of blockages from the catchments on both sides of the road.

**Routine**

**Graded Road**

19.50' +17.50' +19.00' +20.50'

If the gradient is insufficient, installing a new culvert should be considered.

Large gravel spread to prevent blockages in culverts by stabilizing the surrounding earthen lining.

Encourage residents to clear snow near their homes to protect their property

Coordinating Snow Clearance Public Works

Avoiding Snow Chugging Disasters

**Snow Shoveling Techniques:**  
 A. Clearing a strip down the street  
 B. Push the snow to the edge on one side  
 C. Push the strip of snow down the street  
 D. Ensure that snow piled in the street is in the right place for the snowplow to get by

Filling and Compacting Ground

Transporting and Storing Extra Materials

Crediting or Clearing Handmade Disasters

