

Graduation Portfolio

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M.S. ARCHITECTURE AND URBAN DESIGN
2020. May

COLUMBIA
GSAPP

2019 Summer Semester

Jersey City_Group 2

Hatem AlKhathlan, Sushmita Shekar, Yao Yao

Educational
Space

Event Space

City Fair

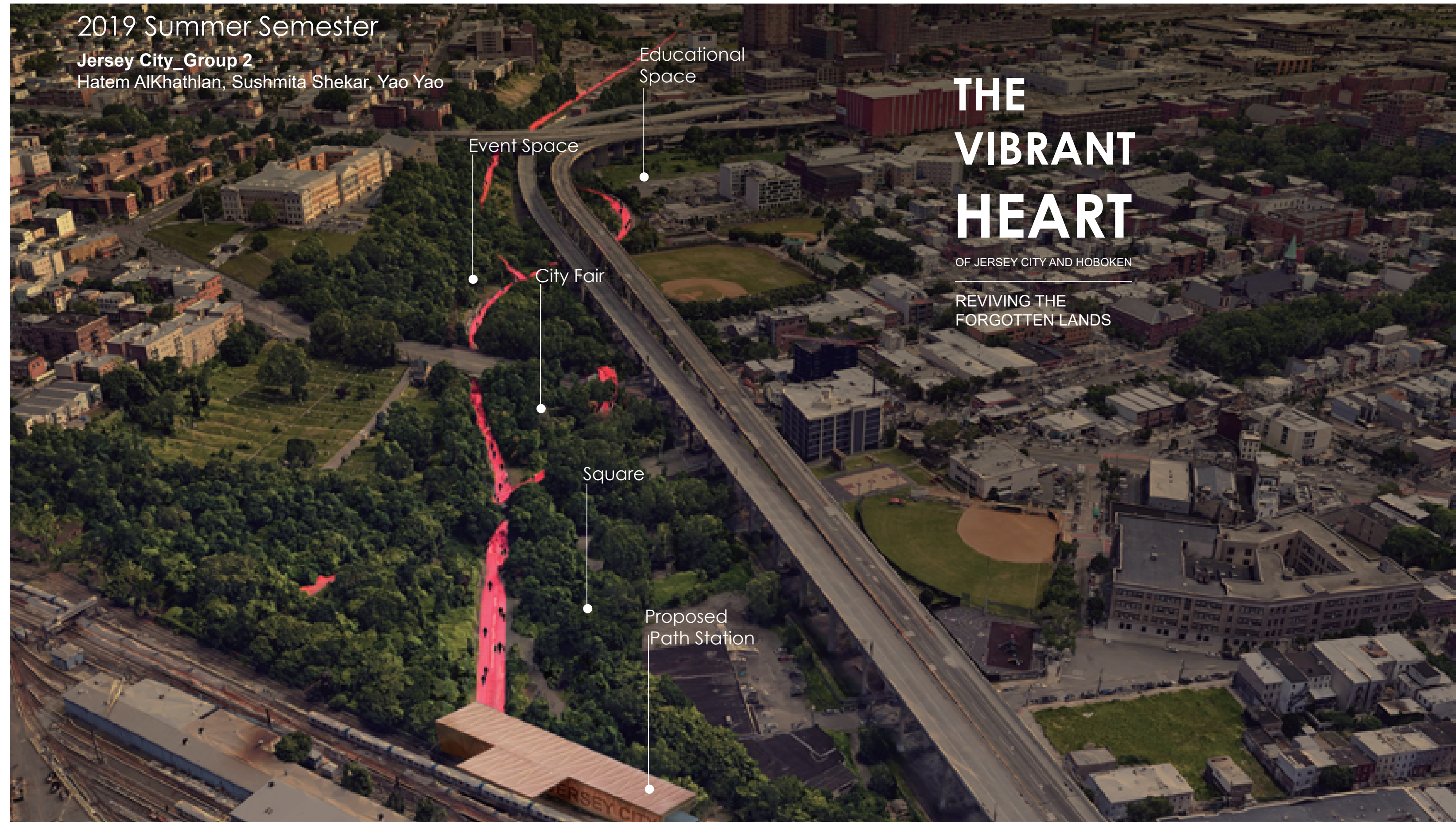
Square

Proposed
Path Station

THE VIBRANT HEART

OF JERSEY CITY AND HOBOKEN

REVIVING THE
FORGOTTEN LANDS



WHAT IF JERSEY CITY'S UNDERUTILIZED LANDS BECOMES THE HEART OF THE CITY?

TO CONNECT COMMUNITIES, ENHANCE PUBLIC LIFE AND RESTORE RESILIENCY.



SITE CHALLENGES



Pallisade and Topography



Accessibility



Storm Surge



Ecology



Abandoned Railway



Highway



INTERVENTION STRATEGY



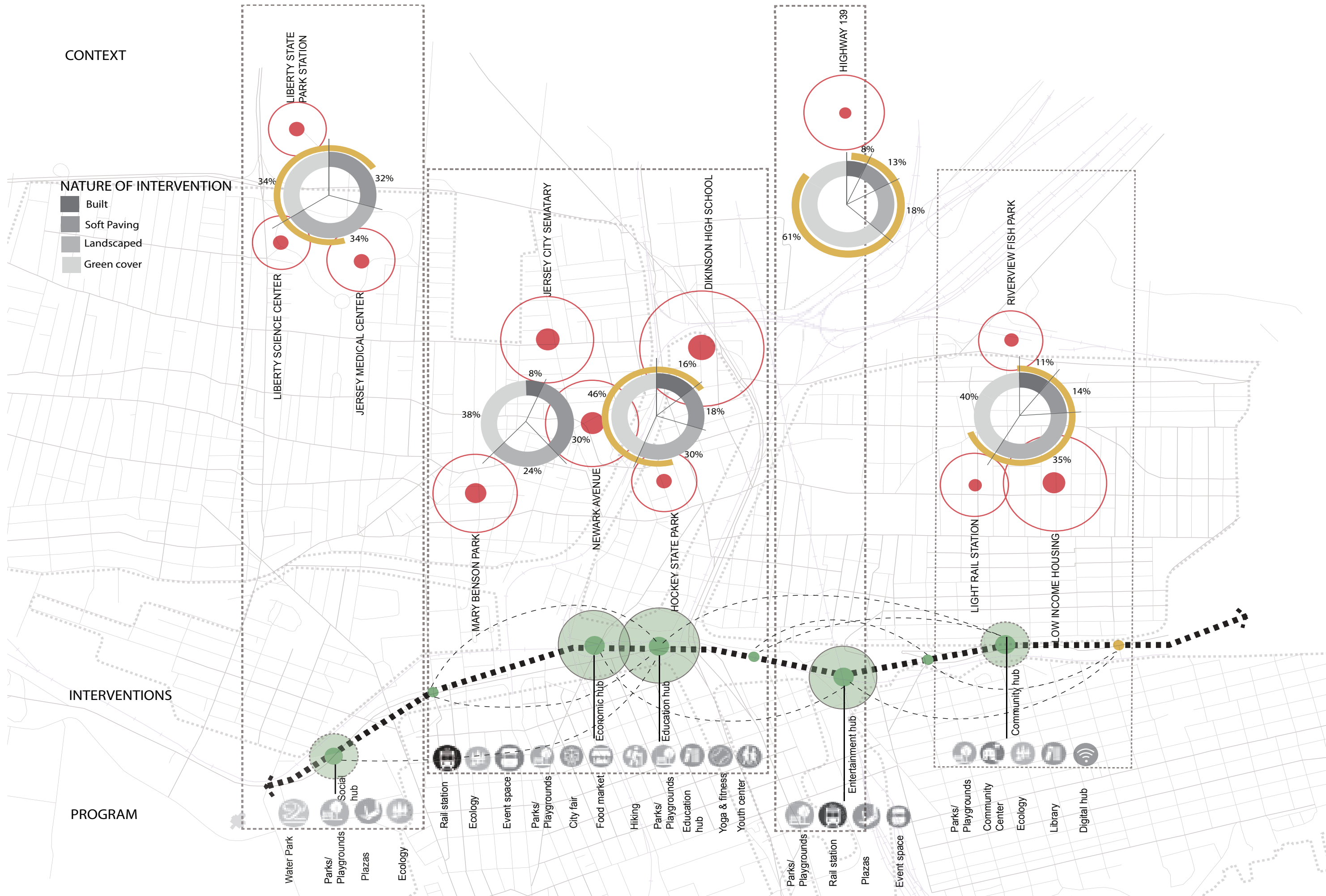
CONTEXT

NATURE OF INTERVENTION

- Built
- Soft Paving
- Landscaped
- Green cover

INTERVENTIONS

PROGRAM



SITE 1 - Hoboken / NJ Transit Line



SITE 2 - Dickinson High School



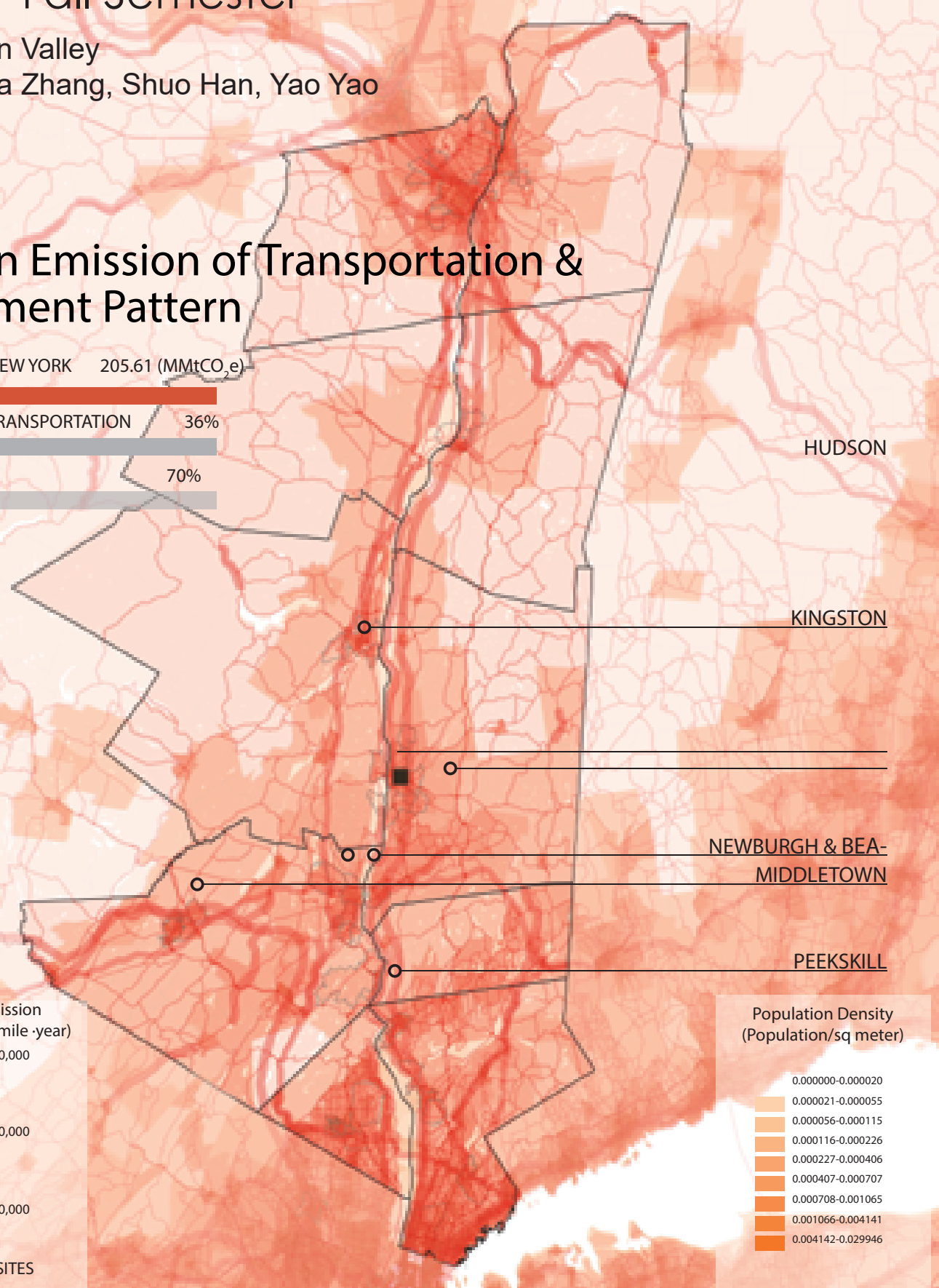
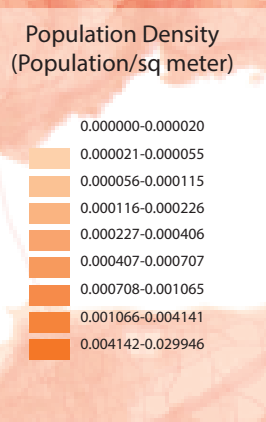
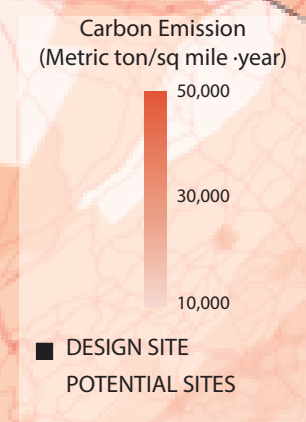
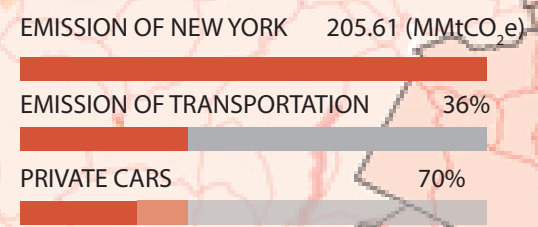
SITE 3 - Mary Benson Park



2019 Fall Semester

Hudson Valley
Isabella Zhang, Shuo Han, Yao Yao

Carbon Emission of Transportation & Settlement Pattern



Drive-Less Life

The transportation sector contributes to **36%** greenhouse gas (GHG) emission in New York State, approximately **70%** of which comes from private vehicles. In Hudson Valley, every **1.5** residents own a private vehicle, while this same number is **2** residents in New York State, and **38** in New York City. Extensive highway networks, deficient infrastructures for mass transits, suburban lifestyle all facilitate a culture of car dependency and contribute to the amount of GHG emission.

This project is a hybrid system to reduce the emission of private vehicles, which use the Poughkeepsie as an example but could expand to the rest of Hudson Valley, has three major methods:

1. Emission-free shared vehicle system, make existing buses replaced by smaller, more frequent shuttles, and cars replaced by shared autonomous electric vehicles.
2. Improve public transportation infrastructure by building new bus stops integrated with public space and urban life.
3. Remove the elevated Route 9 Highway in front of the Poughkeepsie train station, redesign the route as a street with a mix-use development.

Shuo Han, Isabella Zhang, Yao Yao

Sources: New York State Greenhouse Gas Inventory: 1990-2016.
American Fact Finder

Improve the Current Transit System

CURRENT

- Wait for 25min - 1hr
- Average 9.82 People
- Driver Cost: \$25/hour, 20% of Total Cost
- Limited Bus Stops

- Difficult to Access by Walk
- Huge Parking Lot and Garages

- Uncomfortable Side-Walk
- No Bicycle Lanes

- People Choose Private Vehicle

EXPECTED

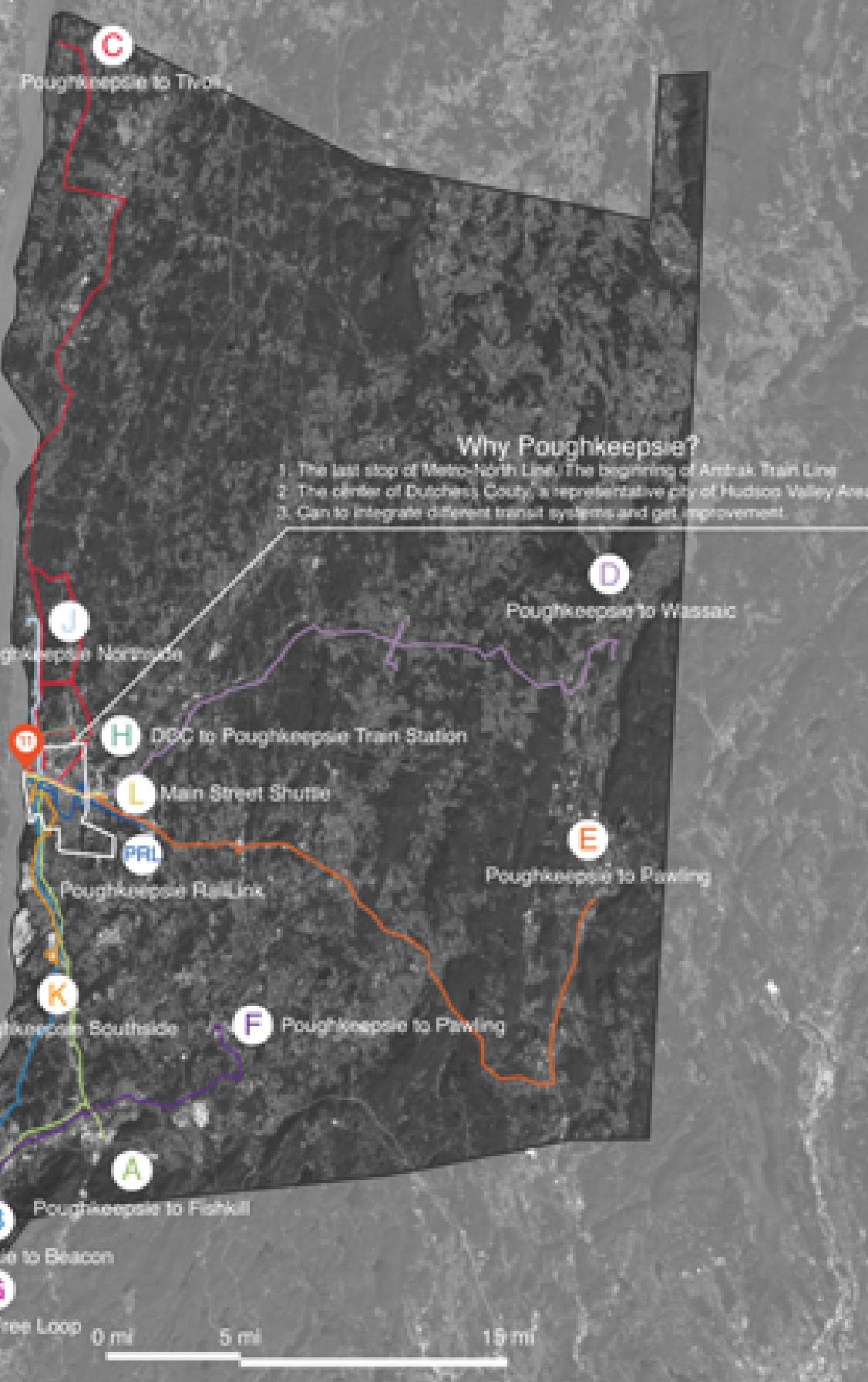
- More Frequent (10-15min)
- Smaller Shuttle
- Autonomous/Driver-Less
- More Bus/Shuttle Stops
- As Public Space
- Real-Time Refresh System

- Electric, Shared, Autonomous
- Link Database to Shuttles



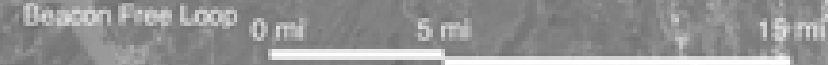
- Better Connection to Bus
- Calmer, Walk to Train Station
- With More Public Space
- Shared Blue Road

- Less Private Vehicles

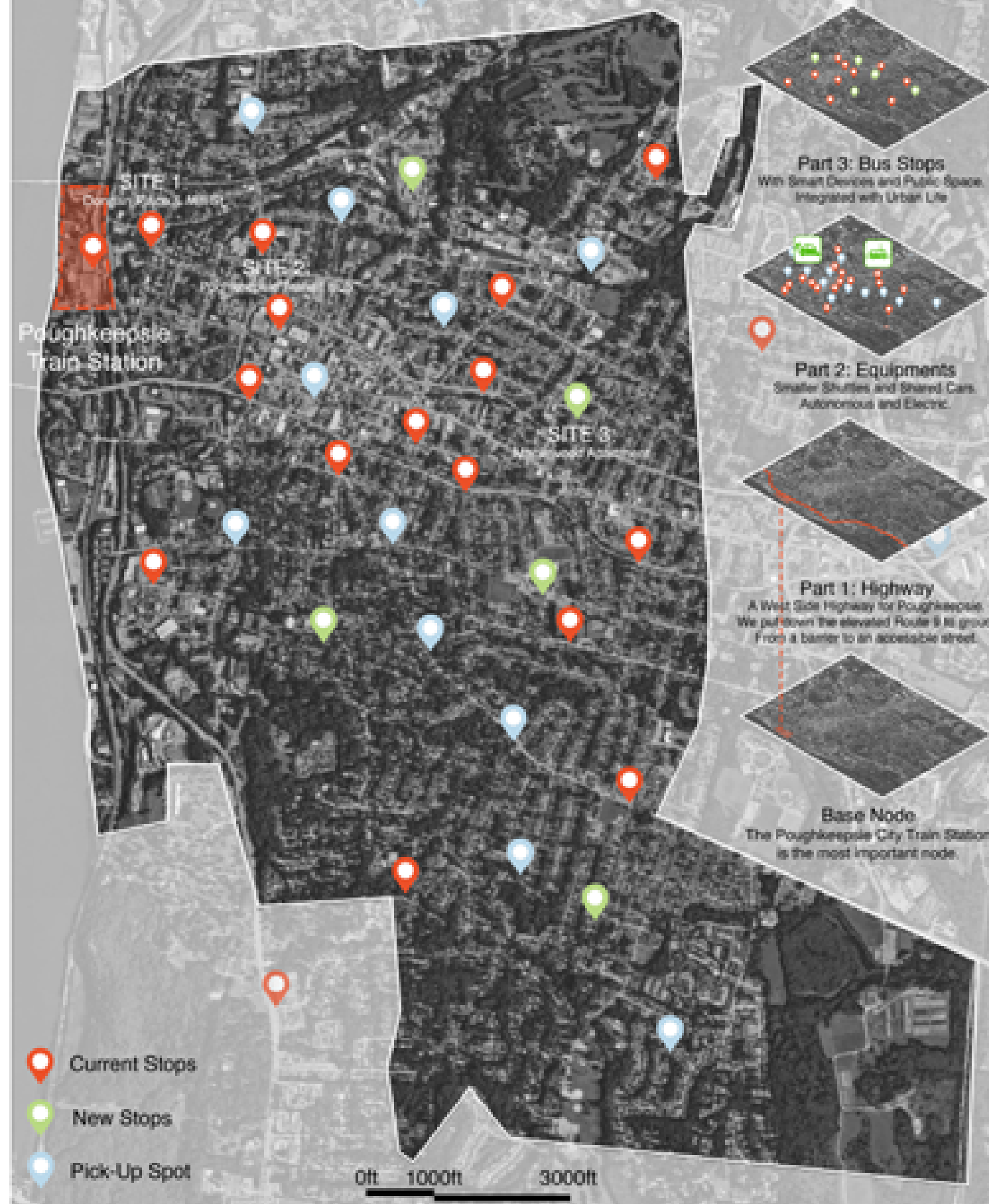


Why Poughkeepsie?

- The last stop of Metro-North Line, The beginning of Amtrak Train Line
- The center of Dutchess County, a representative city of Hudson Valley Area
- Can to integrate different transit systems and get improvement.



Change in Poughkeepsie



- Current Stops
- New Stops
- Pick-Up Spot



Part 3: Bus Stops
With Smart Devices and Public Space Integrated with Urban Life

Part 2: Equipments
Smaller Shuttles and Shared Cars, Autonomous and Electric.

Part 1: Highway
A West Side Highway for Poughkeepsie. We put down the elevated Route 9 to ground. From a barrier to an accessible street.

Base Node
The Poughkeepsie City Train Station is the most important node.

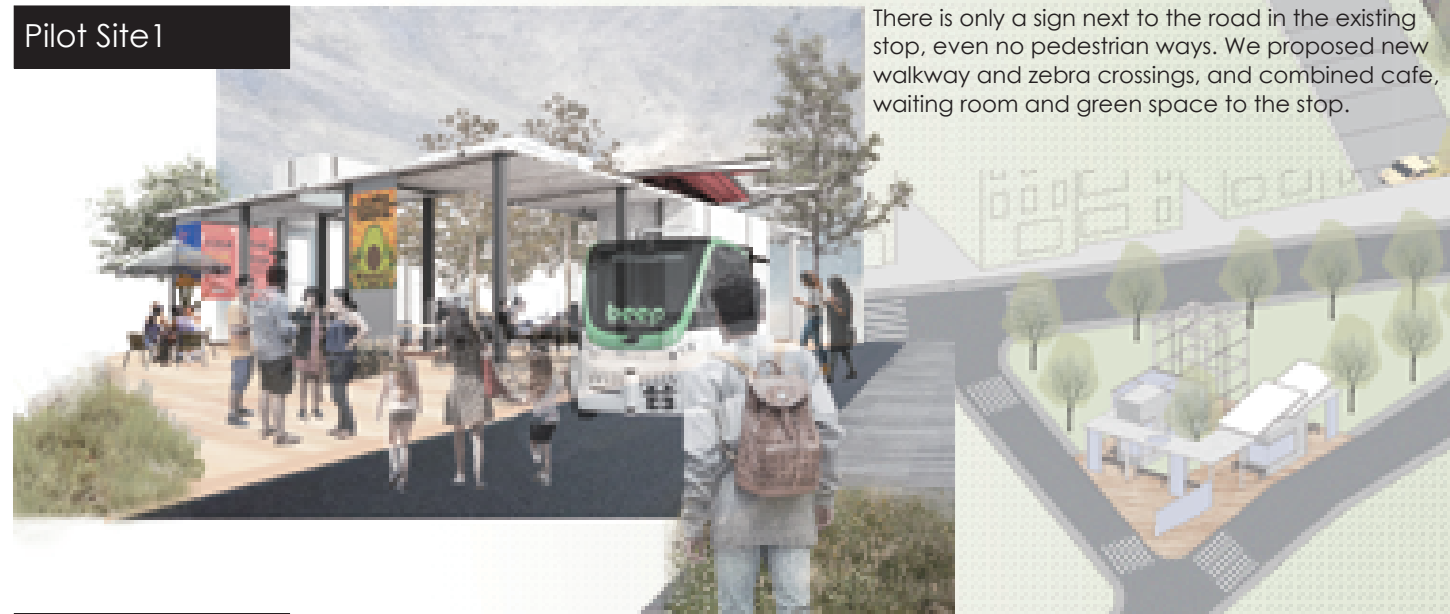
Better Bus Stops



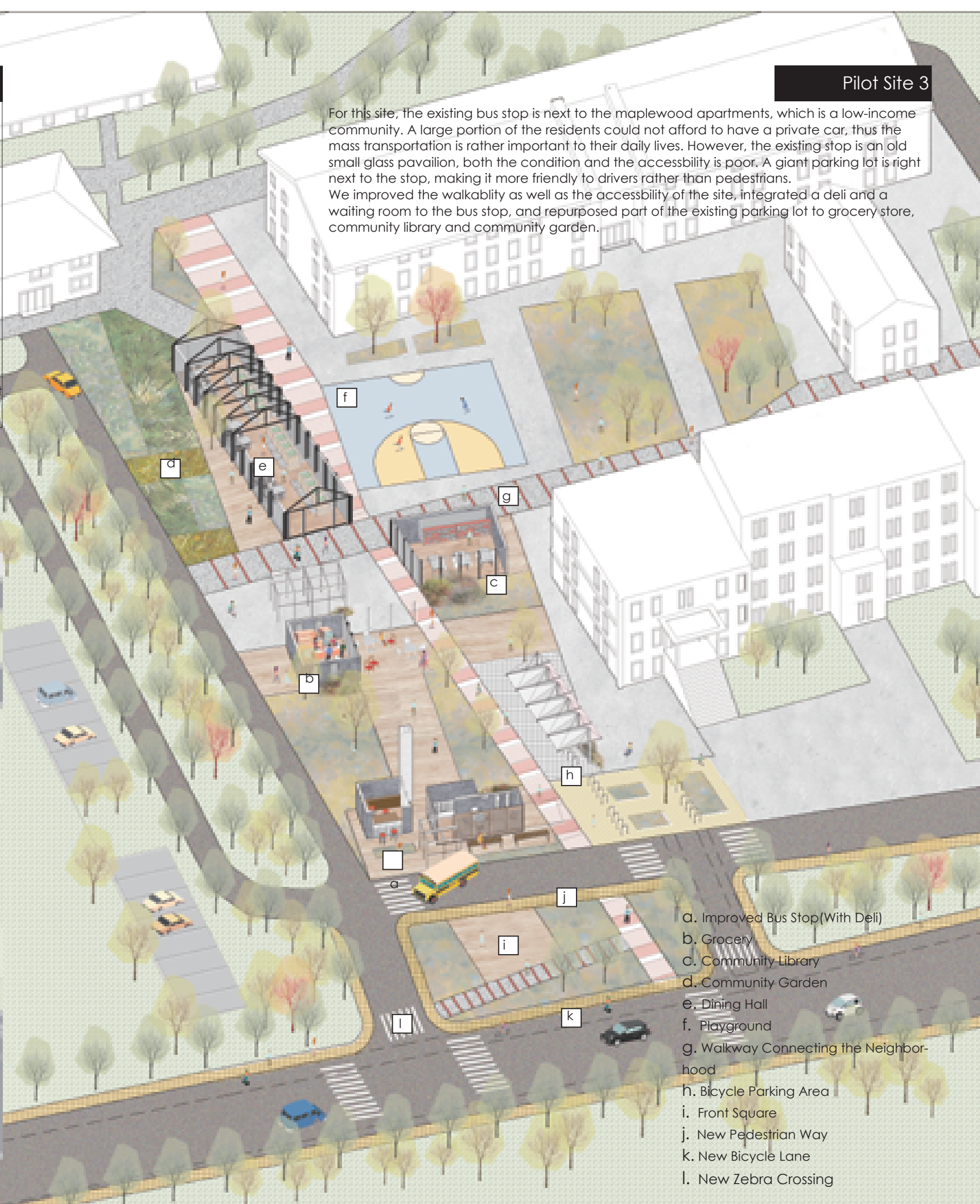
Pilot Site 3

For this site, the existing bus stop is next to the maplewood apartments, which is a low-income community. A large portion of the residents could not afford to have a private car, thus the mass transportation is rather important to their daily lives. However, the existing stop is an old small glass pavilion, both the condition and the accessibility is poor. A giant parking lot is right next to the stop, making it more friendly to drivers rather than pedestrians. We improved the walkability as well as the accessibility of the site, integrated a deli and a waiting room to the bus stop, and repurposed part of the existing parking lot to grocery store, community library and community garden.

Pilot Site 1



Pilot Site 2



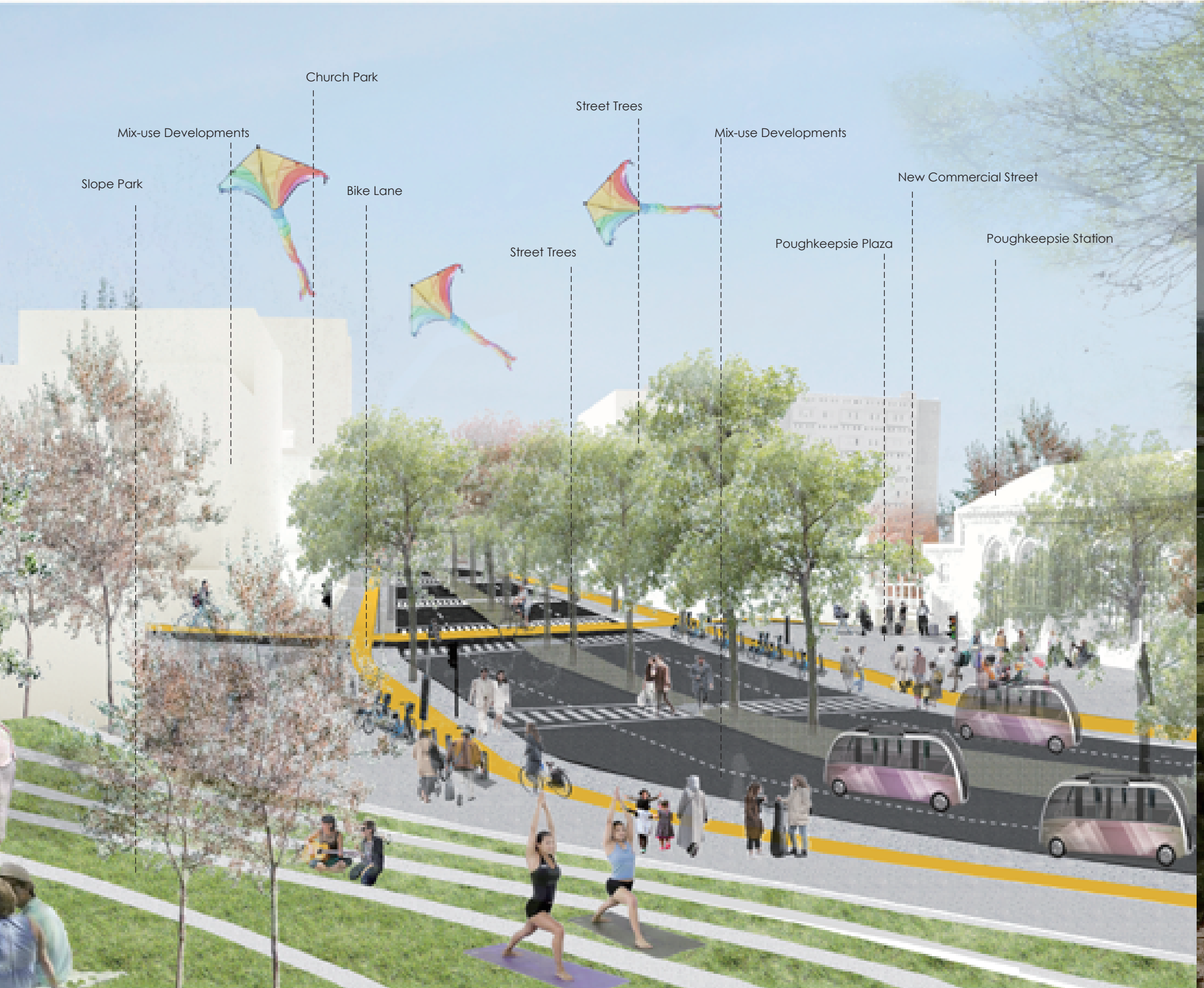
- a. Improved Bus Stop (With Deli)
- b. Grocery
- c. Community Library
- d. Community Garden
- e. Dining Hall
- f. Playground
- g. Walkway Connecting the Neighborhood
- h. Bicycle Parking Area
- i. Front Square
- j. New Pedestrian Way
- k. New Bicycle Lane
- l. New Zebra Crossing

Masterplan



- 1. Poughkeepsie Station
- 2. Poughkeepsie Plaza
- 3. U.S Route 9
- 4. Slope Park
- 5. Footpath to Fall Kill
- 6. Bike Station
- 7. Bike Lane
- 8. Mix-use development
- 9. Church Park
- 10. Street Front
- 11. Street Tree
- 12. Highway Park
- 13. New Commercial Street

1.2 miles



Project Site



2020 Spring Semester

Mozambique Beira

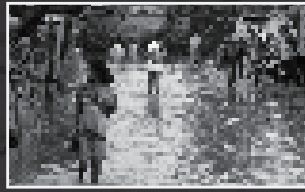
Alvi Khan, Scott Guo, Menghan Zhang, Yao Yao

BEIRA

LIVING COASTLINE



FLOOD FROM



PRECIPITATION



STORM WATER SURGE



BEACH EROSION

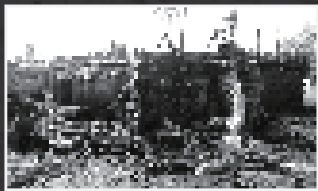
URBANISM



FOOD INSECURITY



WATER INSECURITY

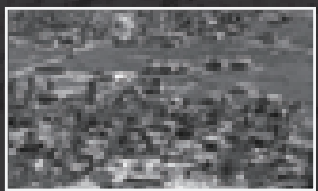


RAPID URBANIZATION



UNEMPLOYMENT

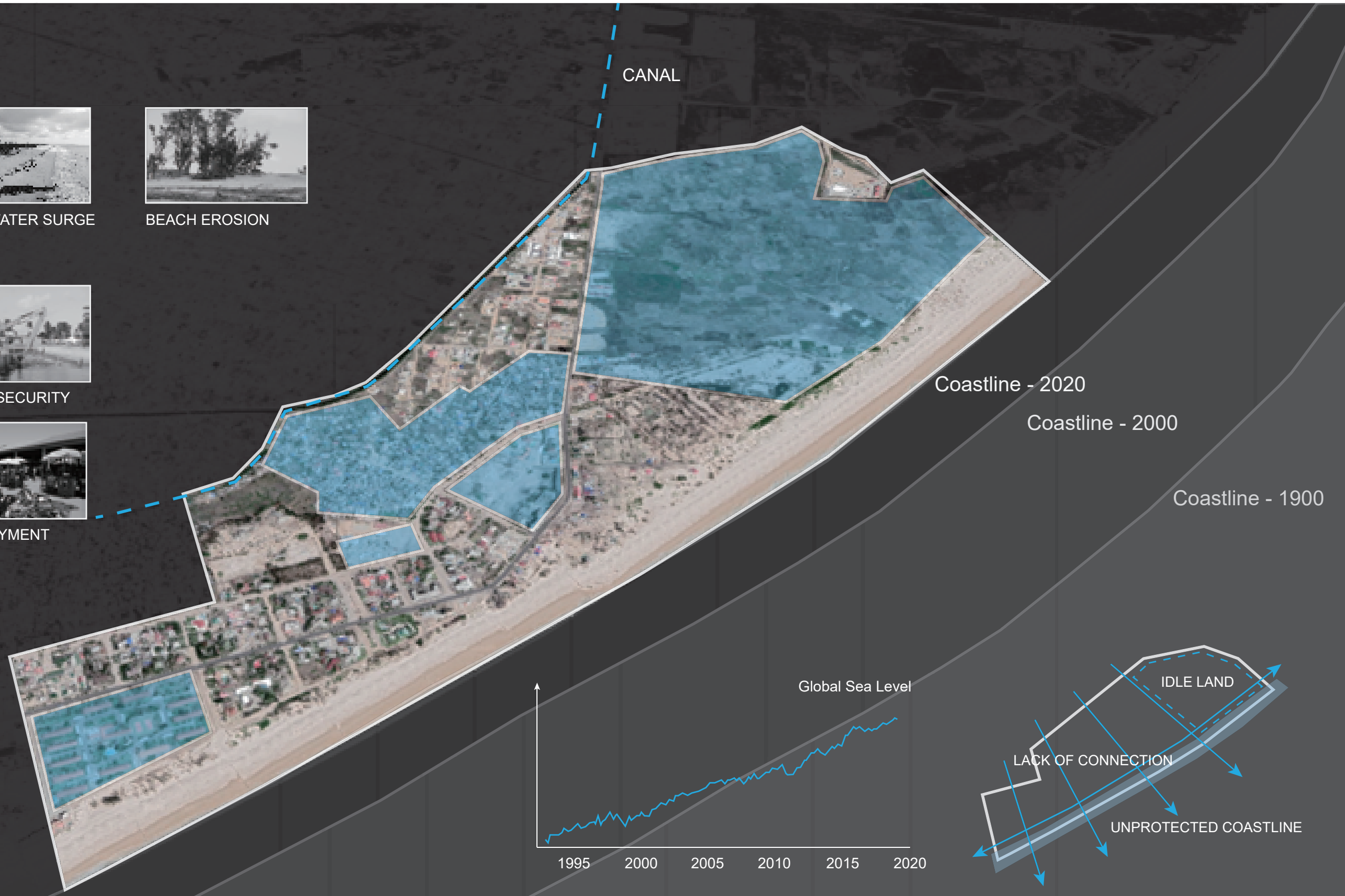
ENVIRONMENT



LAND ABUSE



NATURAL HABITAT DESTRUCTION



Strategies

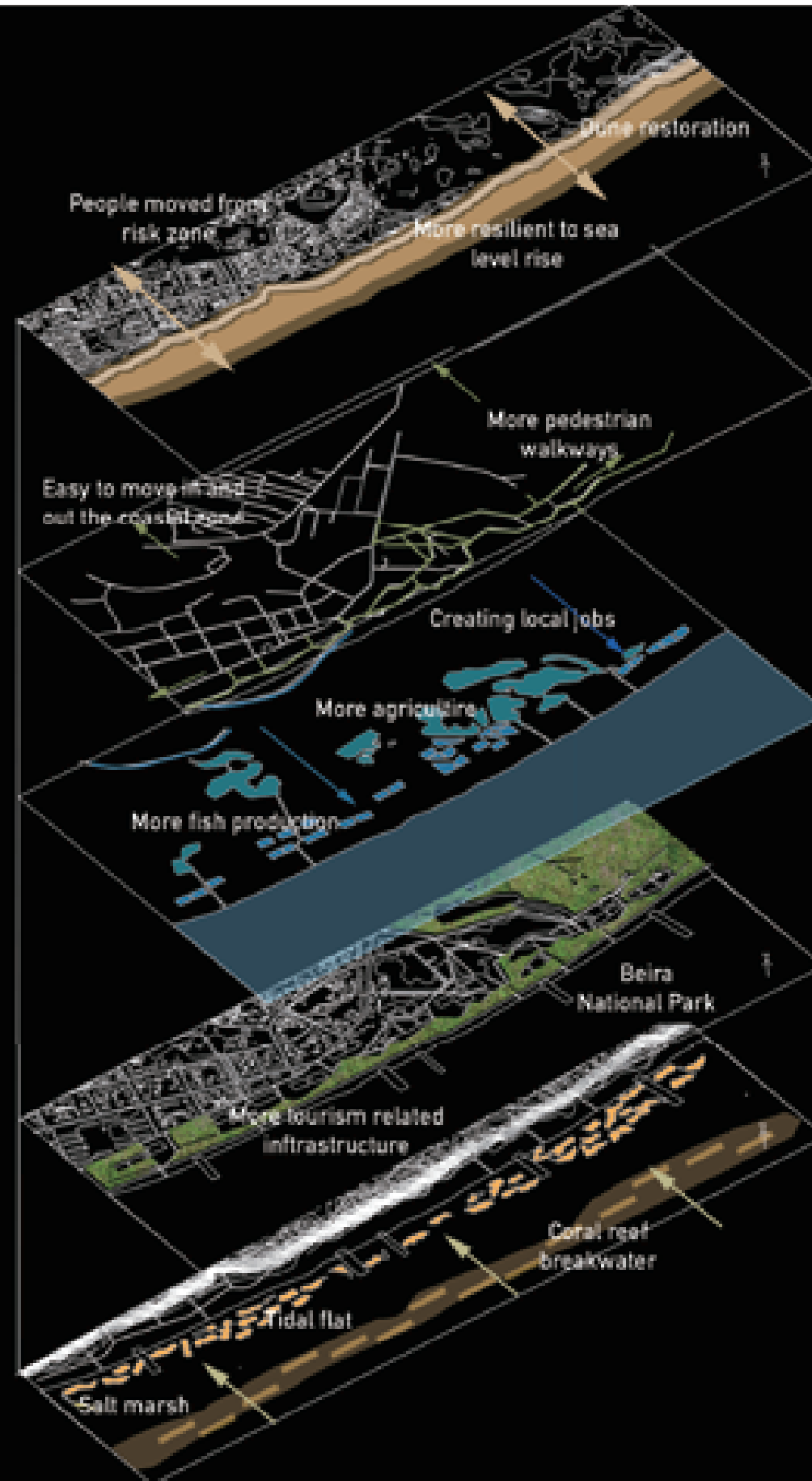
Expansion and thickening the dunes through sand catchers.

Accessibility that enables ease of movement in and out of the coastal area.

Agriculture and Aquaculture along with increasing biodiversity.

Creating a new entity with Sofala Coastline Park and integrating Tourism infrastructure.

Incorporating mangroves, breakwater and sand accumulation expands the beach



Resiliency is achieved by thickening the sand dunes, introducing fish and filtration ponds, and an integrated tourism infrastructure within the Coastline Park; it will produce economic self-sustainability, and robust improvements in livelihood and ecology.

1. Sand Dunes

Expanding the sand dunes



2. Accessibility

Creating access to the coastline through improved walkways.



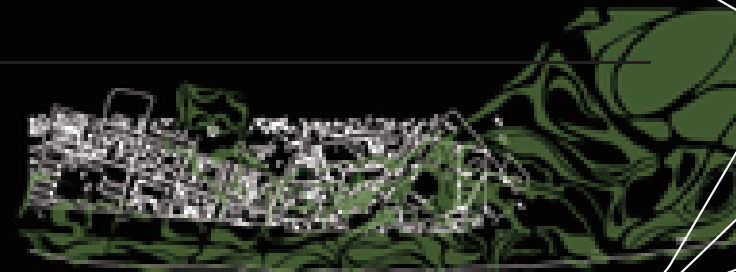
3. Agriculture and Aquaculture

Introducing aquaculture ponds and filtration ponds i.e. Aerobic, maturation and facultative ponds to treat water, cultivate fish and agriculture.



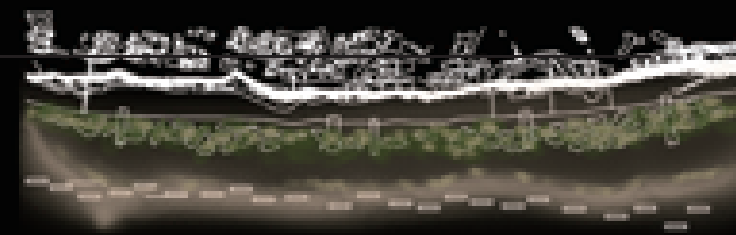
4. Parks & Public Space

Introducing Coastline Park that creates a robust economy through tourism as well as increasing biodiversity.



5. Mangroves & Breakwaters

The saltmarsh will increase the mangrove growth and the breakwater will prevent coastal erosion as well accumulate sand over time creating a secondary beach.



INTERNATIONAL ORGANISATIONS AND NGOS

- Columbia University
- Chamber of Tourists
- World Wide Fund for Nature
- George Carr Fund for Nature
- Coastal Protection Infrastructure, Swiss Development

GOVERNMENT

- Local Government

LOCALS

- Local Community
- University and research teams
- Hotels and restaurants
- Local Farmer and fishermen

2020

Survey & Interviews

Establish a community co-operation

Workshop & Training

Research on systems (park stormwater, drainage, treatment pond)

Extend the canal system and park construction

Flood proof the hotels and use emergency shelter when required

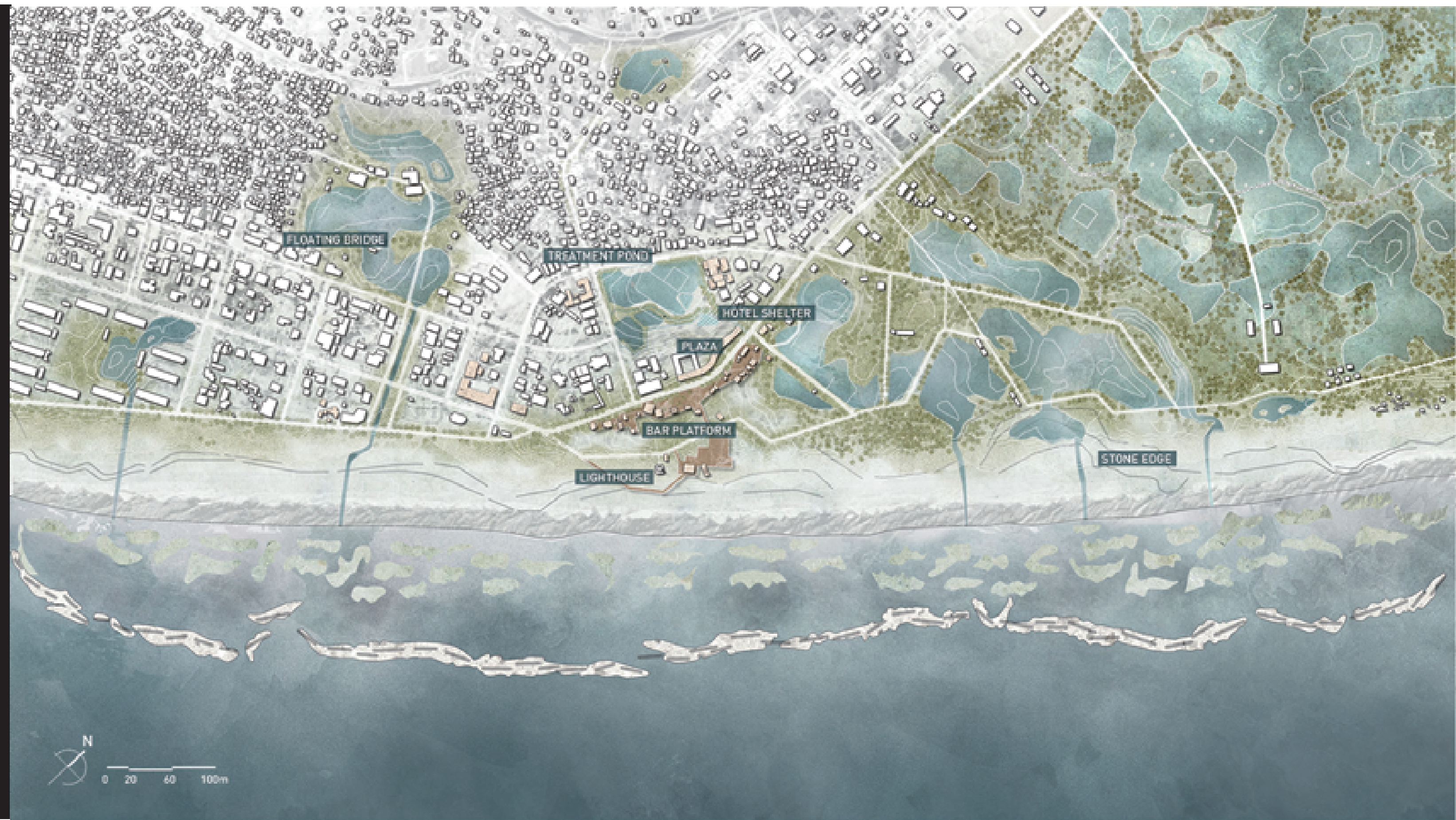
Install and maintain coral reef breakwaters, mangroves etc.

Communities as stakeholder, boosting local markets,.

Maintaining park, community stewardship

Educate community and research.

2100



FLOATING BRIDGE

TREATMENT POND

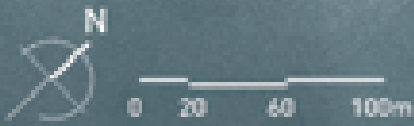
HOTEL SHELTER

PLAZA

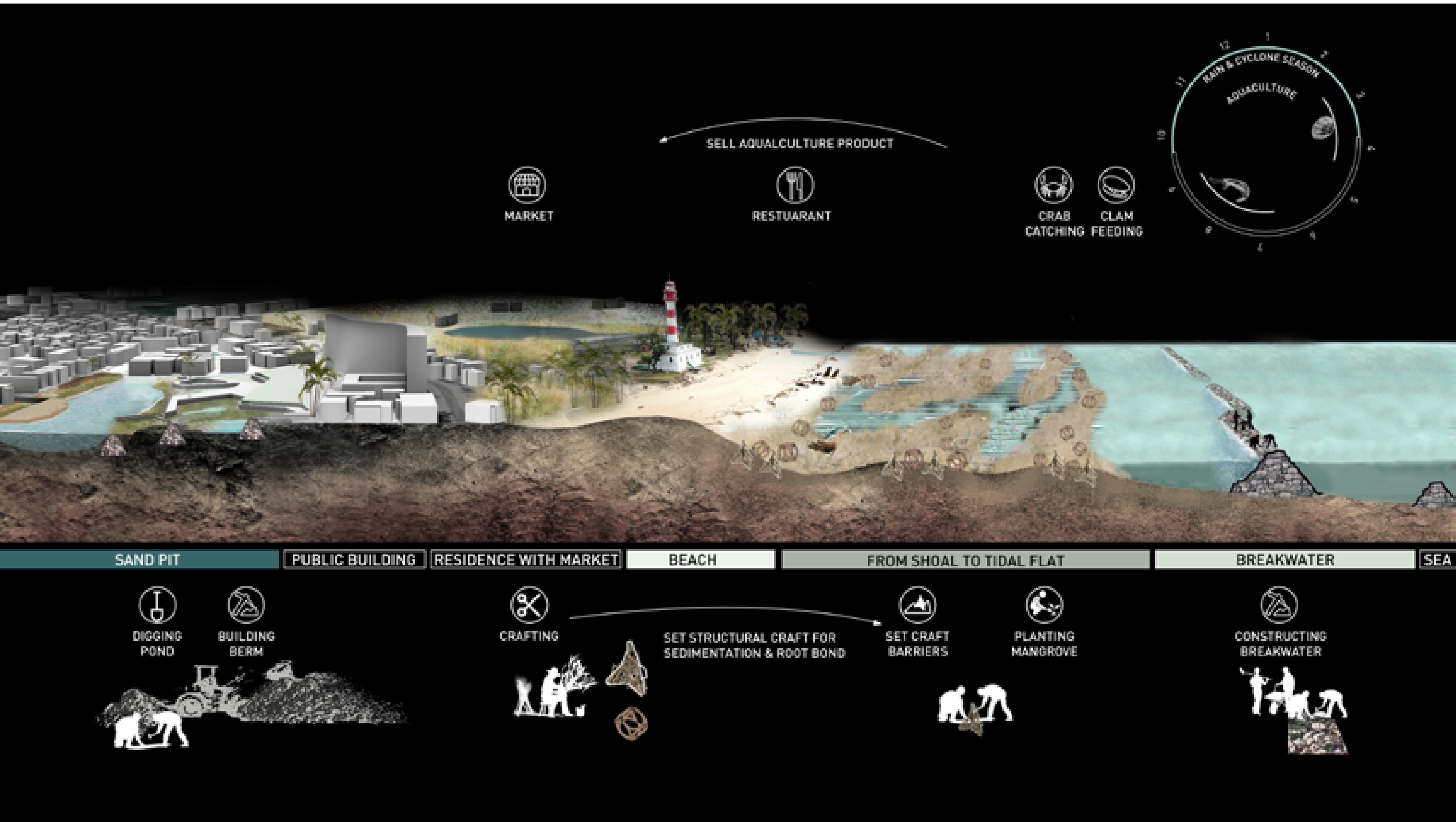
BAR PLATFORM

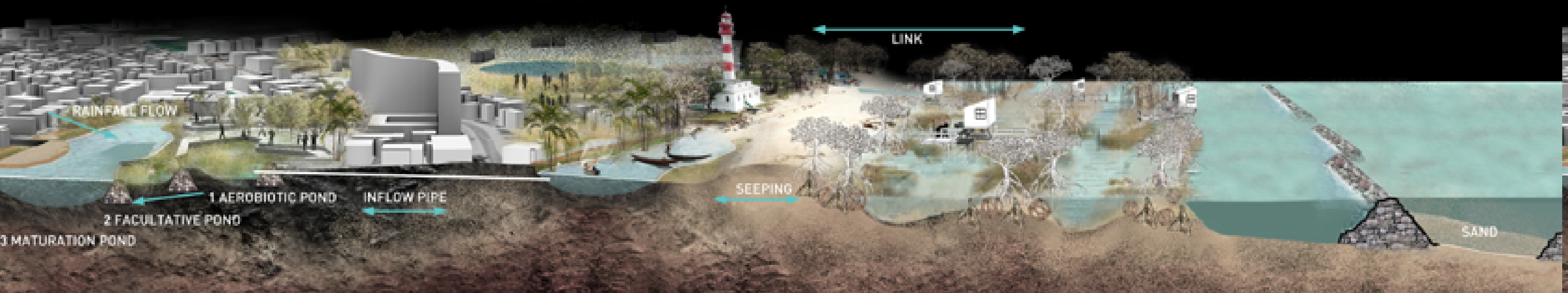
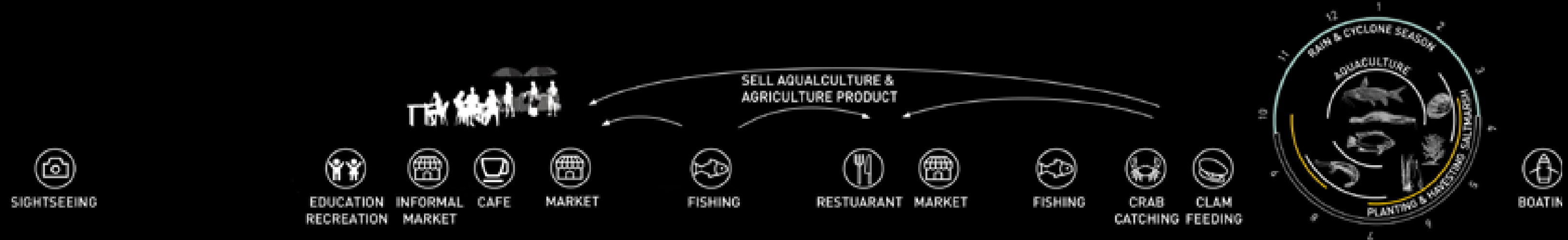
LIGHTHOUSE

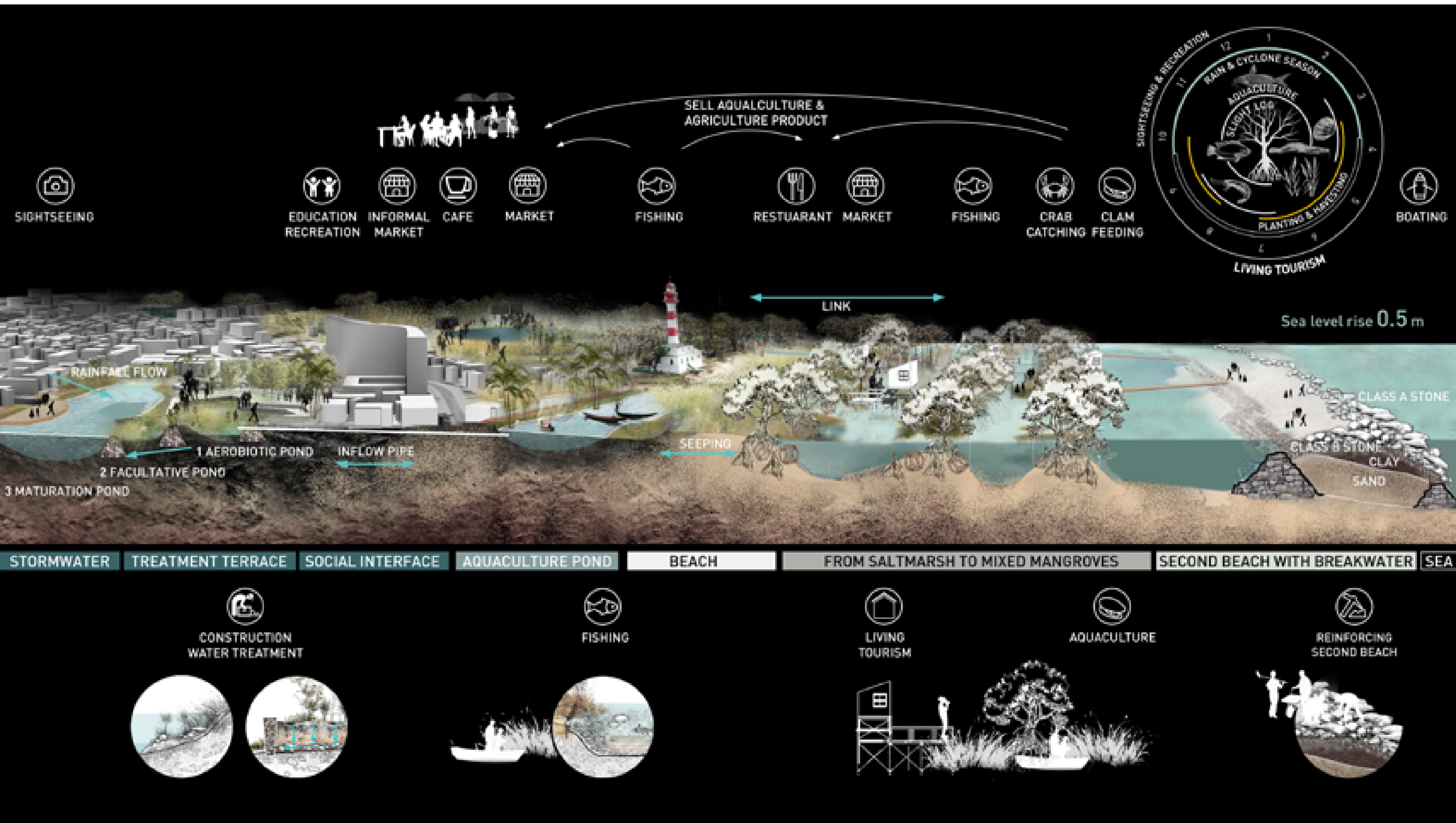
STONE EDGE











2020

2025

2030

2035

2040

2045

2050

SAND DUNE

Stabilization of sand dune with stone reefs and coir fiber logs

Expansion of sand dune through caught sediment

Living sand dune with wetland plant and submerged aquatic vegetation

ACCESSIBILITY
PUBLIC SPACE

Construction of stone pedestrain path and elevated overlook bridge

Connection with living coastaline

Accessible area resisting threaten of flood and tidal water

WATER
RESILIENCE

Stormwater management for absorbing zone

Improvement of water quality via filtration of run-off while creating habitat

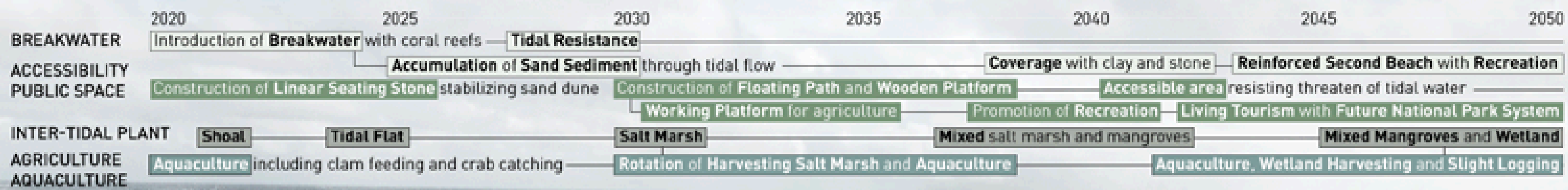
Nature and biodlversity protection for intertidal zone

Promotion of Outdoor Recreation

Sustainability of exploring and teaching

Establishment of Future National Park System







2020

2025

2030

2035

2040

2045

2050

WATER
RESILIENCE

Stormwater Management for absorbing zone

Underground connection with absorbing zone

Construction of **Treatment Terrace** including anaerobic, facultative and maturation pond

Treatment terrace toward **Restored Wetland**

Improvement of **Water Quality** via **filtration** of run-off and flood

Reuse for Irrigation and non-portable water

ACCESSIBILITY
PUBLIC SPACE

Construction of **Plaza and Pedestrian Path with Platform** — **Connection** with local community and living coastal life

Accessible area resisting threaten of flood

Promotion of **Community Activities** including movable market and playground

Sustainability of exploring and teaching

Connection with Future National Park



Quirimbas National Park

Gilé National Reserve

Angoche Island

Marromeu National Reserve

Beira

Bazaruto Archipelago National Marine Park

Zinave National Park

Banhine National Park

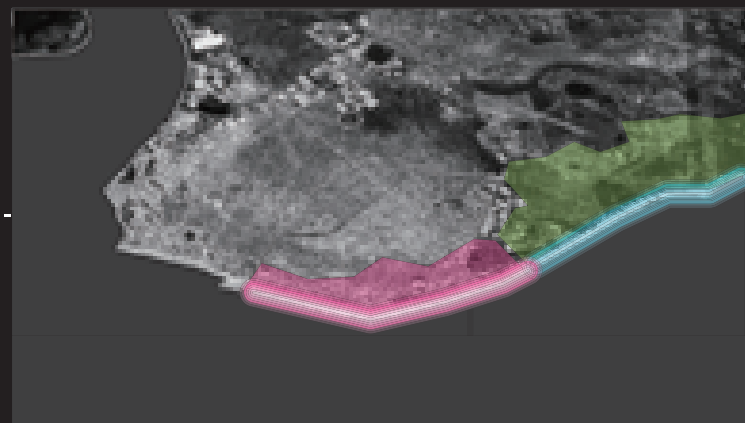
Limpopo National Park

Inharrime

Maputo Special Reserve

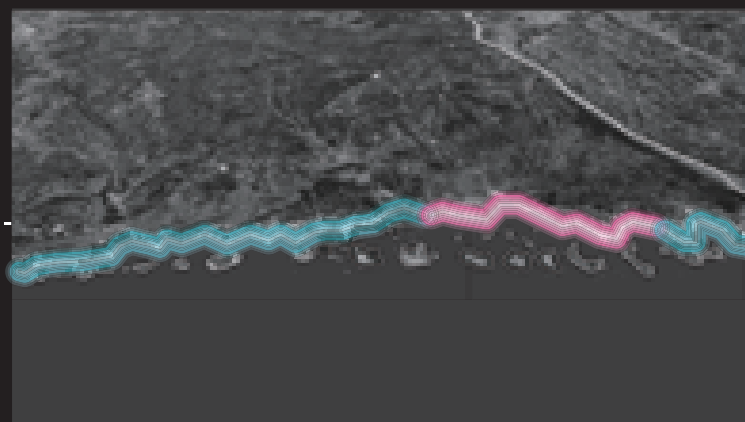
A BEIRA

Beira is the capital and largest city of Sofala Province, where the Pungwe River meets the Indian Ocean, in the central region of Mozambique. It is the fourth-largest city by population in Mozambique, after Maputo, Matola and Nampula. The cyclone "Idai" hit Beira in 2019 and warned us the resilience and coastal design should be an important topic to consider for its future.



B QUIRIMBAS

The Quirimbas Archipelago is in the Indian Ocean, just off the northern coast of Mozambique. Many of its islands are part of Quirimbas National Park, which is known for coral reefs and waters inhabited by dolphins, whales and other marine life. The long beaches, mangrove-covered islands feature, and colonial-era ruins have great potential for tourism and resilient coastal projects.



C ANGOICHE ISLAND

Angoche is a city of Nampula Province in Mozambique. The islands and reefs provide a habitat for diverse species. What happened here is similar to Beira, cyclone "Hudah" hit this area in 2000. Coastal resilience projects would help this area ecologically and economically.

