



Resilient by Design Update

San Francisco Bay Restoration Authority

June 1, 2018

Harnessing innovation to build more resilient communities

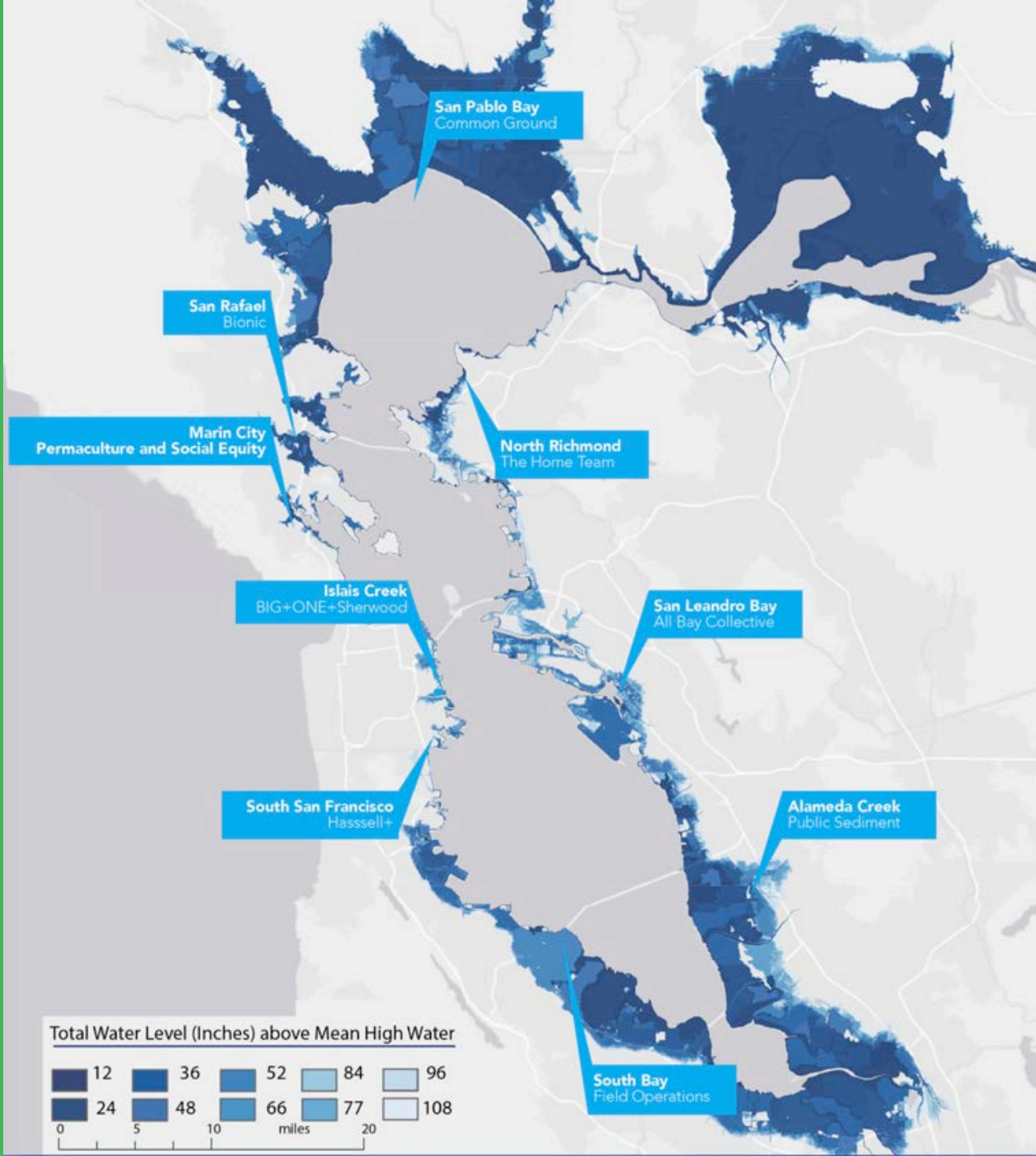
Year-long **challenge** bringing together local residents, public officials, and local, national, and international experts to develop **innovative solutions** that will strengthen our region's **resilience to sea level rise, severe storms, flooding and earthquakes**. Building off of the NYC **Rebuild by Design** challenge, resilient by design takes a proactive approach to protect our communities **before disaster strikes**, and climate impacts worsen



Bay Area Challenge



Where teams worked



- All Bay Collective | Oakland, Alameda, San Leandro Bay
- BIG+ONE+Sherwood | San Francisco, Islais Creek
- Bionic Team | San Rafael
- Common Ground | San Pablo Bay
- Field Operations Team | East Palo Alto to Sunnyvale
- The Home Team | North Richmond
- HASSELL+ | San Mateo County, South San Francisco
- P+SET | Marin City
- Public Sediment | Alameda Creek

Education and Collaboration

RESILIENT

BAY AREA CHALLENGE BY

DESIGN





FLOODS AFFECT EVERYTHING
LAS INUNDACIONES AFECTAN TODOS

Yep, that's pretty
much everything...
-Katie Paterson

HOMES & APARTMENTS
VIVIENDAS Y APARTAMENTOS

SCHOOLS
ESCUELAS

GROCERY STORES
TIENDEAS DE ALIMENTOS

PHARMACIES
FARMACIAS

POST OFFICES
OFICINAS DE CORREOS

GAS STATIONS
ESTACIONES DE GASOLINA

BUSINESSES
NEGOCIOS

RESTAURANTS
RESTAURANTES

INFRASTRUCTURE
INFRAESTRUCTURA

SAN RAFAEL FLOOD MOBILE

The cool stick figure kids
are using these tags
La figura genial de stick kids usa estas etiquetas

bionic
Landscape Architecture
Urban Design
Planning

@bioniciand
#FloodMobil
#ResilientBy



RESILIENT SOUTH CITY

SOUTH SAN FRANCISCO, SAN MATEO COUNTY

Resilient by Design
Bay Area Challenge

May 2018

HASSELL⁺

RESILIENT

BAY AREA CHALLENGE

BY

DESIGN

FROM A LOOP...

COLLECT

DEFINING RENEWAL CORRIDORS LINKED TO TRANSIT
CREATING SPACES FOR WATER AND PEOPLE
ALLOWING FOR EMERGENCY GATHERING AND ORGANISATION
CREATING PLACES FOR CELEBRATION AND COMMUNITY-BUILDING



FROM A LOOP... ...TO A NETWORK

COLLECT

DEFINING RENEWAL CORRIDORS LINKED TO TRANSIT
CREATING SPACES FOR WATER AND PEOPLE
ALLOWING FOR EMERGENCY GATHERING AND ORGANISATION

CONNECT

TURNING A LOOP INTO A NETWORK
CONNECTING THE BAY AND RIDGE TRAILS
CREATING "STREETS OF RETREAT" UP AND DOWN
NEW CROSS-BAY FERRY CONNECTIONS



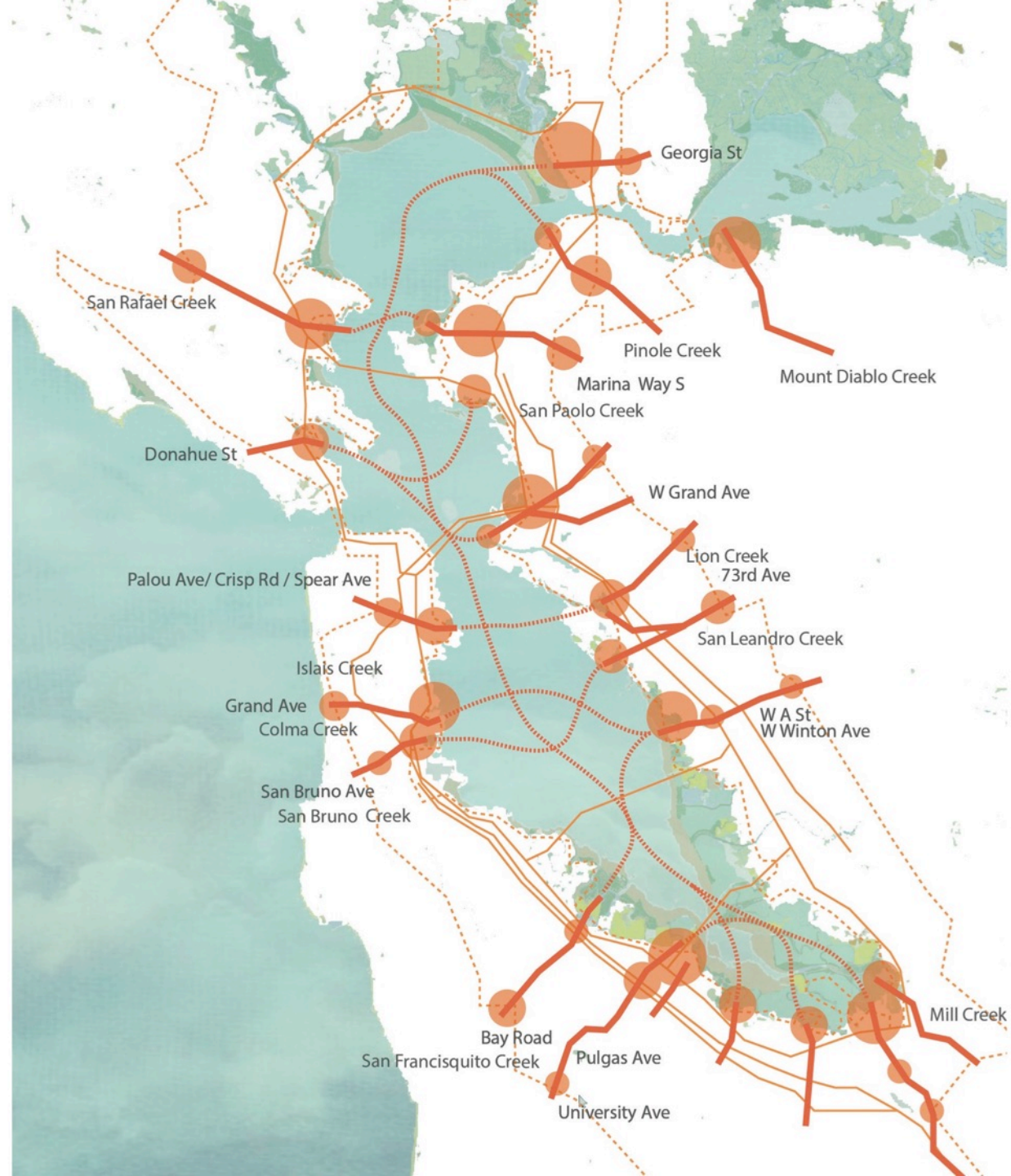
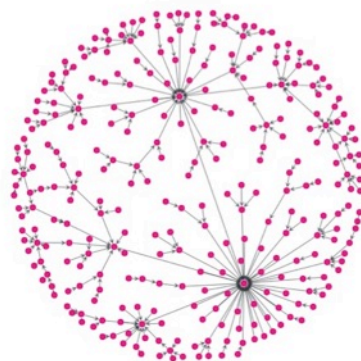
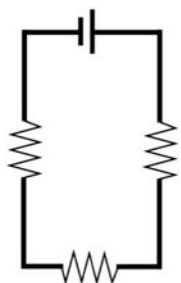
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304

WHAT

WOULD

YOU DO TO

BECOME

RESILIENT

SOUTH CITY STOREFRONT

“A little higher.... Yeh that’s the spot. It floods there sometimes... plus it’s hard to cross the street! I’m no expert but I’ve got a couple of ideas...”



SOUTH CITY ENGAGEMENT



SR 37
SCENIC BAYWAY

Design Concepts



Rendering of the causeway

PUBLIC SEDIMENT

BAYLANDS TODAY



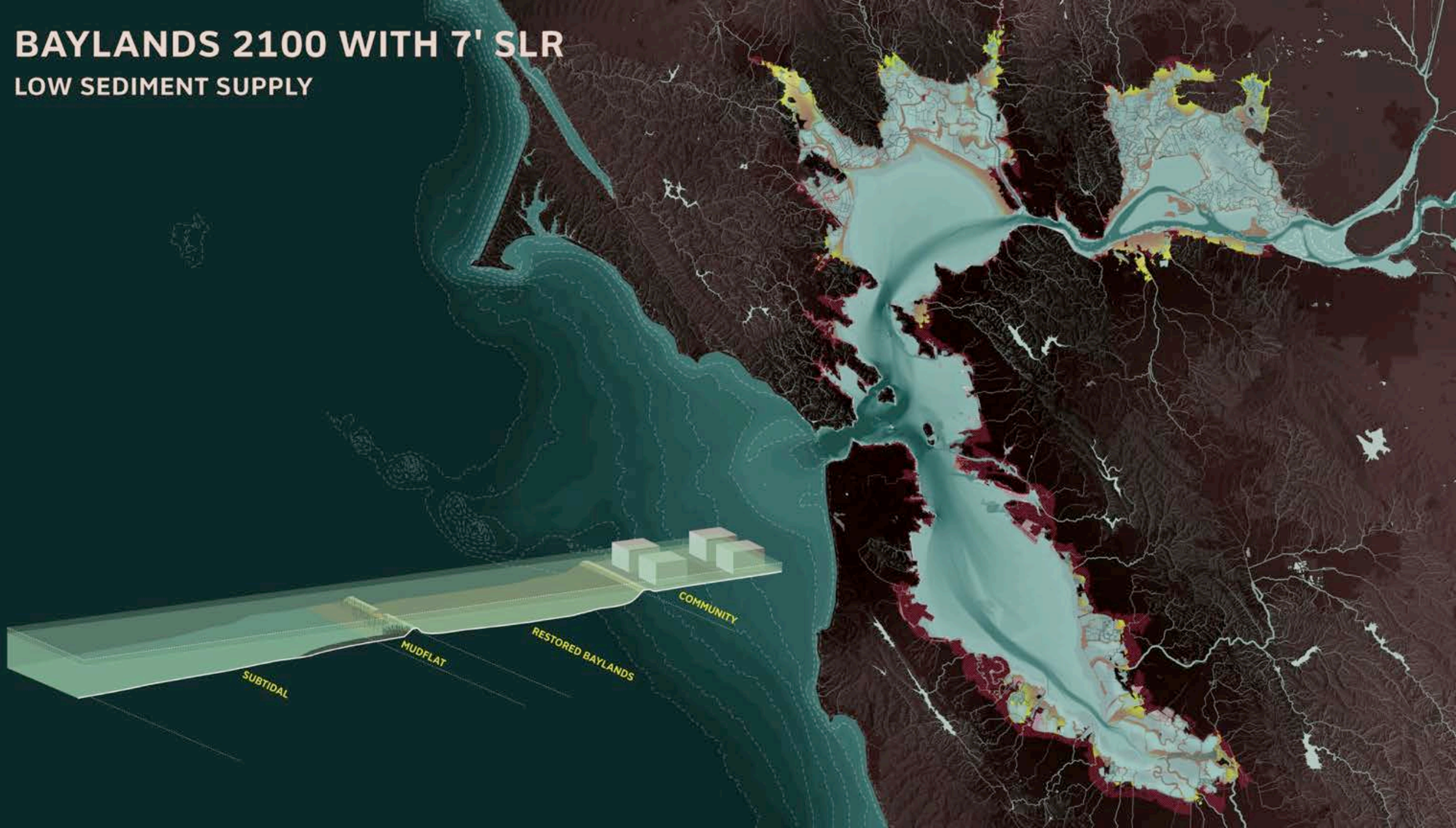
BAYLANDS 2100 WITH 3' SLR

LOW SEDIMENT SUPPLY



BAYLANDS 2100 WITH 7' SLR

LOW SEDIMENT SUPPLY



THE FLOOD CONTROL CHANNEL



THE CHANNEL WAS NOT DESIGNED TO MOVE SEDIMENT

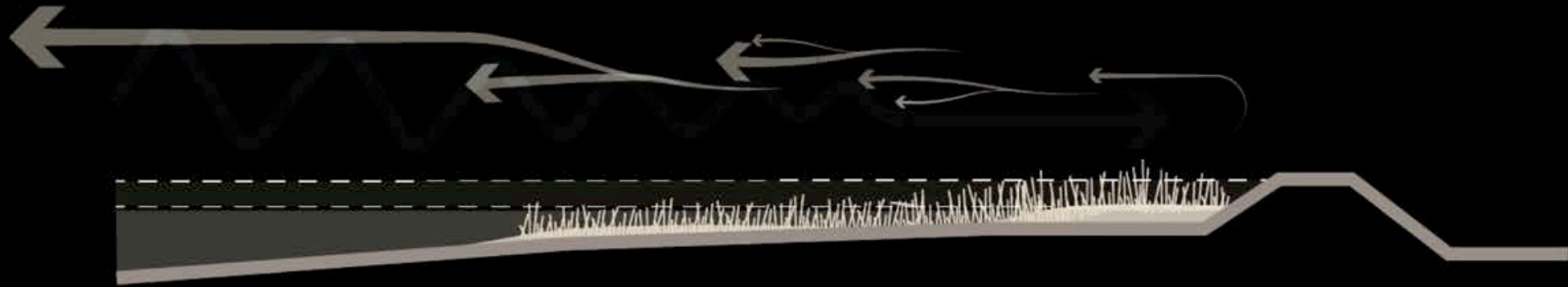


THE CHANNEL WAS NOT DESIGNED FOR THE PASSAGE OF FISH



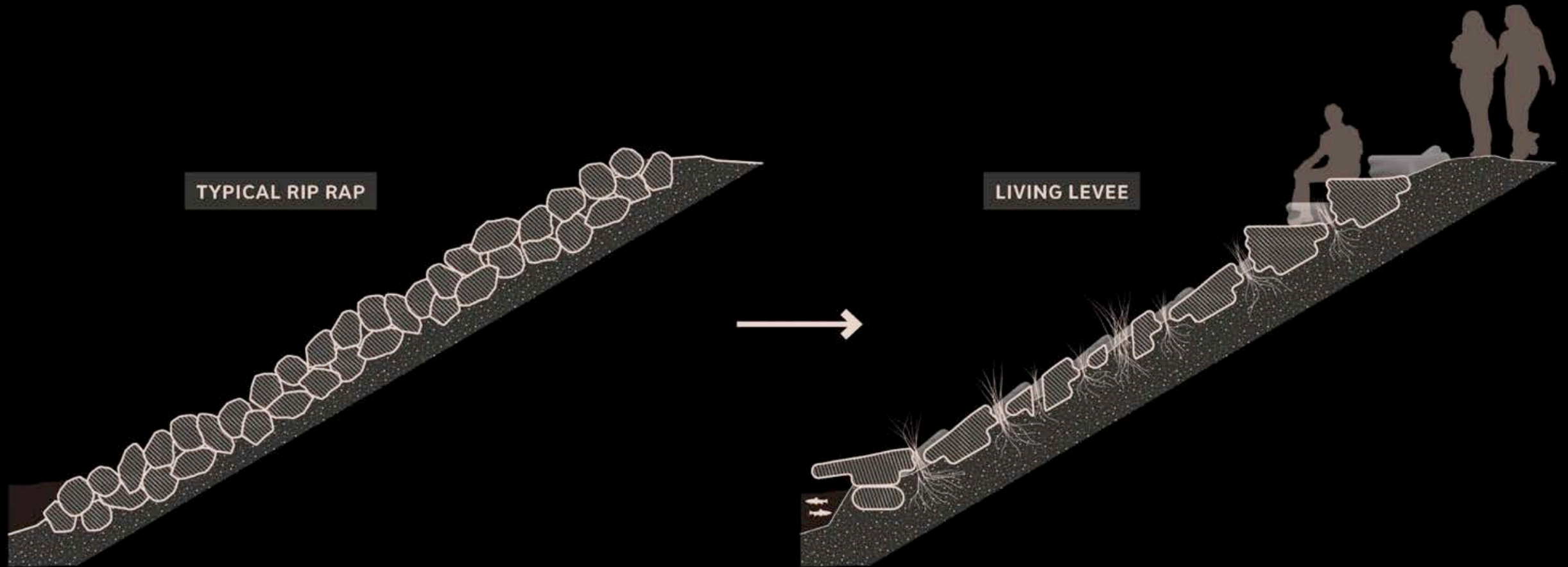
THE CHANNEL WAS NOT DESIGNED TO ENGAGE PEOPLE

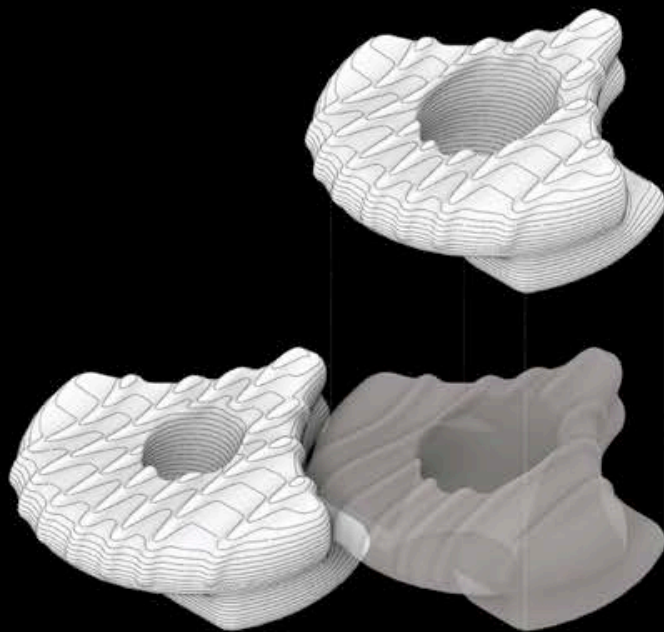




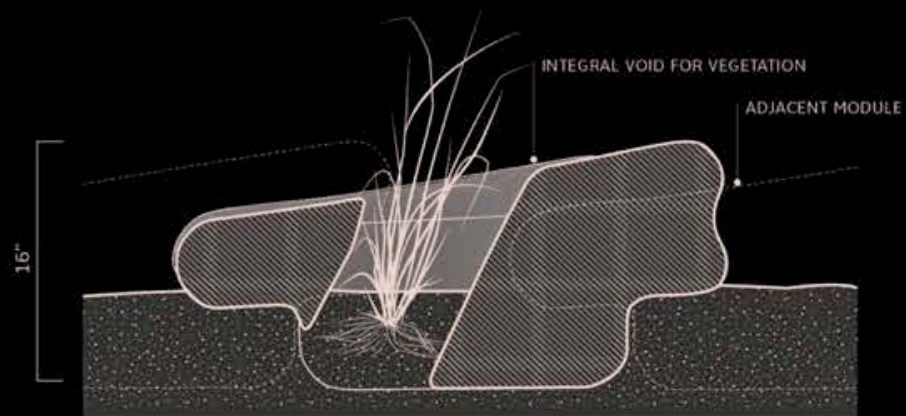
**TIDAL BAYLANDS CUSHION URBAN EDGES +
AND MITIGATE THE RISKS OF SEA LEVEL RISE.**

LIVING LEVEE





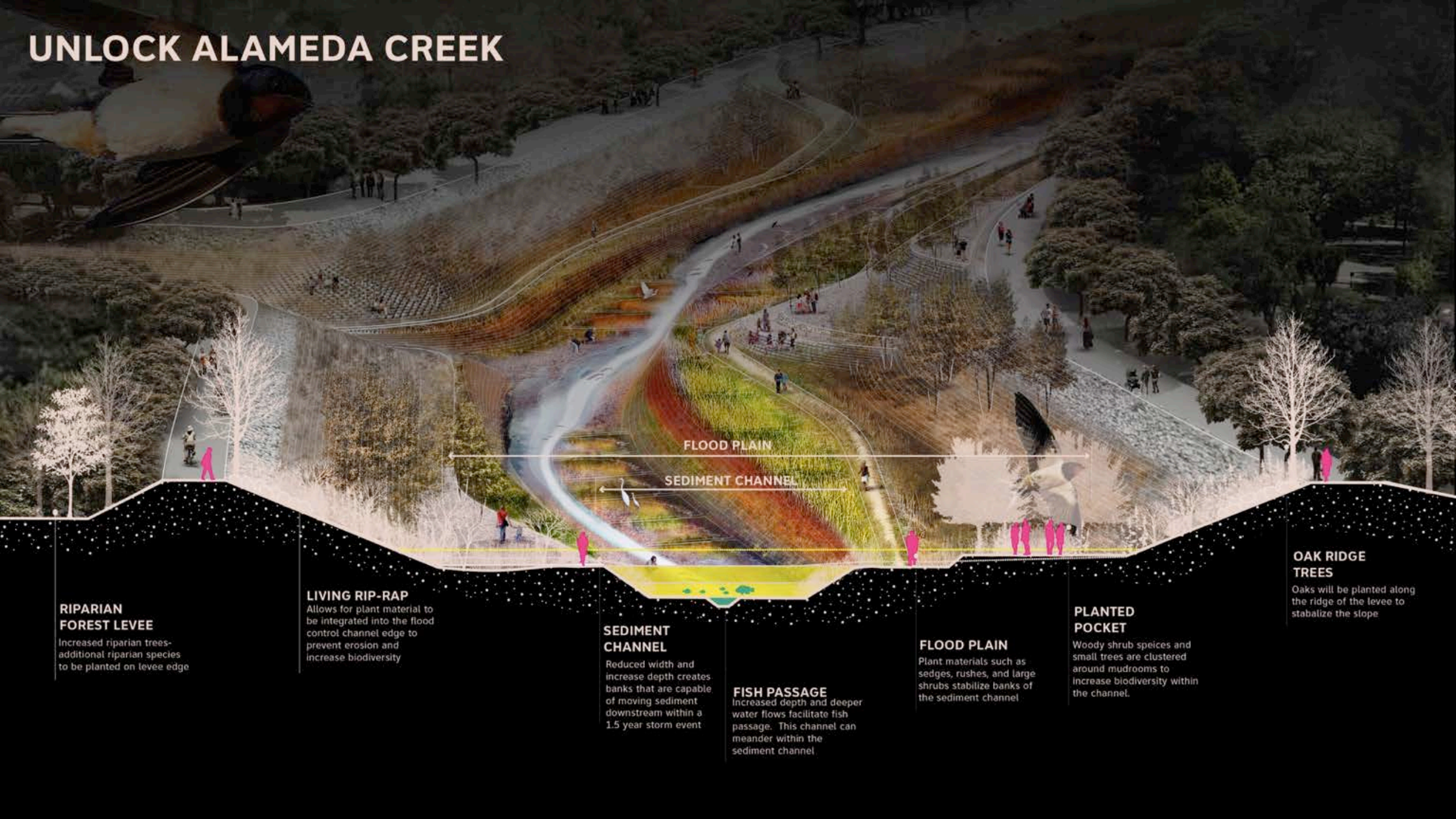
NESTING / TILING LOGIC
TYPICAL MODULE PLAN



TYPICAL MODULE SECTION



UNLOCK ALAMEDA CREEK



RIPARIAN FOREST LEVEE

Increased riparian trees- additional riparian species to be planted on levee edge

LIVING RIP-RAP

Allows for plant material to be integrated into the flood control channel edge to prevent erosion and increase biodiversity

SEDIMENT CHANNEL

Reduced width and increase depth creates banks that are capable of moving sediment downstream within a 1.5 year storm event

FISH PASSAGE

Increased depth and deeper water flows facilitate fish passage. This channel can meander within the sediment channel

FLOOD PLAIN

Plant materials such as sedges, rushes, and large shrubs stabilize banks of the sediment channel

PLANTED POCKET

Woody shrub species and small trees are clustered around mudrooms to increase biodiversity within the channel.

OAK RIDGE TREES

Oaks will be planted along the ridge of the levee to stabilize the slope



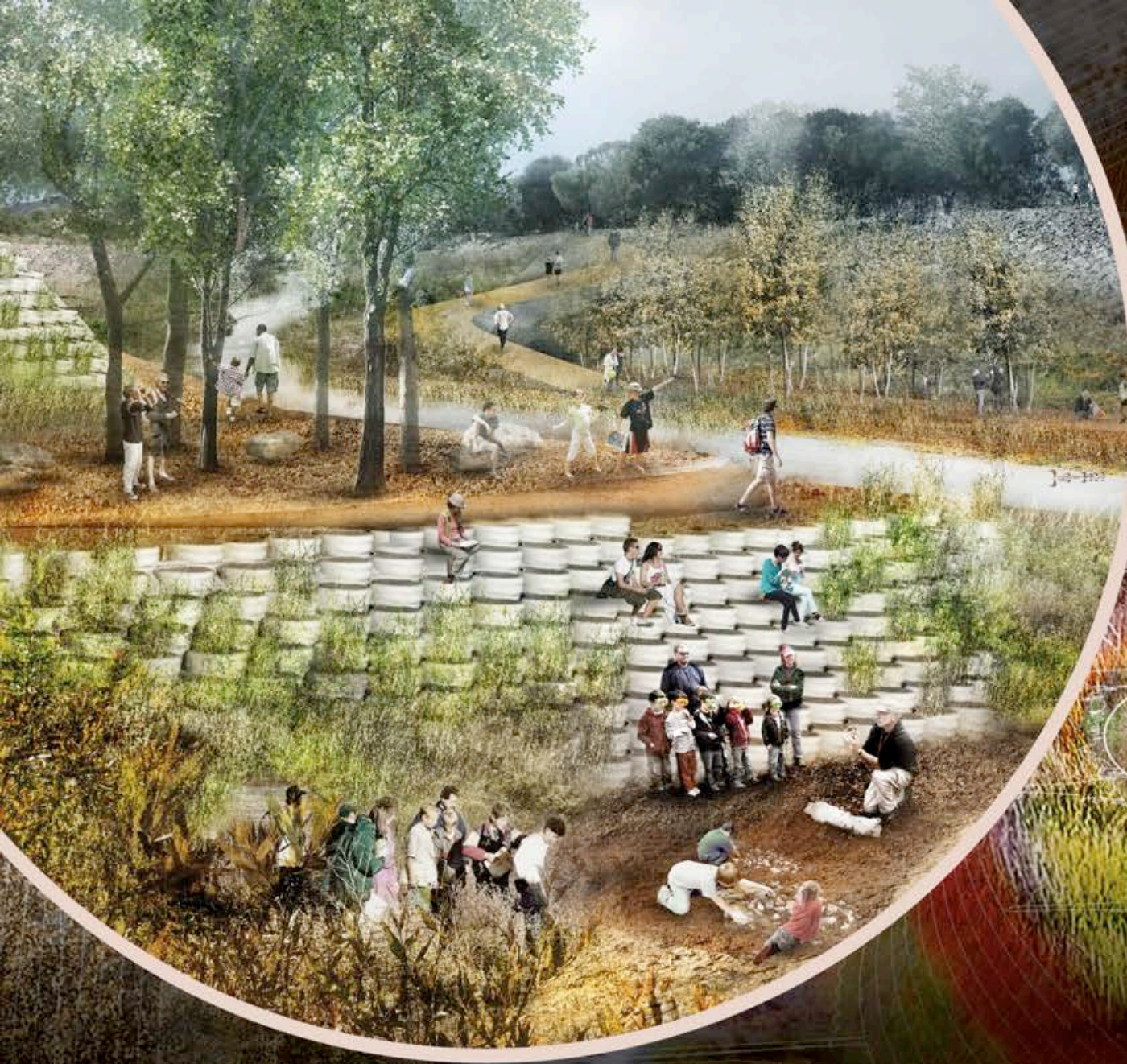
LIVING LEVEE

MUDROOMS

FISH CHANNEL

SEDIMENT CHANNEL

TERRACE TRAIL



FLOOD TERRACE TRAIL



MITHUN

▲ The Home Team

RESILIENT

BAY AREA CHALLENGE

BY

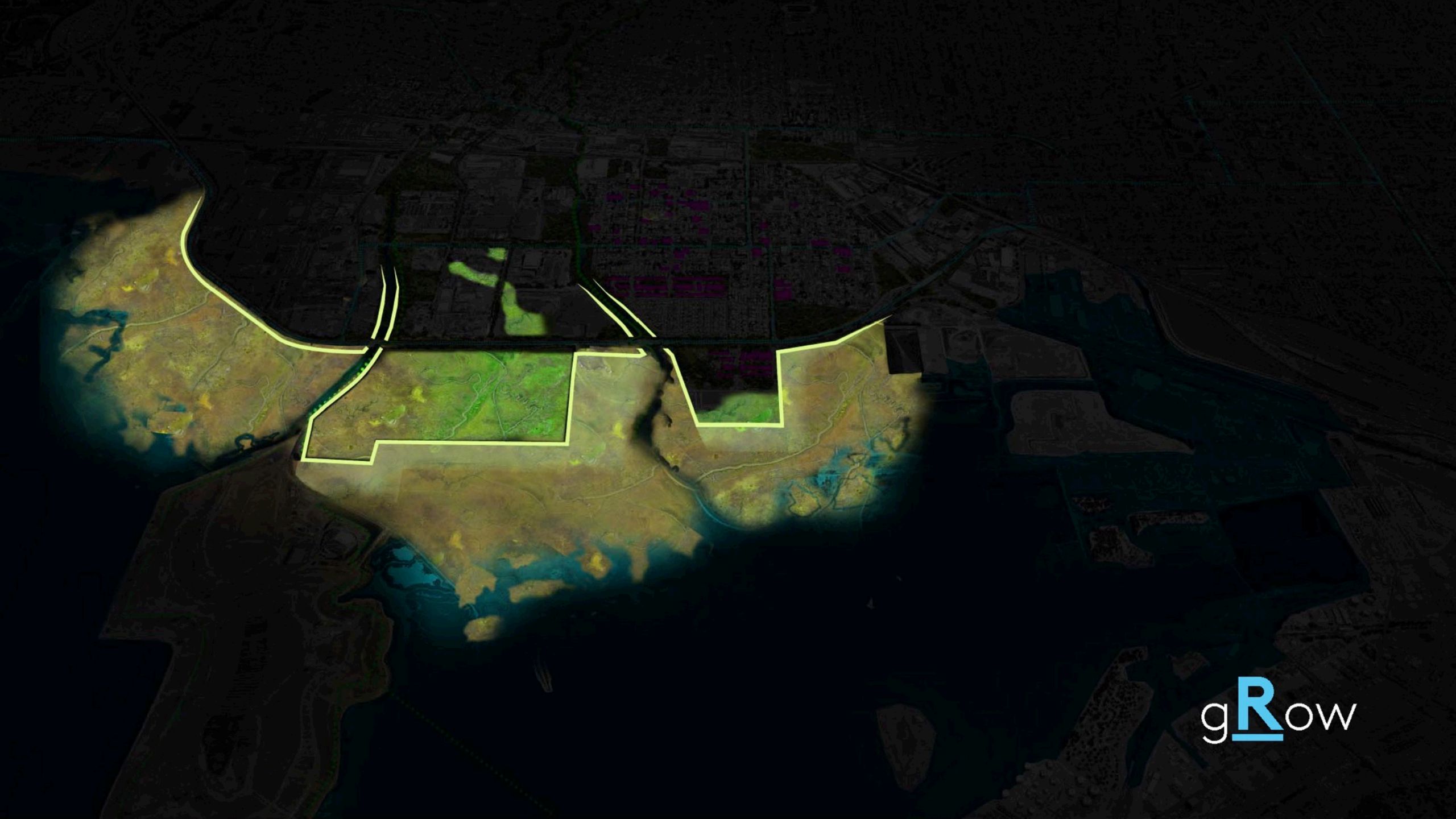
DESIGN

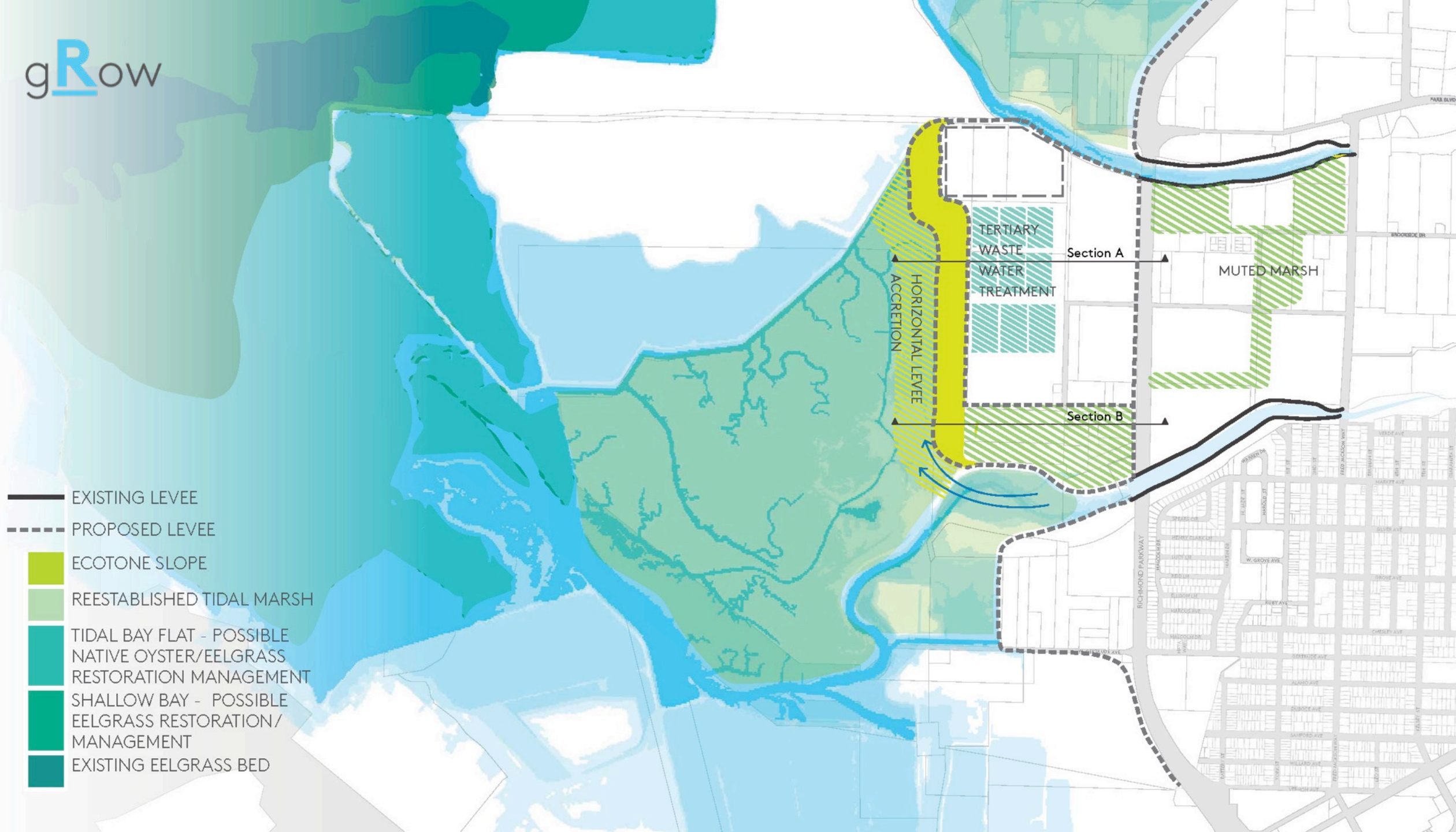
our **R**-HOME

North Richmond Priority Resilience Area

©Mithun







- EXISTING LEVEE
- - - PROPOSED LEVEE
- ECOTONE SLOPE
- REESTABLISHED TIDAL MARSH
- TIDAL BAY FLAT - POSSIBLE NATIVE OYSTER/EELGRASS RESTORATION MANAGEMENT
- SHALLOW BAY - POSSIBLE EELGRASS RESTORATION/MANAGEMENT
- EXISTING EELGRASS BED

HIDDEN HABITATS:



CLAPPER RAIL



SALT HARVEST MOUSE



EEL GRASS



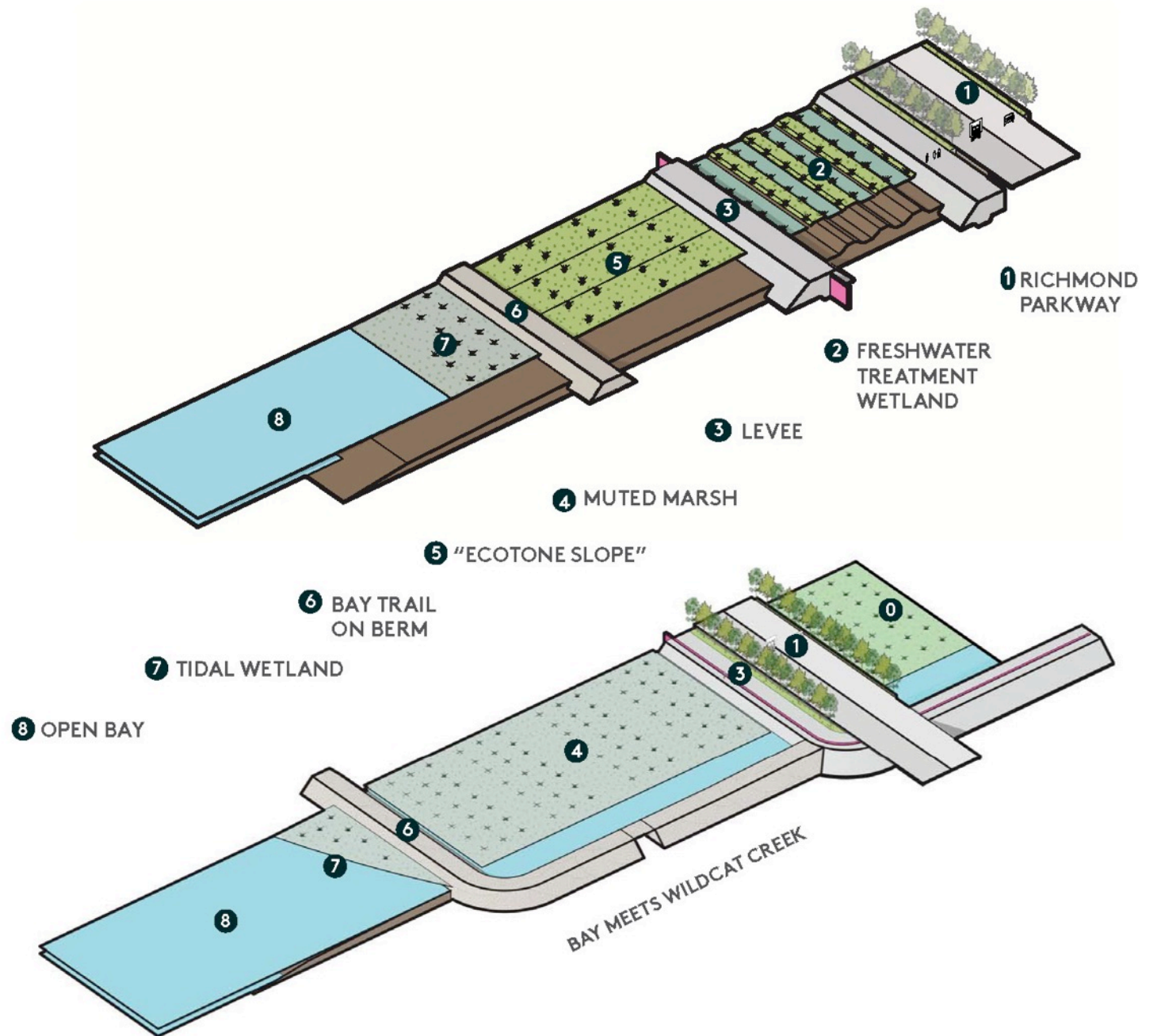
PACIFIC HERRING



MIGRATORY BIRDS



OYSTERS











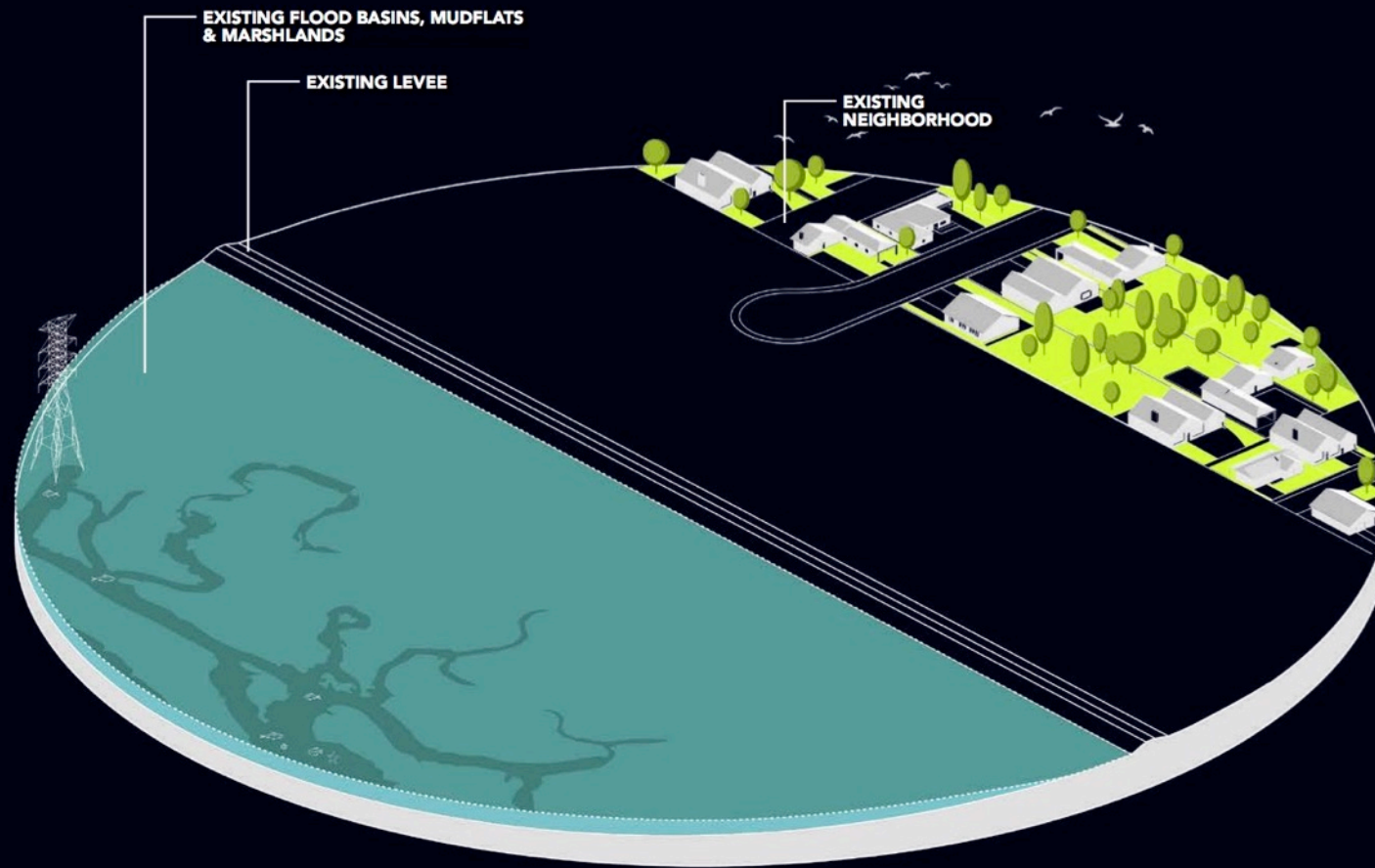


nature = sponge

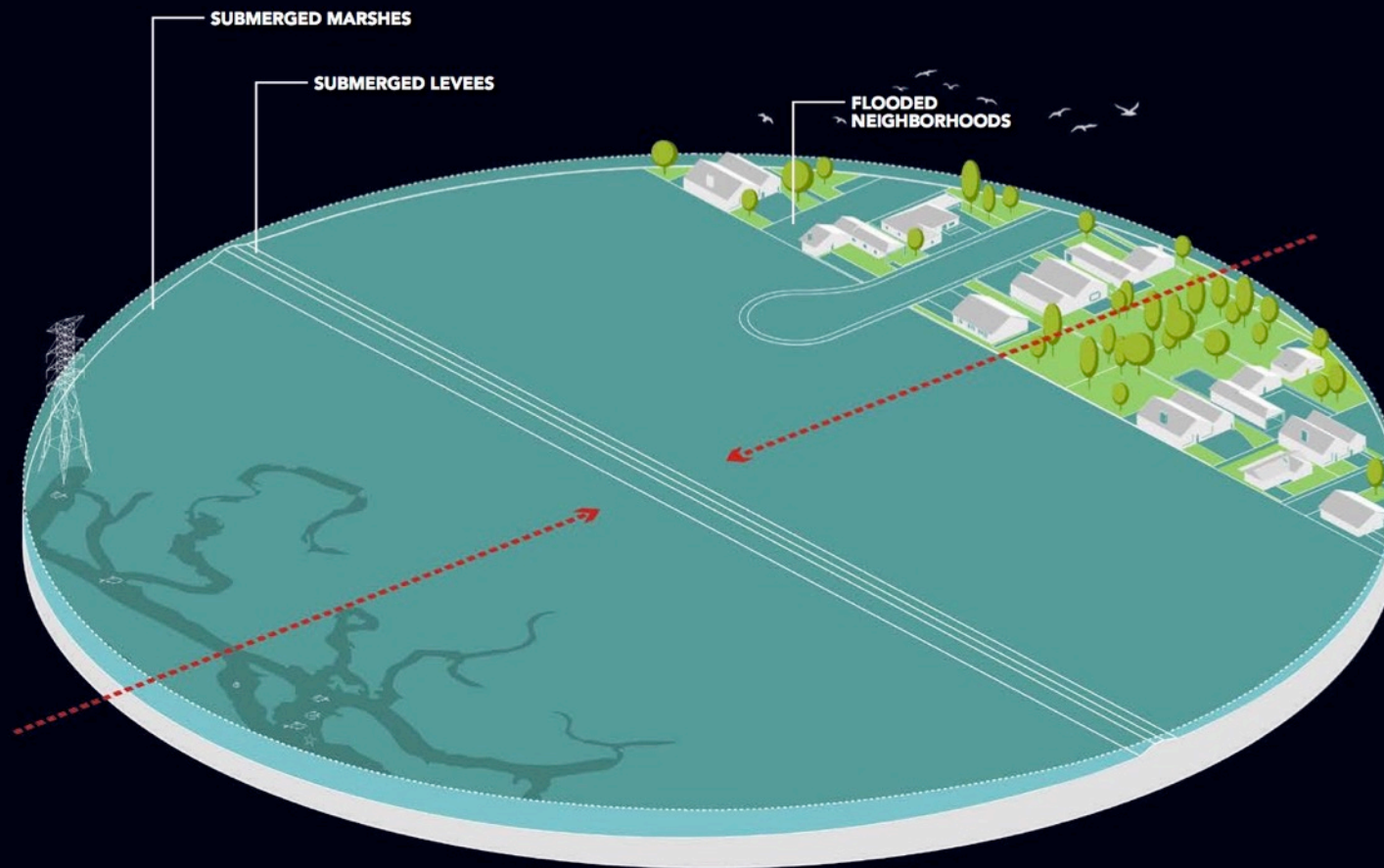
nature = sponge



nature = sponge



The Bay Edge Today
(East Palo Alto)

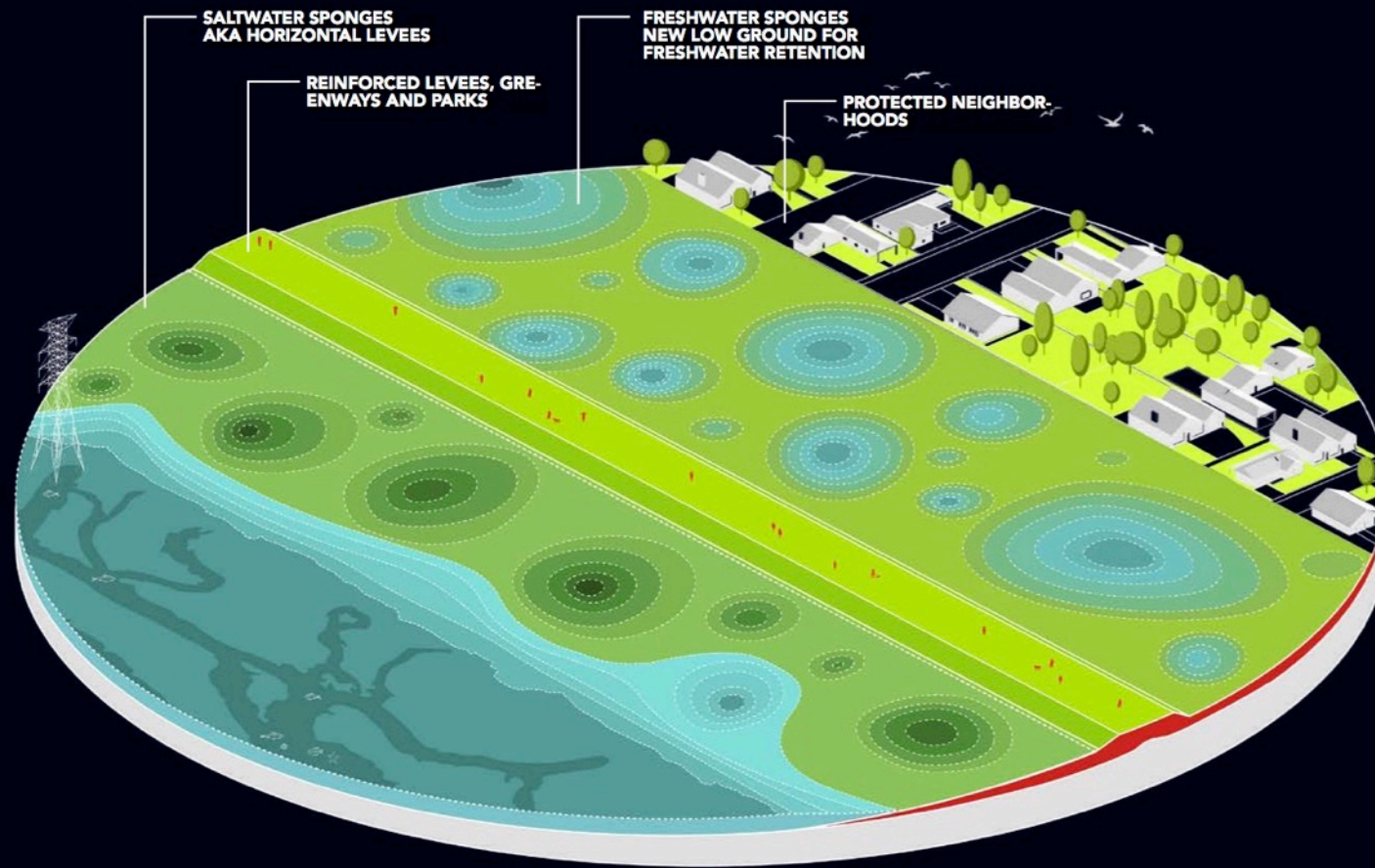


Sea Level Rise



Surface Water

Flooding



The Sponge



RESILIENT THE
BY FIELD
DESIGN OPERATIONS
TEAM

#spongehub



**Engagement
East Palo Alto
Sunday Services**

THE BAY



Engagement Sunnyvale Farmers Market



SOUTH BAY SPONGE

The great natural ecology of the Bay (its marshes, wetlands, dunes, oysters - all the "sponges" for the region - absorb water, filter it, and store it, allowing for water to migrate).

In the face of climate change and rising sea levels, how do we use the Bay's natural soft systems to remain viable in the face of rising sea levels?

Furthermore, how might we utilize the natural soft systems of the Bay to create more resilient ecological systems of absorption?

To the extent that the Bay has always had soft wetland and marsh areas, these have been mostly dismantled over time, and will continue to be lost as water levels rise and subside than up.

These wetlands are critical to resiliency as they help to absorb and remove damage from lands and habitats and the shoreline.

Scientists around the Bay Area propose that the most effective way to address rising sea levels is through large-scale restoration of the Bay's historic tidal marshes. Re-engineering the shoreline to green infrastructure - an ecological "sponge" - would not only help defend against sea level rise, but would also sequester carbon, cleanse pollutants and restore fish and wildlife.

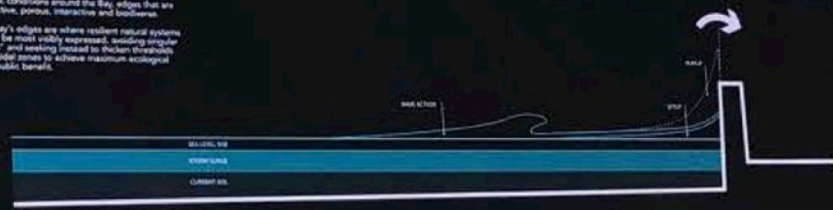
FROM "WALLS" TO "SOFT SYSTEMS"

We are investigating a variety of infrastructural and alternative "soft system" edges that work for specific conditions around the Bay, edges that are protective, porous, interactive and resilient.

The Bay's edges are where resilient natural systems might be most easily expressed, creating single "soft" and seeking instead to cluster throughout inter-scale zones to achieve maximum ecological and public benefits.



=



South Bay Sponge

Sunnyvale Baylands Park "Sponge"



South Bay Sponge
Sunnyvale East Micro-delta



South Bay Sponge

Soft infrastructure for climate adaptation



What's Next

- Building on momentum
- Identifying promising opportunities
- Cultivating local and regional champions
- Finding funding!



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To stay updated, sign up at resilientbayarea.org