MID-SOUTH REGIONAL
RESILIENCE PLAN

Public Workshop Series 2: Draft Resilience Strategies

Tuesday, May 22nd Hernando Public Library, 370 W Commerce St, Hernando

Wednesday, May 23rd Baker Community Center, 7942 Church St., Millington

Thursday, May 24th The University of Memphis Highland Branch, 460 S Highland St, Memphis

RESILIENT SHELBY

SASAKI

Ritchie Smith Associates

SMALL PLANET WORKS, INC.

BLDG MEMPHIS

PIQUE

POWERS HILL DESIGN

Following the 2011 Mississippi River Floods, Shelby County was identified by the U.S. Department of Housing and Urban Development as TN's most impacted area. To fund post-flood recovery, the County entered the National Disaster Resilience Competition (NDRC) and was successful in securing a major Federal grant for local flood mitigation projects and to plan for a more resilient region.

This project—**the Mid-South Regional Resilience Master Plan**— is one of those NDRC projects and will identify strategies to make the Mid-South more secure against future climate and weather related disasters and chronic stressors. The geographic extent of the plan includes all of Shelby and DeSoto Counties, as well as parts of Fayette and Marshall Counties.

Resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience.

— U.S. Department of Housing and Urban Development (HUD)

2011 MISSISSIPPI RIVER FLOODS

345,000+

People lost power

$2B+

In property damages

198

Homes flooded

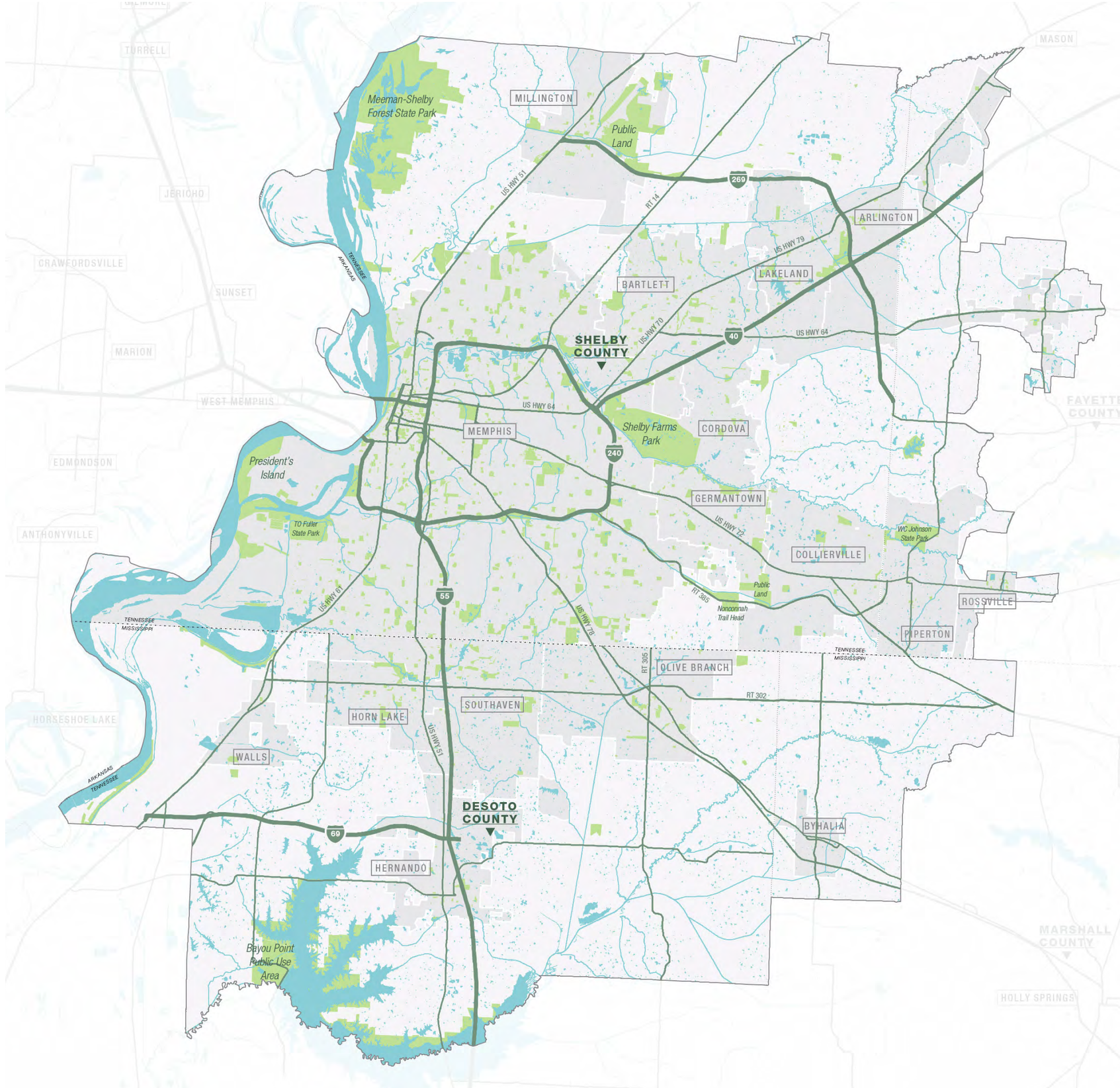
PROJECT EXTENT

23 Cities and Towns

4 Counties

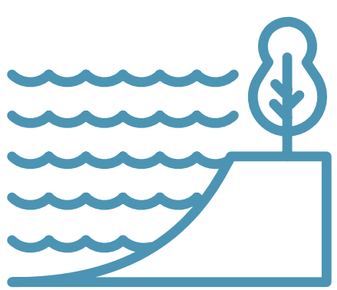
2 States

1 Region



THREATS

River Flooding

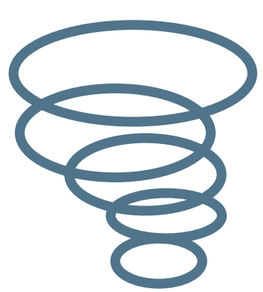


Flash Flooding

Extreme Heat & Drought

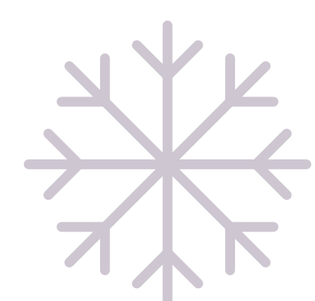
Damaging Wind

Tornadoes



Earthquakes

Winter Weather



PROJECT GOALS

Safeguard Regional Infrastructure

Energy, transportation, waste, communications, drinking water, and food

Protect Property

From damage and value loss

Prevent Interruptions

To business, school operations, and critical services

Promote Public Safety

During and after natural disasters and extreme weather

Provide Multi-Benefit Solutions

Prioritize resilience strategies that also protect natural resources and promote public health, outdoor recreation, and economic development

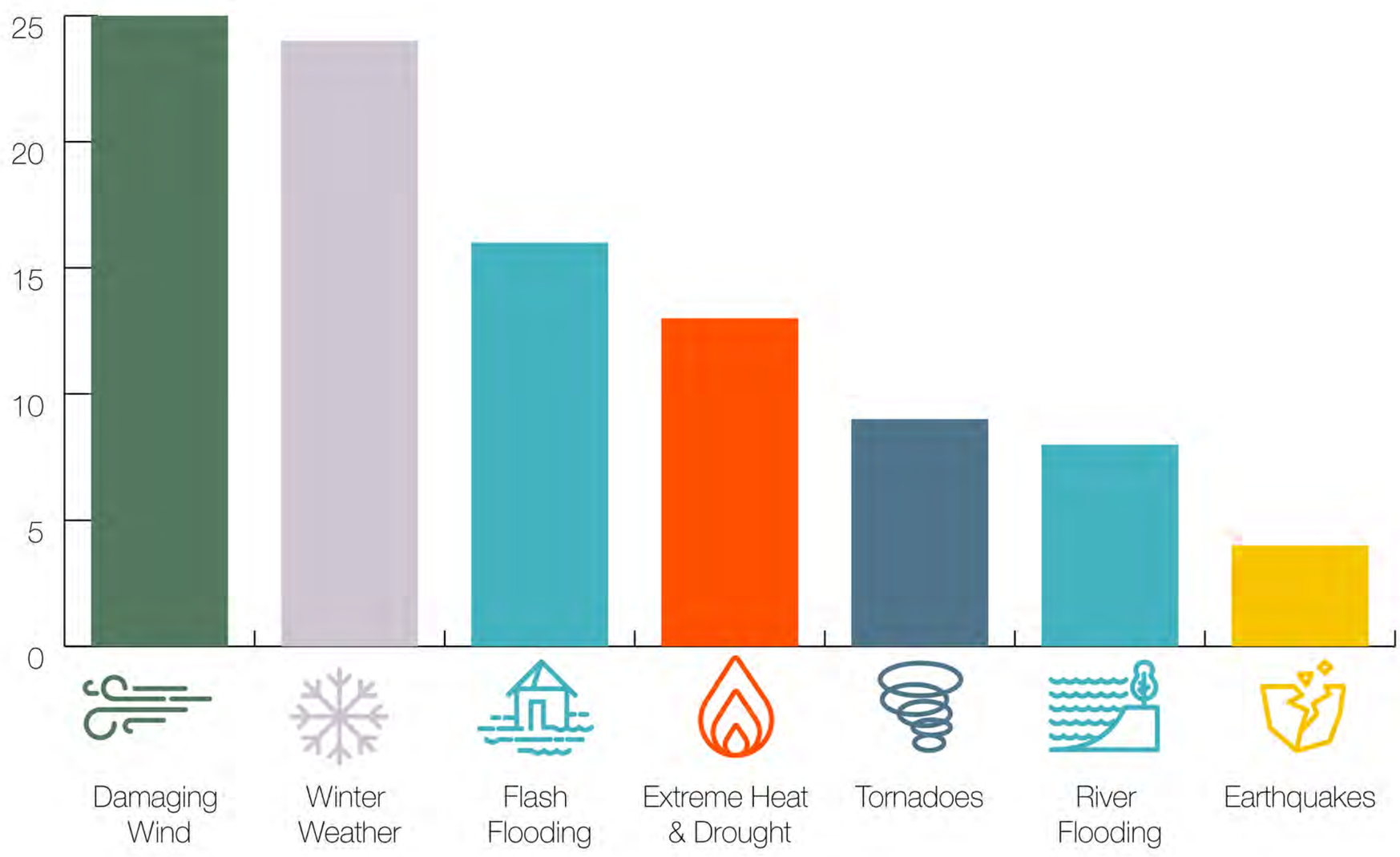
Enhance Quality of Life

Provide new amenities, mitigate extreme heat and drought and cold, and eliminate standing water

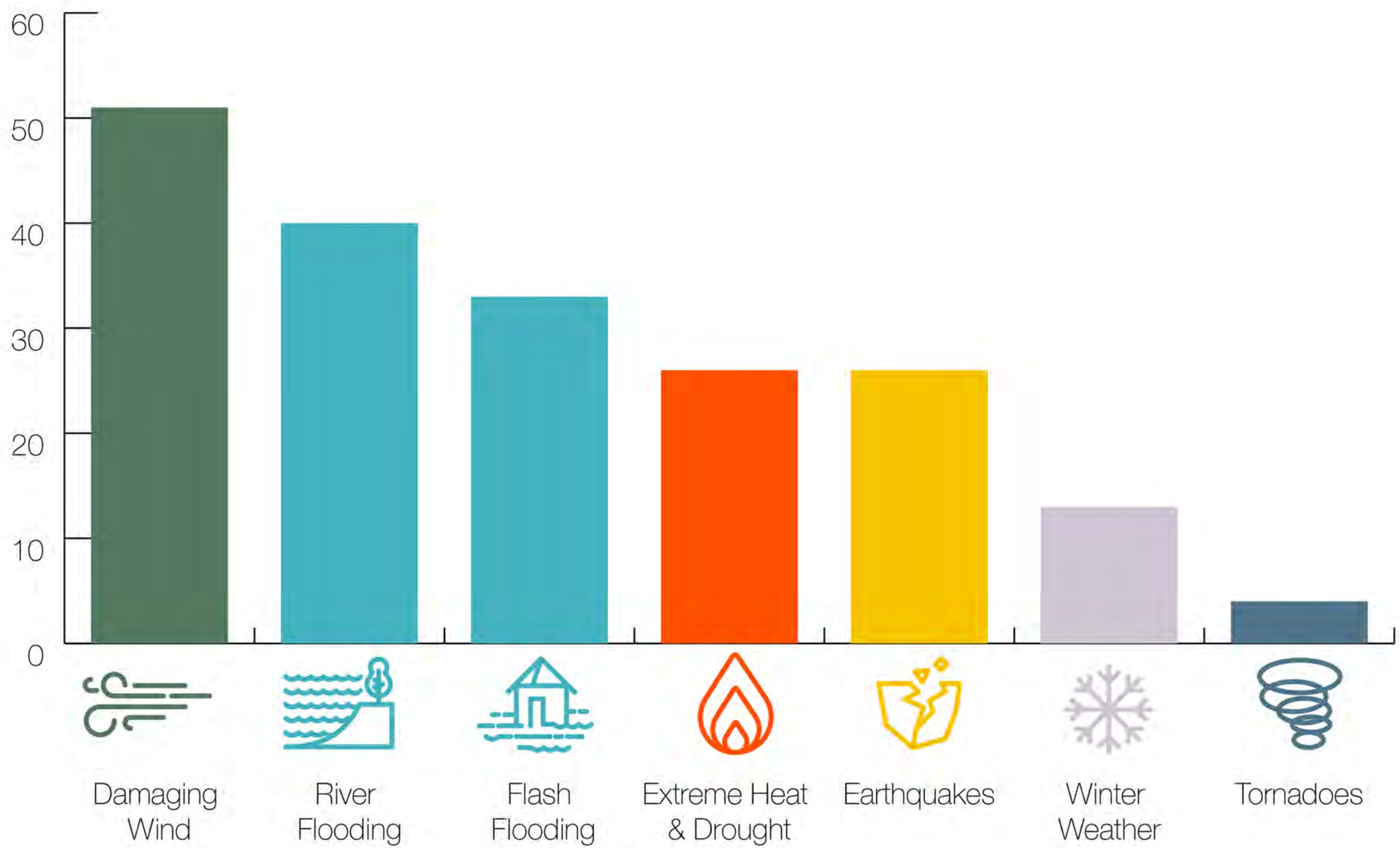
What we heard: General comments

- Don’t want to see the most vulnerable populations of the region left out or forgotten
- The region is not fully equipped to address community needs during or immediately following an extreme event
- People often go to a hospital or church to wait out the event
- Social services organizations are not equipped to immediately address community needs
- Community preparedness and support has diminished over time
- Fewer neighborhood interactions and local social support networks
- Disaster preparedness is less prevalent in schools and community than a generation ago
- Recent development patterns (sprawl) feel irresponsible, and contribute to flooding challenges facing the region

What Extreme Weather Events Affect You Personally?

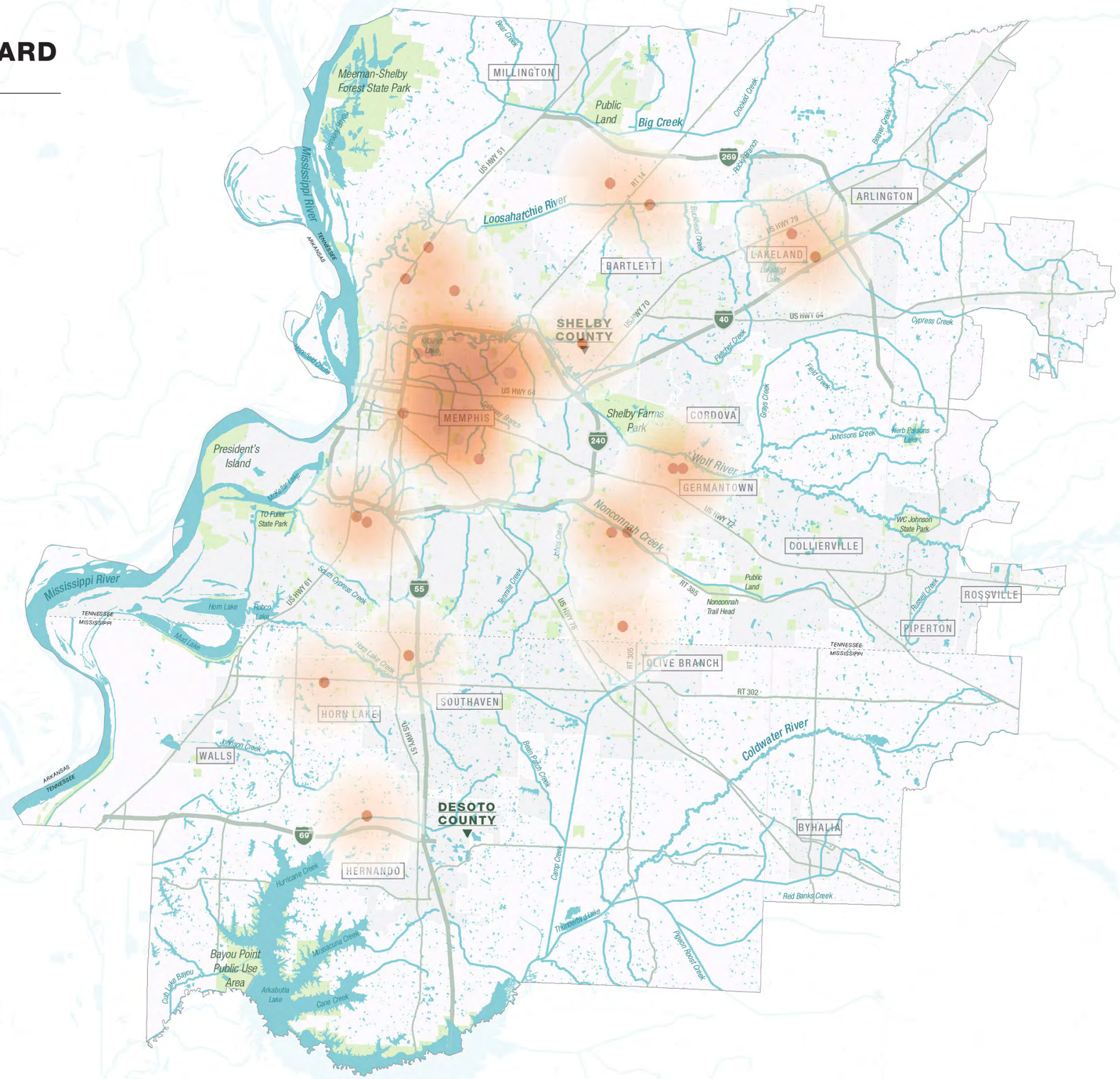


What Extreme Weather Events Pose the Greatest Threat to the Region?



PUBLIC WORKSHOP #1: WHAT WE HEARD

Where do you have
a negative relationship
with water?



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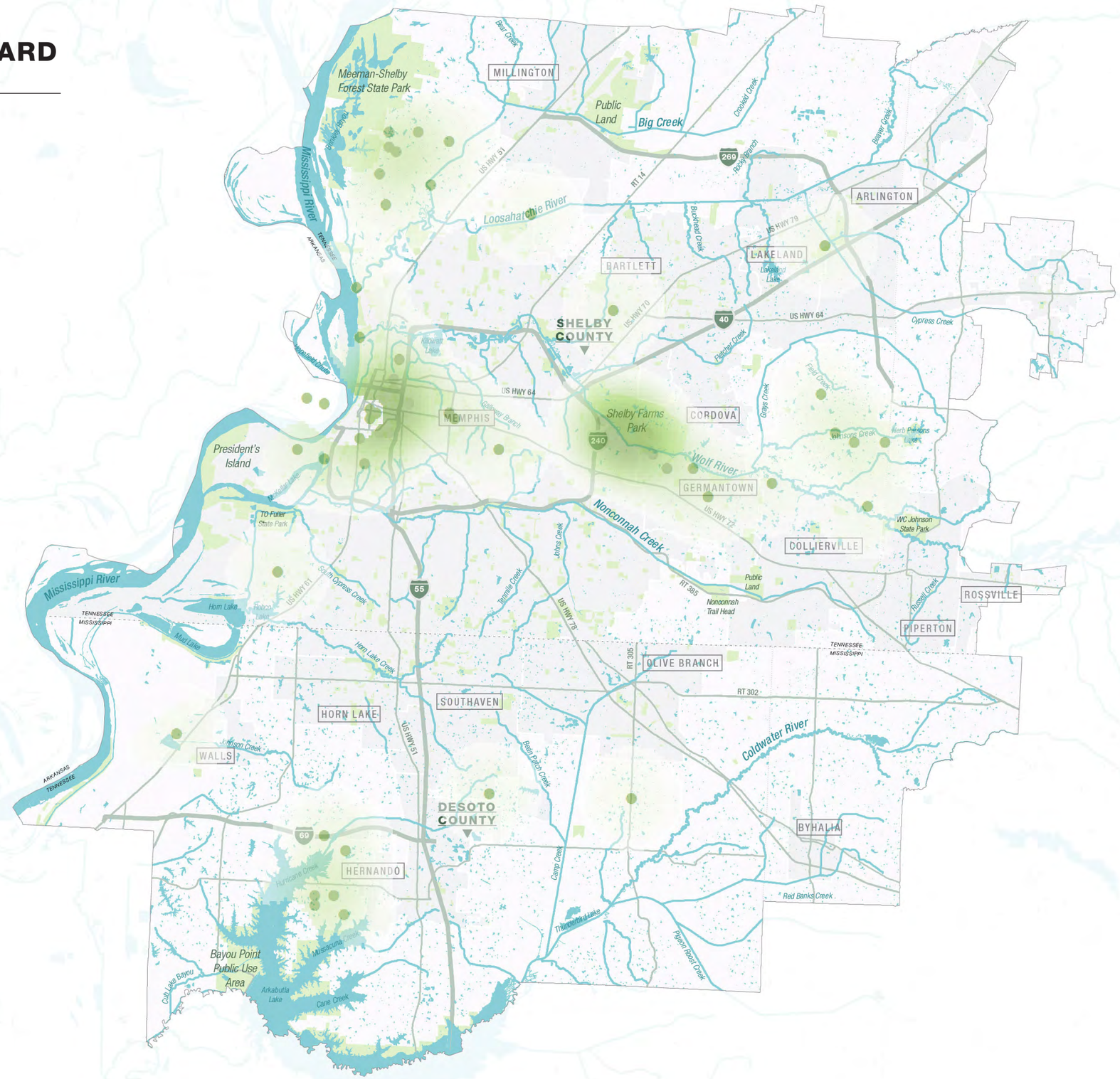


Draft Resilience Strategies

Multi-layered Approach
for Protection Redundancy

Regional Scale

Neighborhood Scale

Building and Site Scale

CREATE A SMART GRID

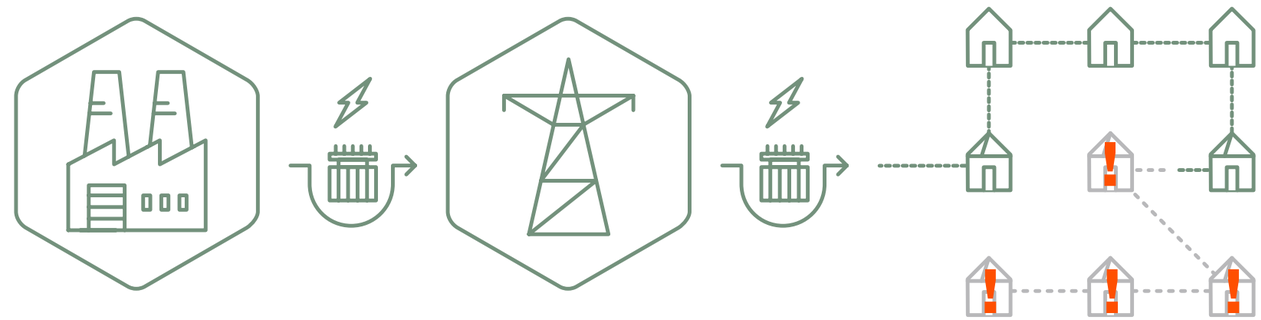
CONVENTIONAL NETWORK:

If one transmission line fails, every downstream home loses power

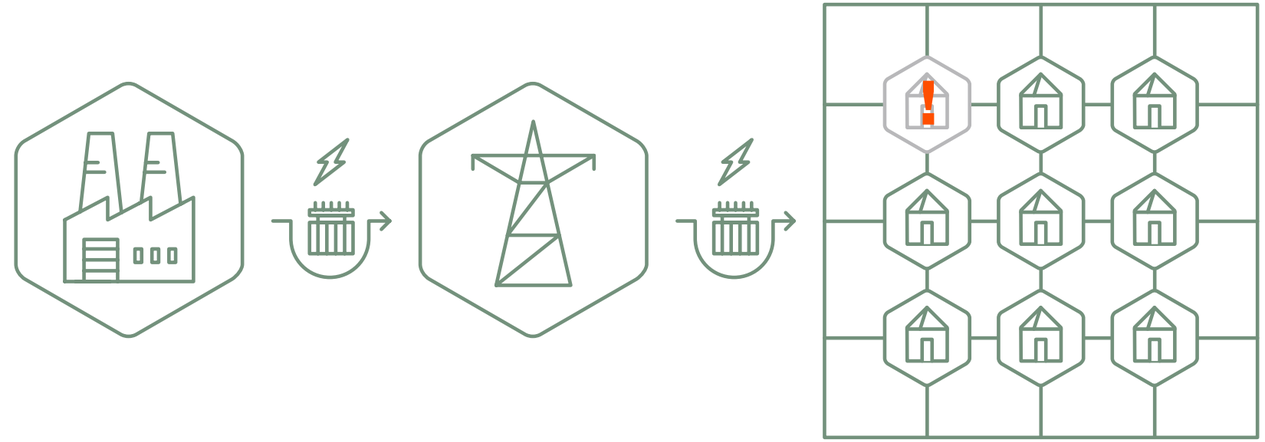
SMART GRID:

If a transmission line fails, all other homes are re-directed to other transmission lines

CONVENTIONAL NETWORK



SMART GRID



↓ 55%

Fewer customers affected by power outages

↓ 53%

Shorter power outages

BURY UTILITIES SELECTIVELY

REDUCED:

- Power outages
- Tree-trimming costs
- Duration of outages in other areas

INCREASED:

- Property values (less visual clutter)
- Network reliability

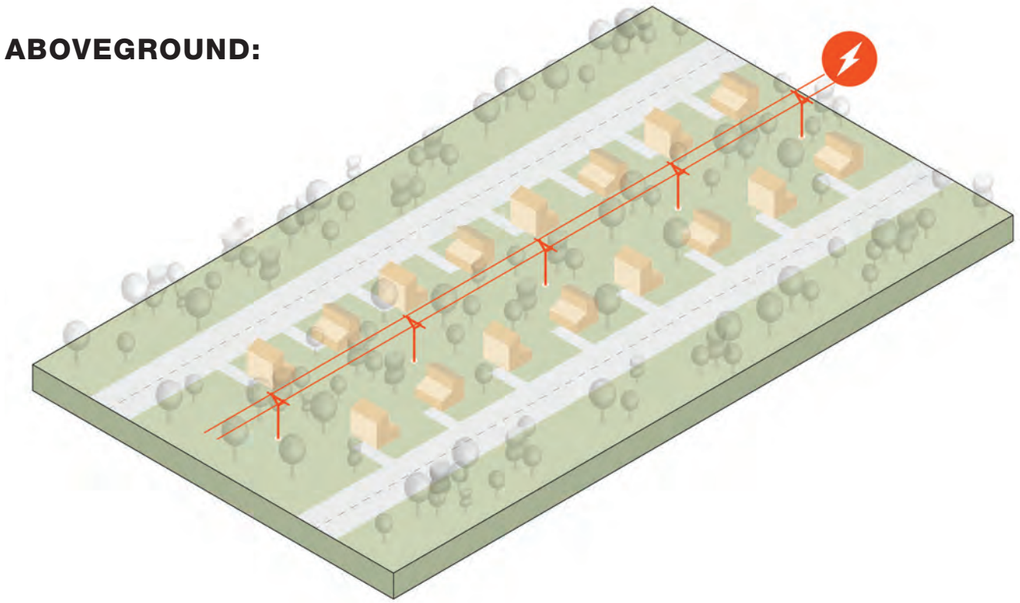
BEST FOR:

Hard-to-access power lines

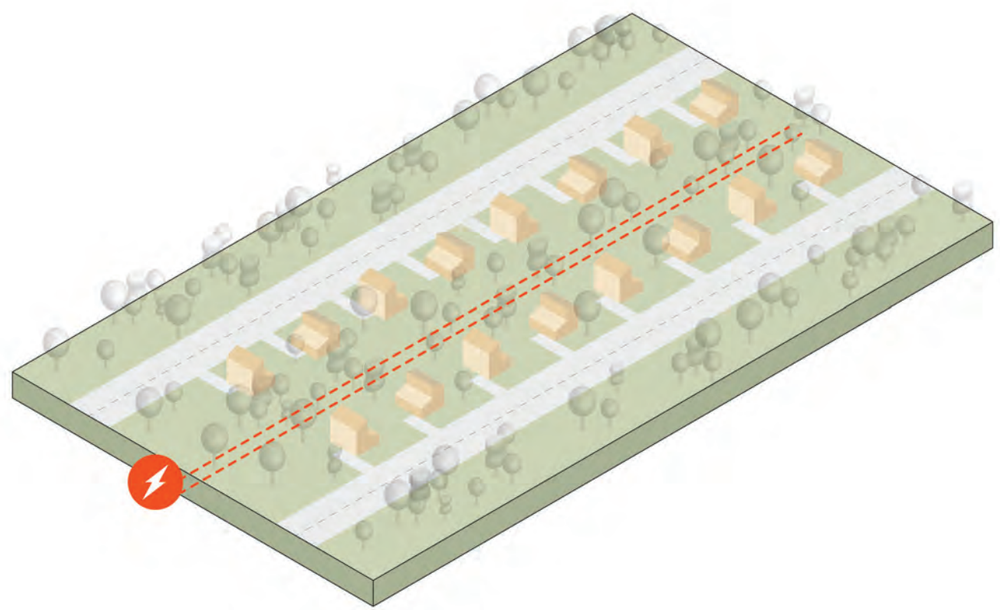
High density neighborhoods

New development sites

ABOVEGROUND:



BELOW GROUND:



WATER FARMING

OVERVIEW

Use the landscape like a sponge

Intentionally dam large tracts of land to retain excess water

Water can be released in controlled quantities and timing

SITE CRITERIA

Rural and undeveloped land uses

Hydric soils

Minimal slope

Preexisting drainage structures

Low land cost

Adjacent to rivers or stream

High ecological value

WATER FARMING

BENEFITS:

Floodwater storage

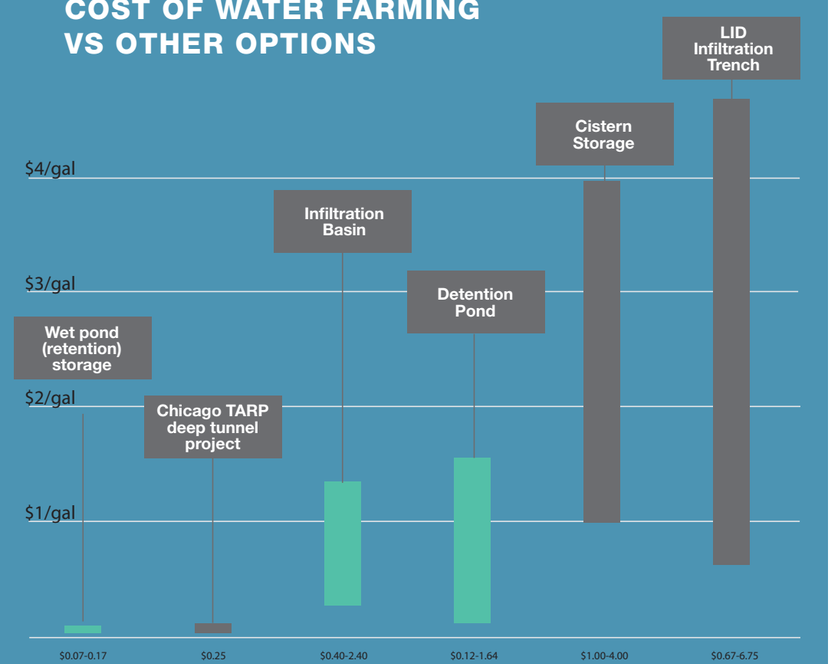
Pollution reduction

Groundwater recharge

Recreational amenity

Habitat restoration

COST OF WATER FARMING VS OTHER OPTIONS

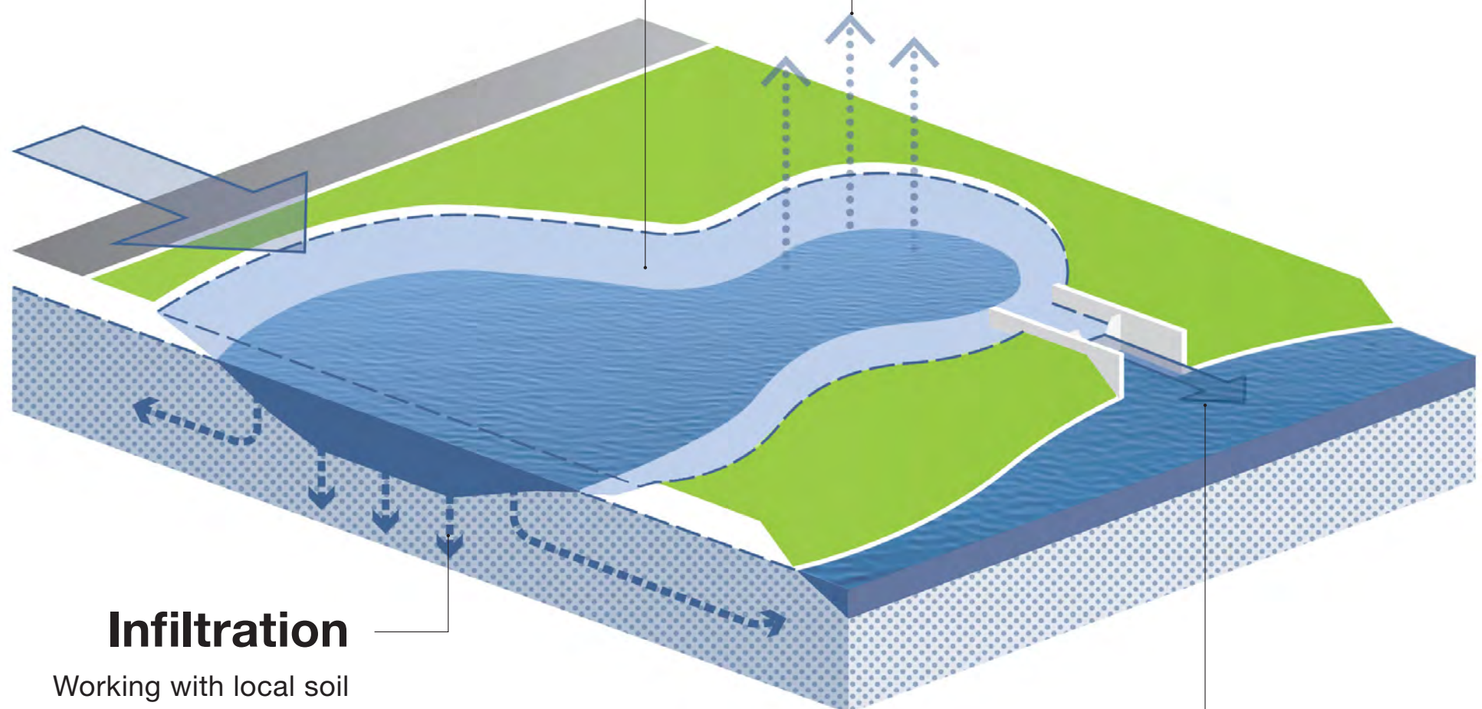


Storage Volume

Designed as a floodable landscape, Water Farms would be designed to hold a designated volume of water for storage, treatment, and future use

Evaporation Loss

While dependent on the local climate, surface evaporation can help to maintain storage capacity



Infiltration

Working with local soil conditions, Water Farms can be engineered to promote groundwater and shallow aquifer recharge

Slow Release

Using statistical rainfall data, outfall structures can slowly release stored water into local streams and drainage systems, buffering peak rainfall events

Draft Resilience Strategies

Multi-layered Approach
for Protection Redundancy

Regional Scale

Neighborhood Scale

Building and Site Scale

NEIGHBORHOOD FLOOD RESILIENCE

EXISTING

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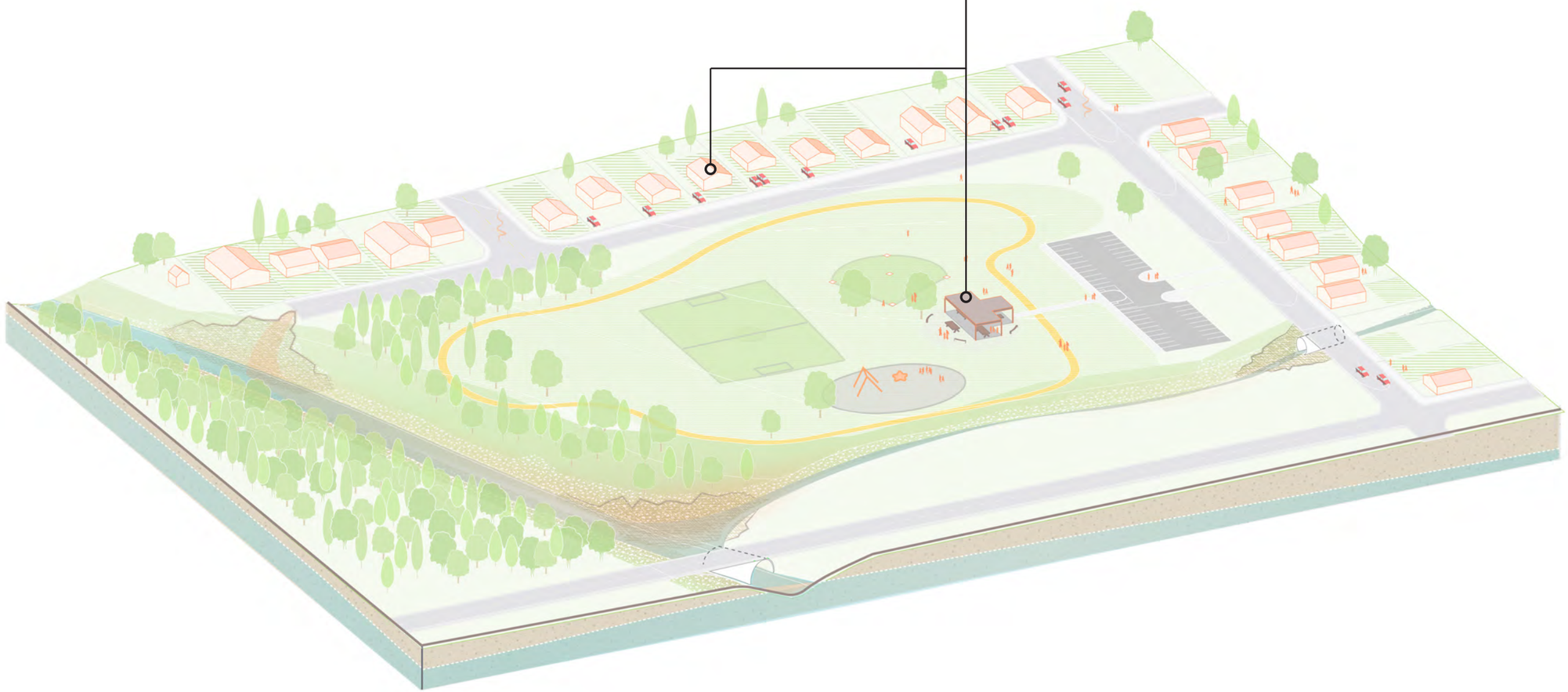
Flood-prone Buildings

Homes and other structures within the floodplain are vulnerable to recurring flooding



NEIGHBORHOOD FLOOD RESILIENCE

EXISTING

Insufficient Drainage

Rapid conveyance in drains, roads, and gutters increase runoff volume and speed

NEIGHBORHOOD FLOOD RESILIENCE

EXISTING

Impervious Surfaces

Impermeable surfaces stop rainwater infiltration

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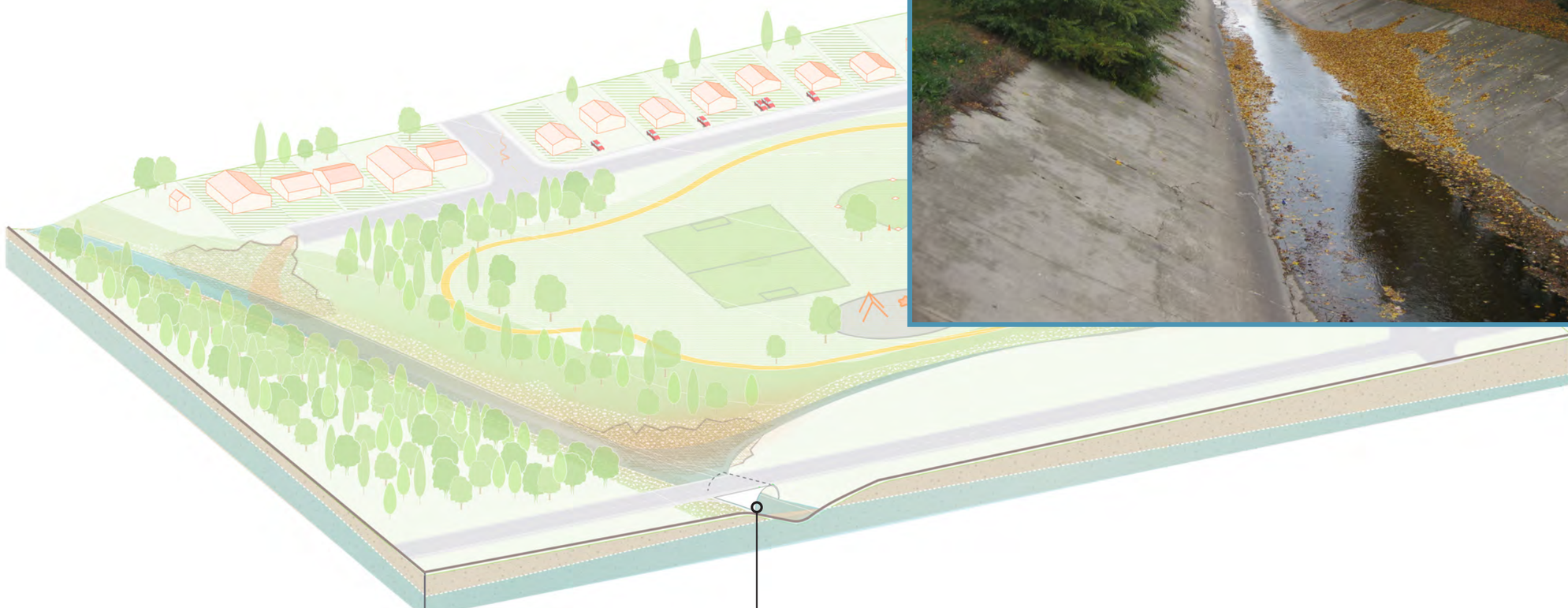

Channelized River

Disrupts river flow and ecosystem

NEIGHBORHOOD FLOOD RESILIENCE

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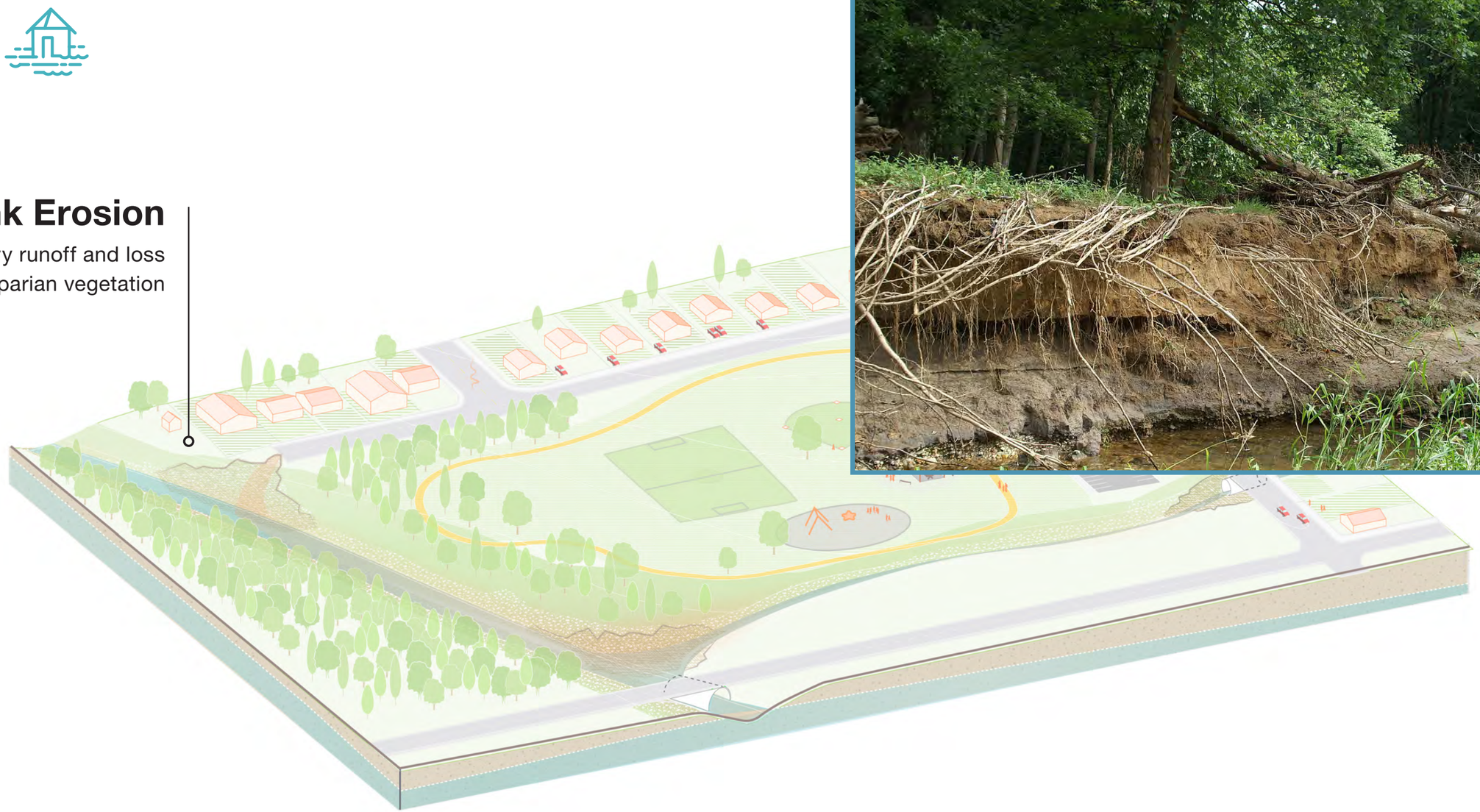

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Vulnerable Structures

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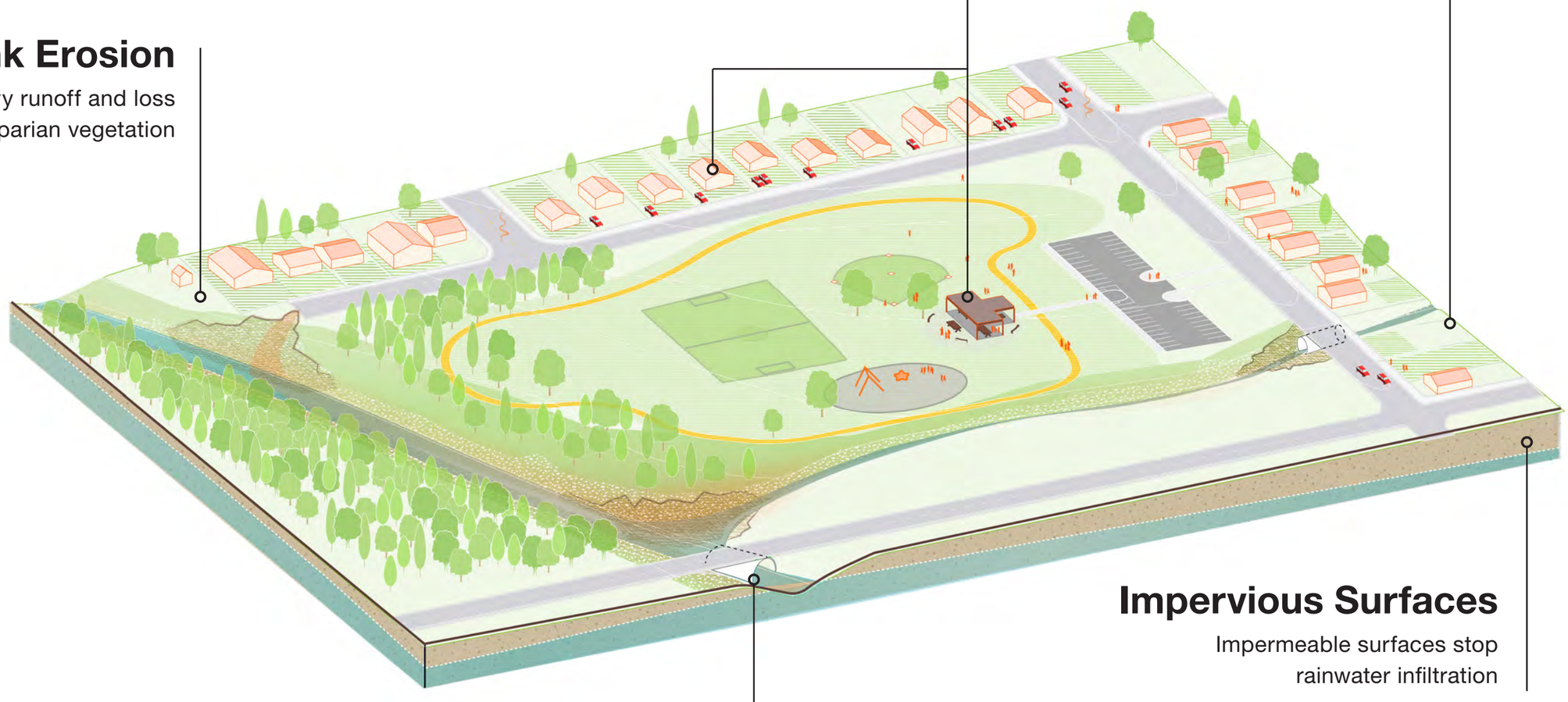
Bank Erosion

Due to heavy runoff and loss of riparian vegetation



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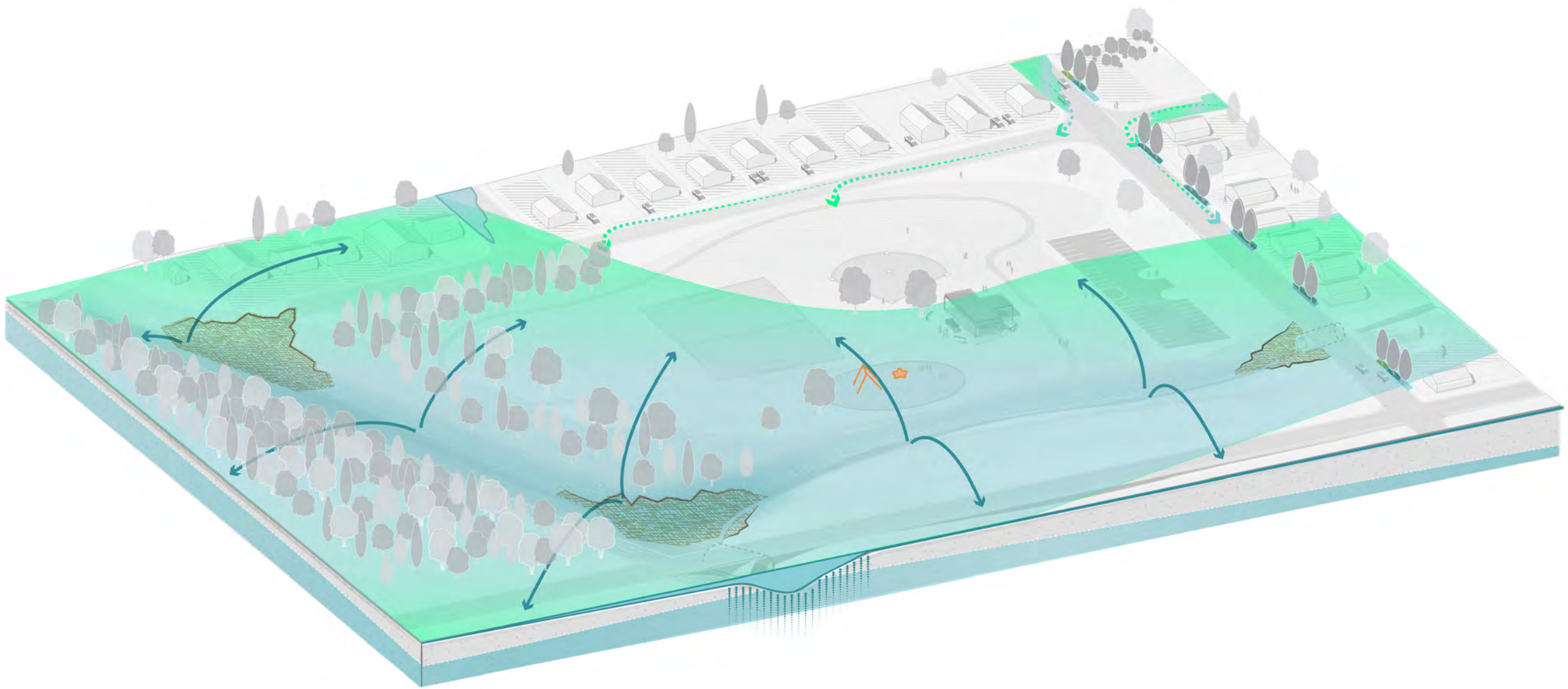

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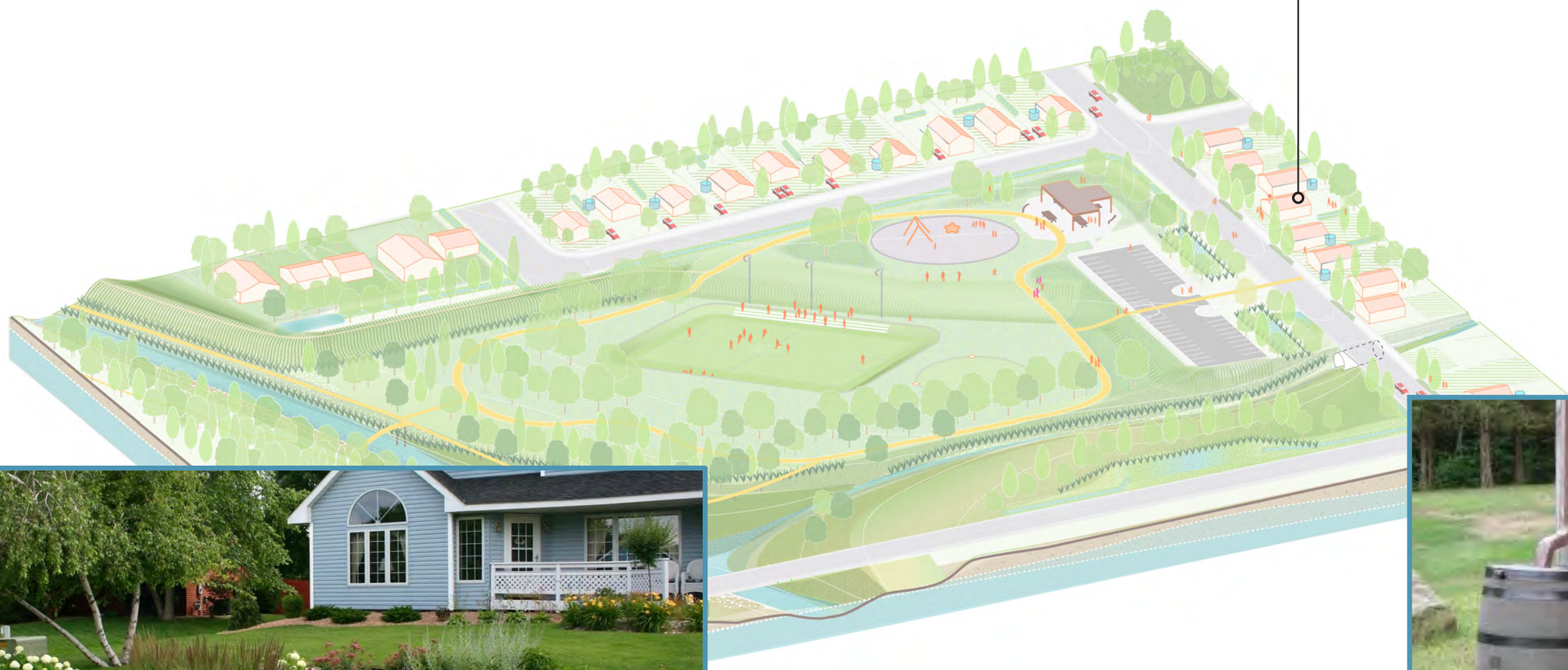

Homeowner Actions

Rain barrels, rain gardens

NEIGHBORHOOD FLOOD RESILIENCE

PROPOSED

Roadside Swales

Slow road runoff and filter out salts and petrochemicals

NEIGHBORHOOD FLOOD RESILIENCE

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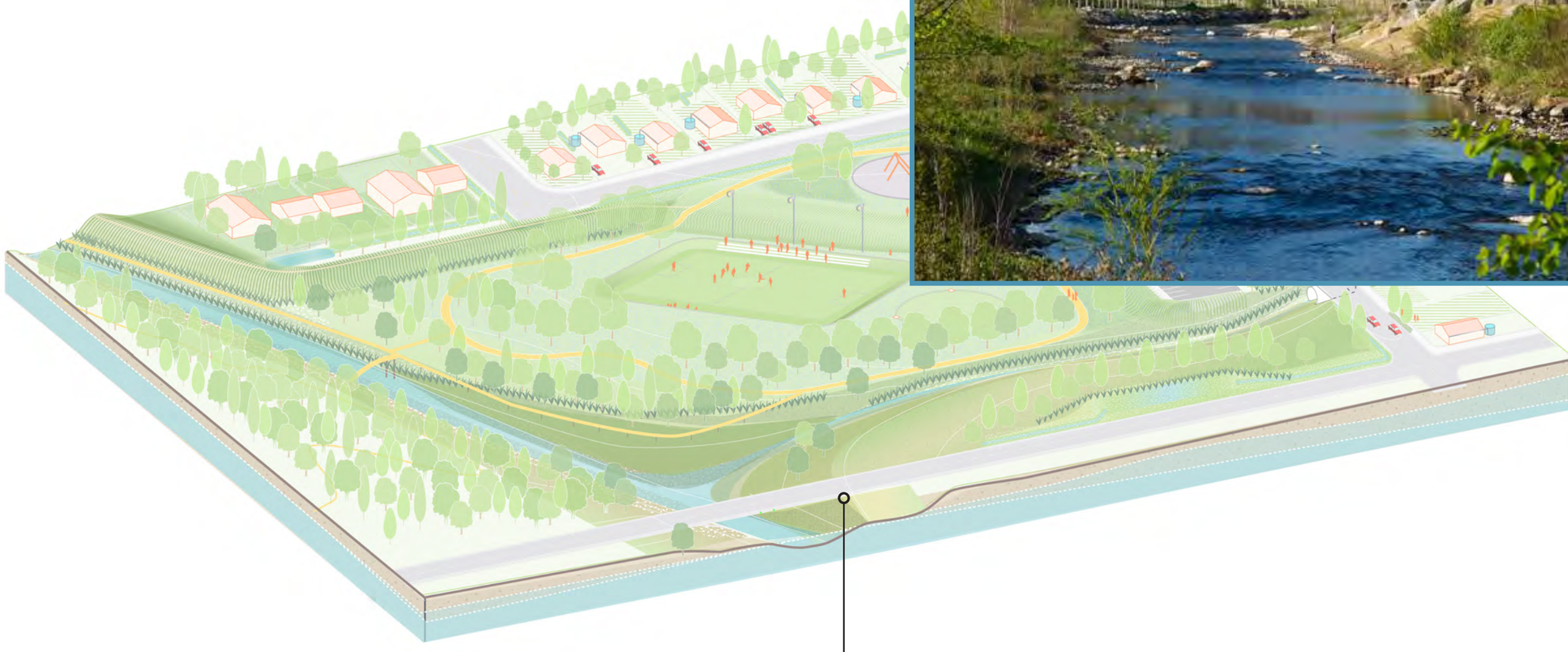


Bank Restoration

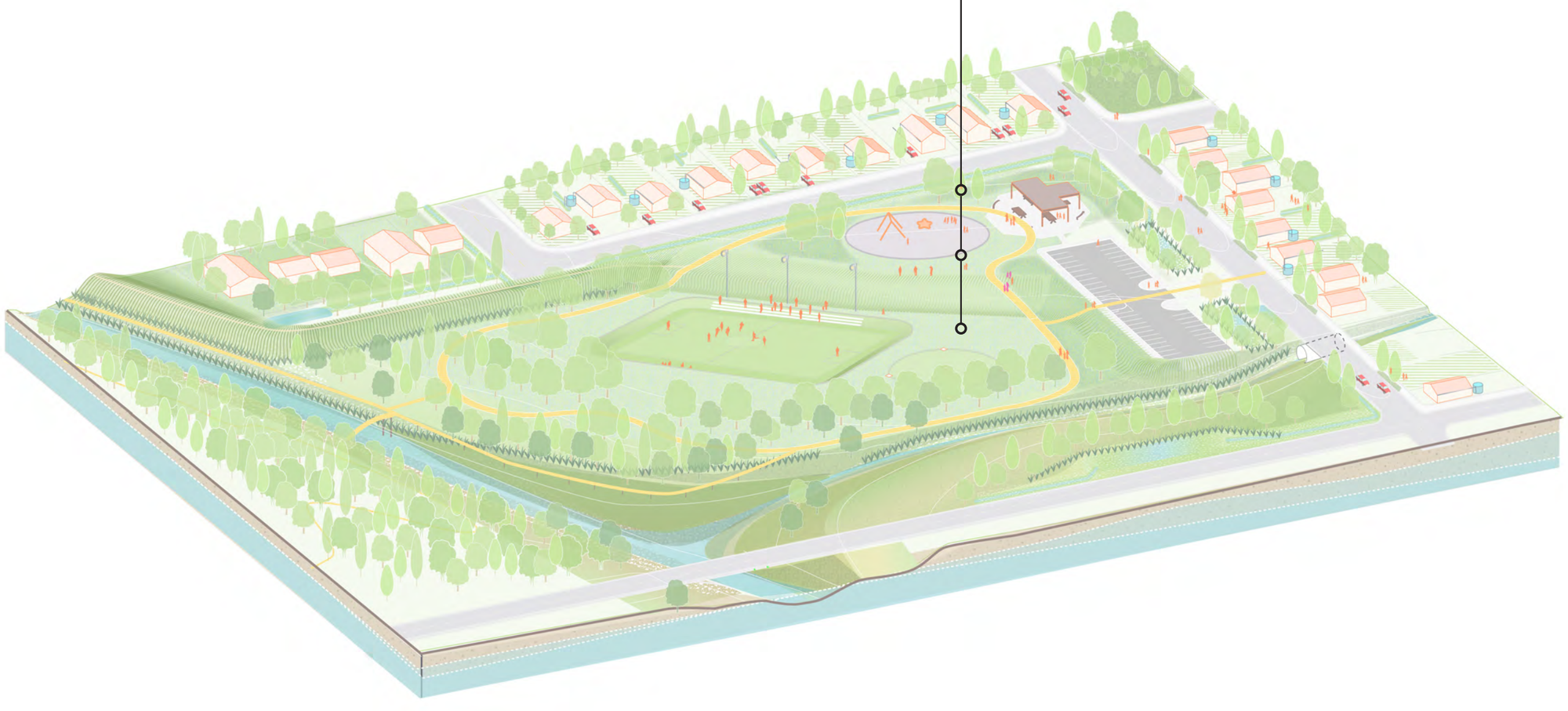
Stabilizes land, purifies runoff,
and increases habitat

NEIGHBORHOOD FLOOD RESILIENCE

PROPOSED

Floodable Parks

Fields store water, assets on high ground, and marine-grade fixtures



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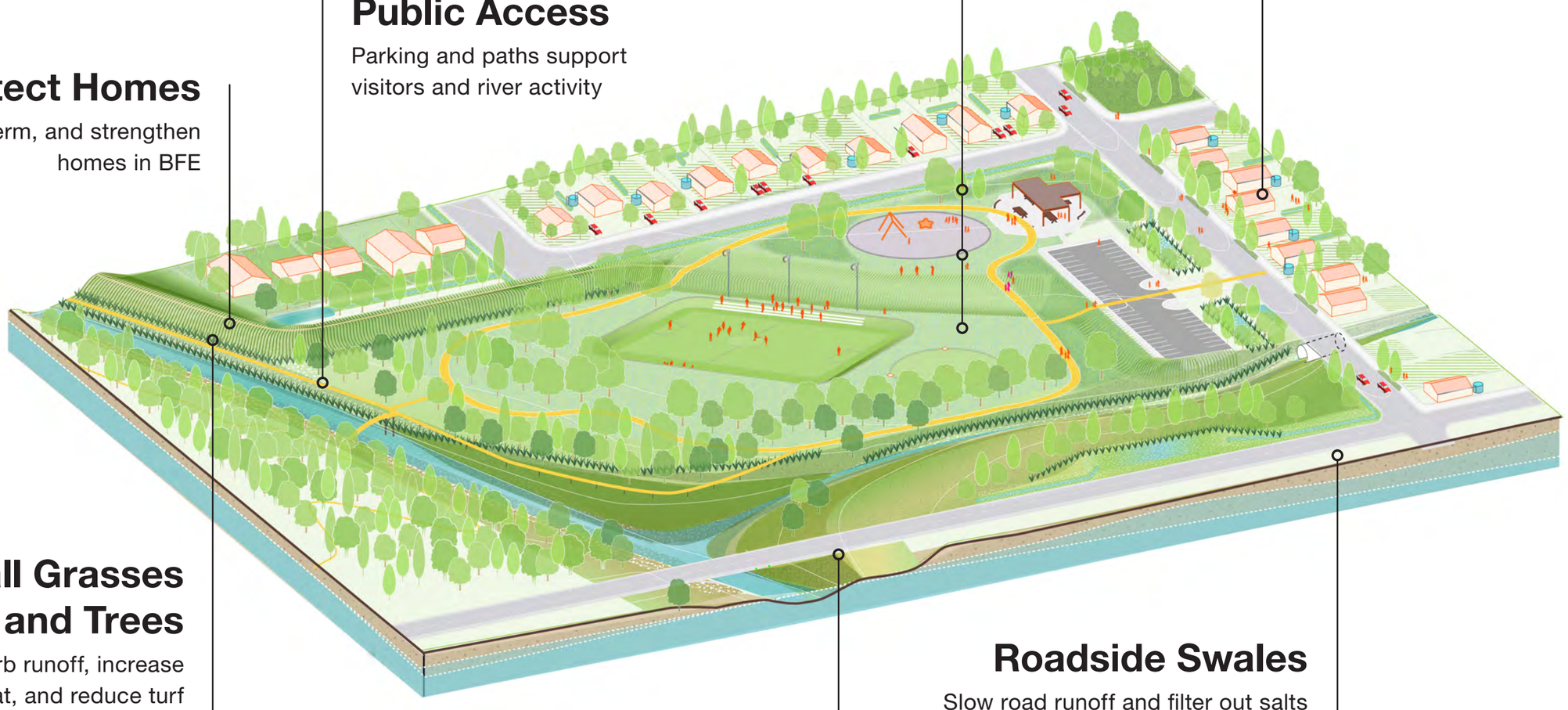
Public Access

Parking and paths support visitors and river activity

Protect Homes

Elevate, berm, and strengthen homes in BFE



Tall Grasses and Trees

Absorb runoff, increase habitat, and reduce turf maintenance

Bank Restoration

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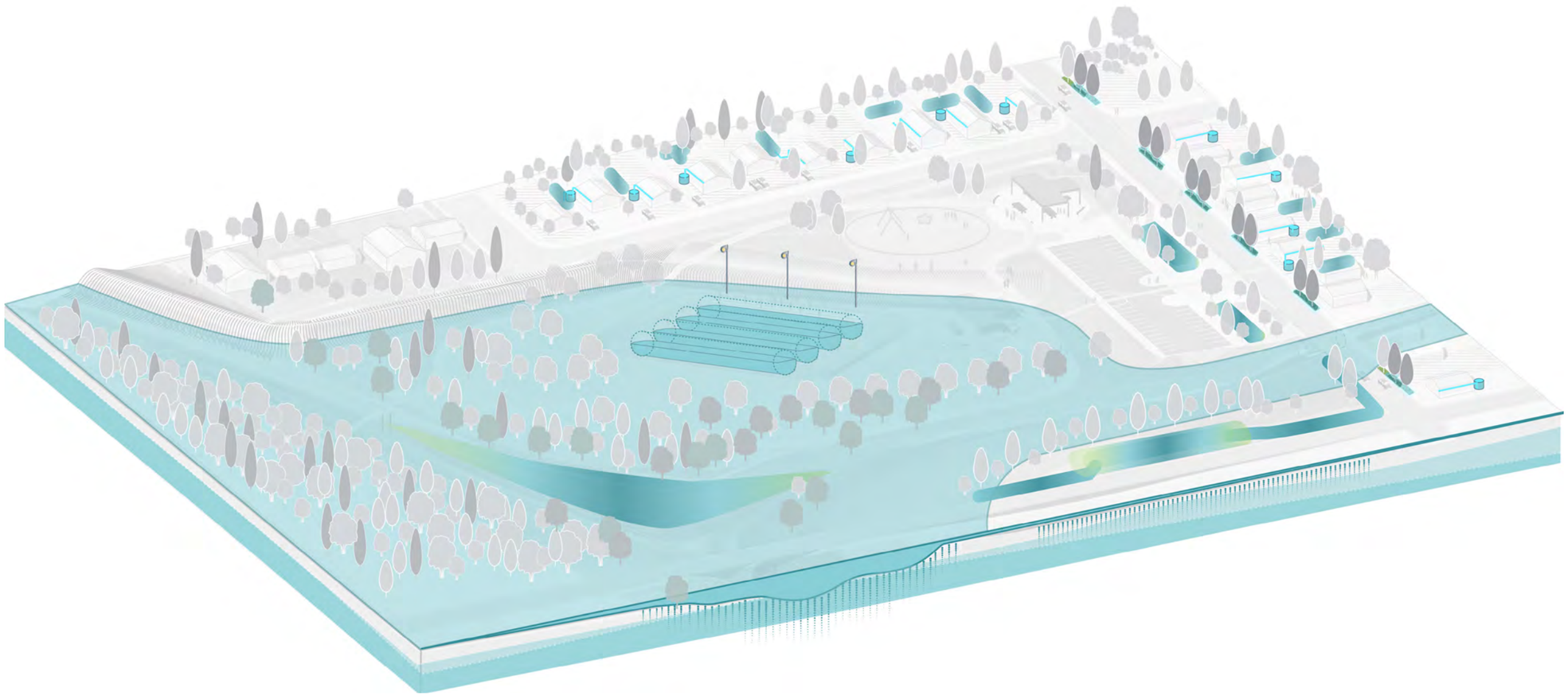
Roadside Swales

Slow road runoff and filter out salts and petrochemicals

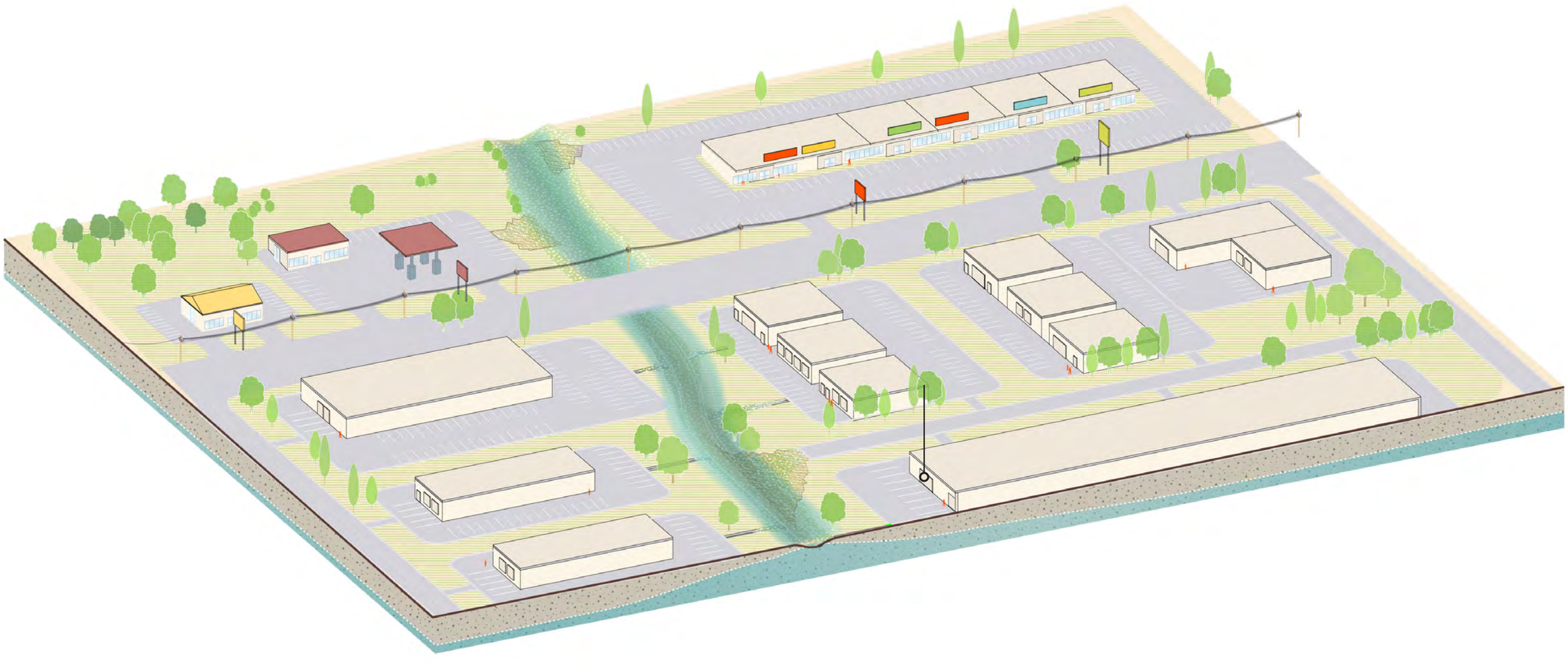
NEIGHBORHOOD FLOOD RESILIENCE

PROPOSED, FLOOD



COMMERCIAL FLOOD RESILIENCE

EXISTING CONDITIONS



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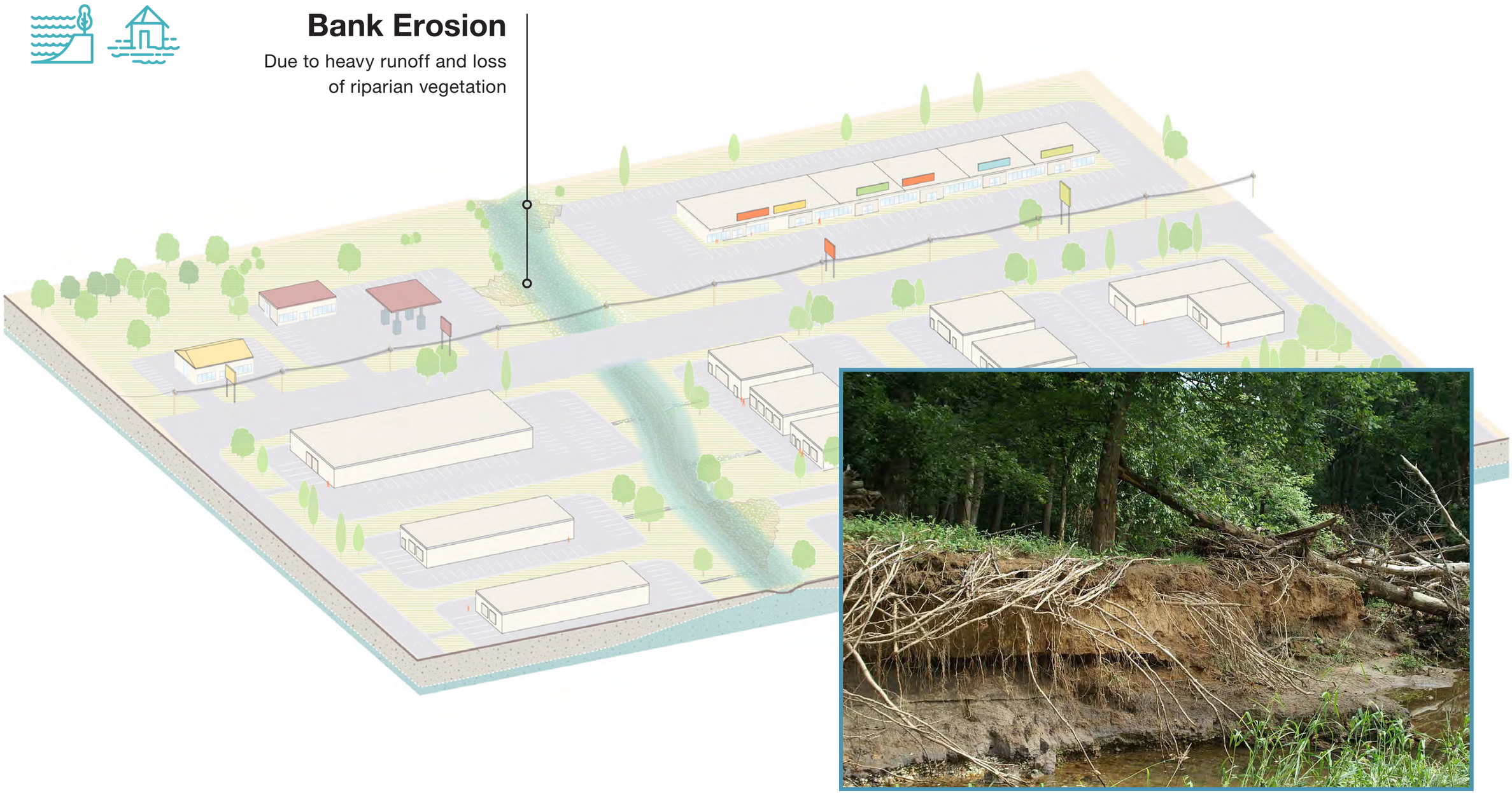
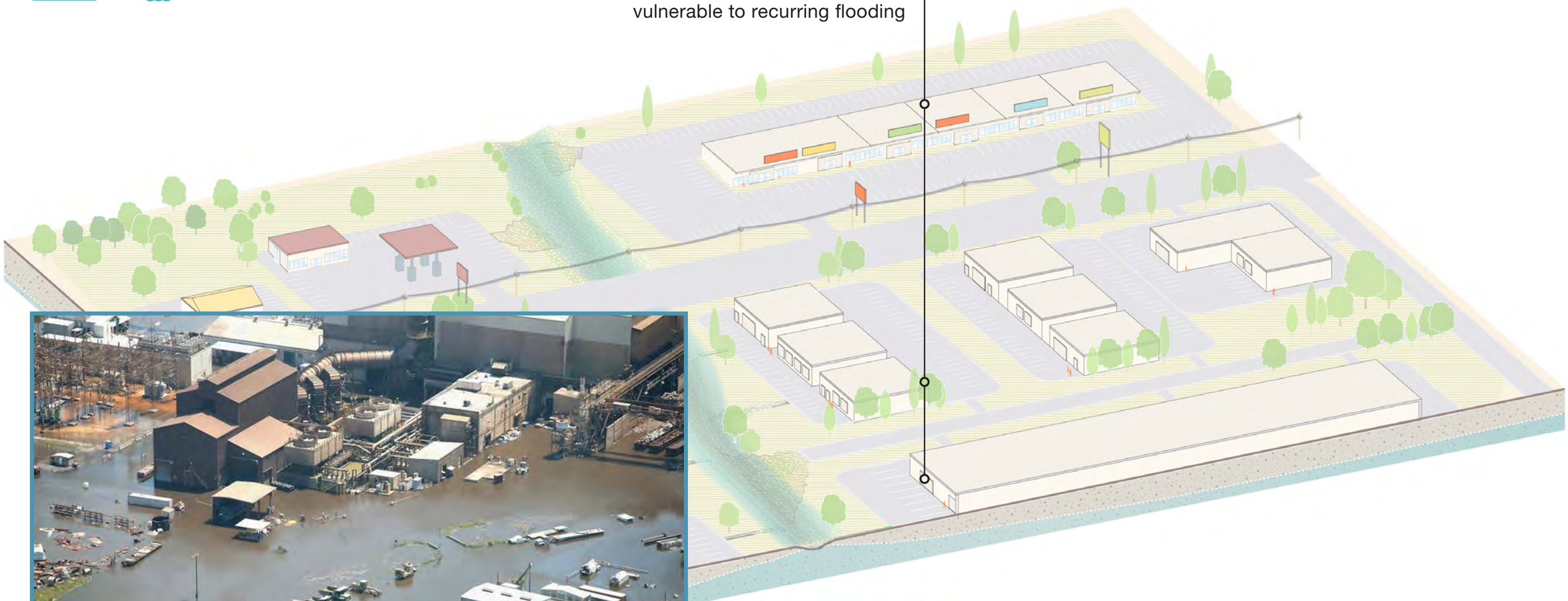
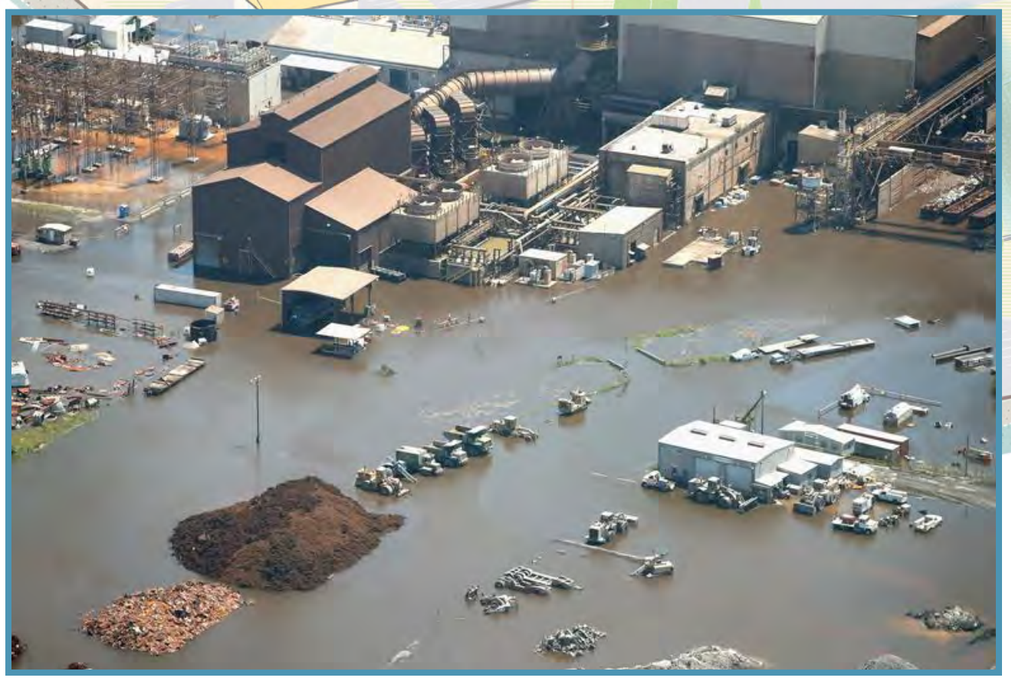


EXISTING CONDITIONS

Vulnerable Structures

Businesses and other structures within the floodplain are vulnerable to recurring flooding





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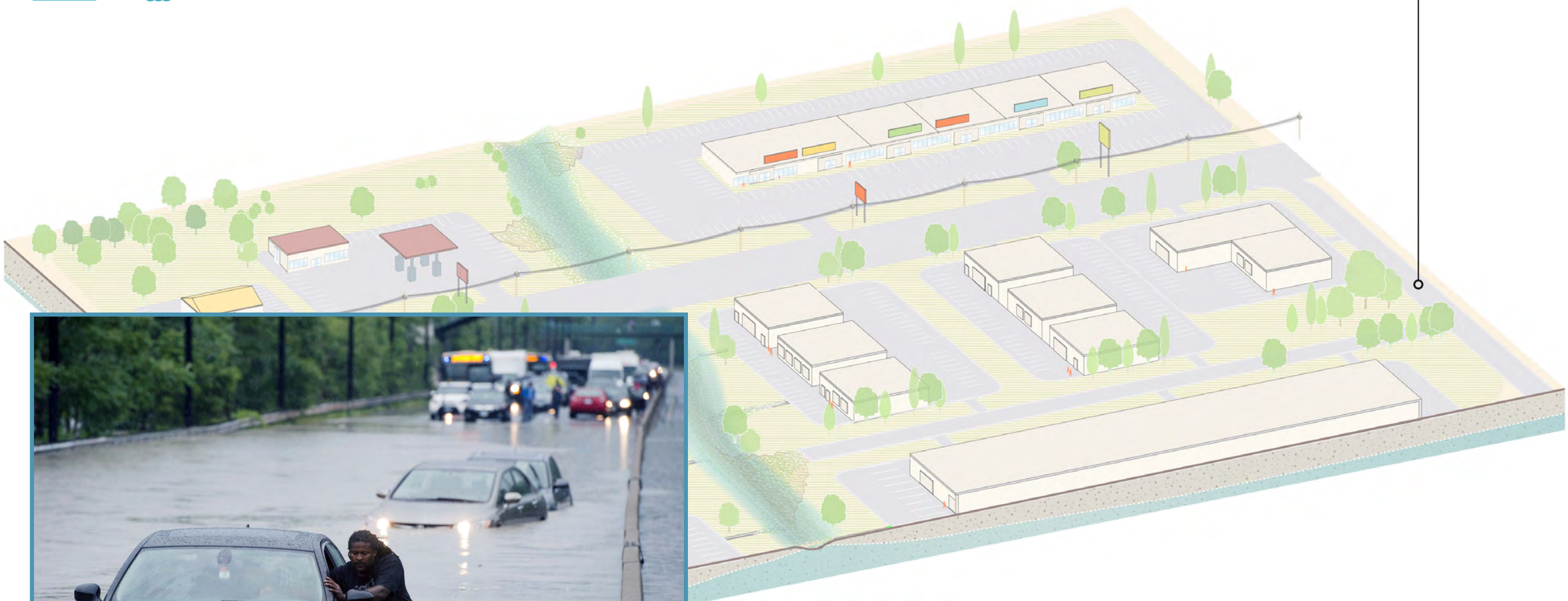

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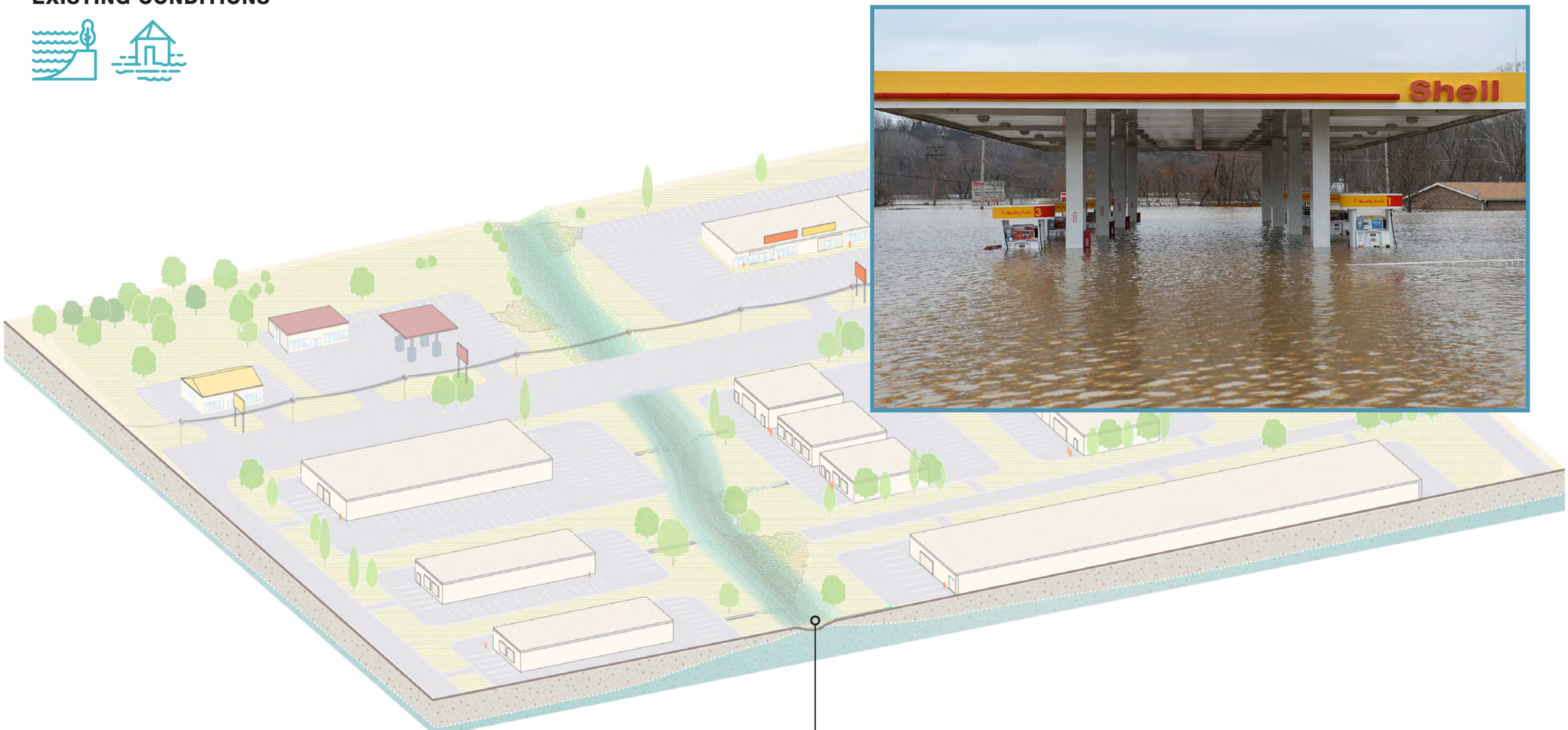

Poor Water Quality

Nearby contaminants run into the river.

COMMERCIAL FLOOD RESILIENCE

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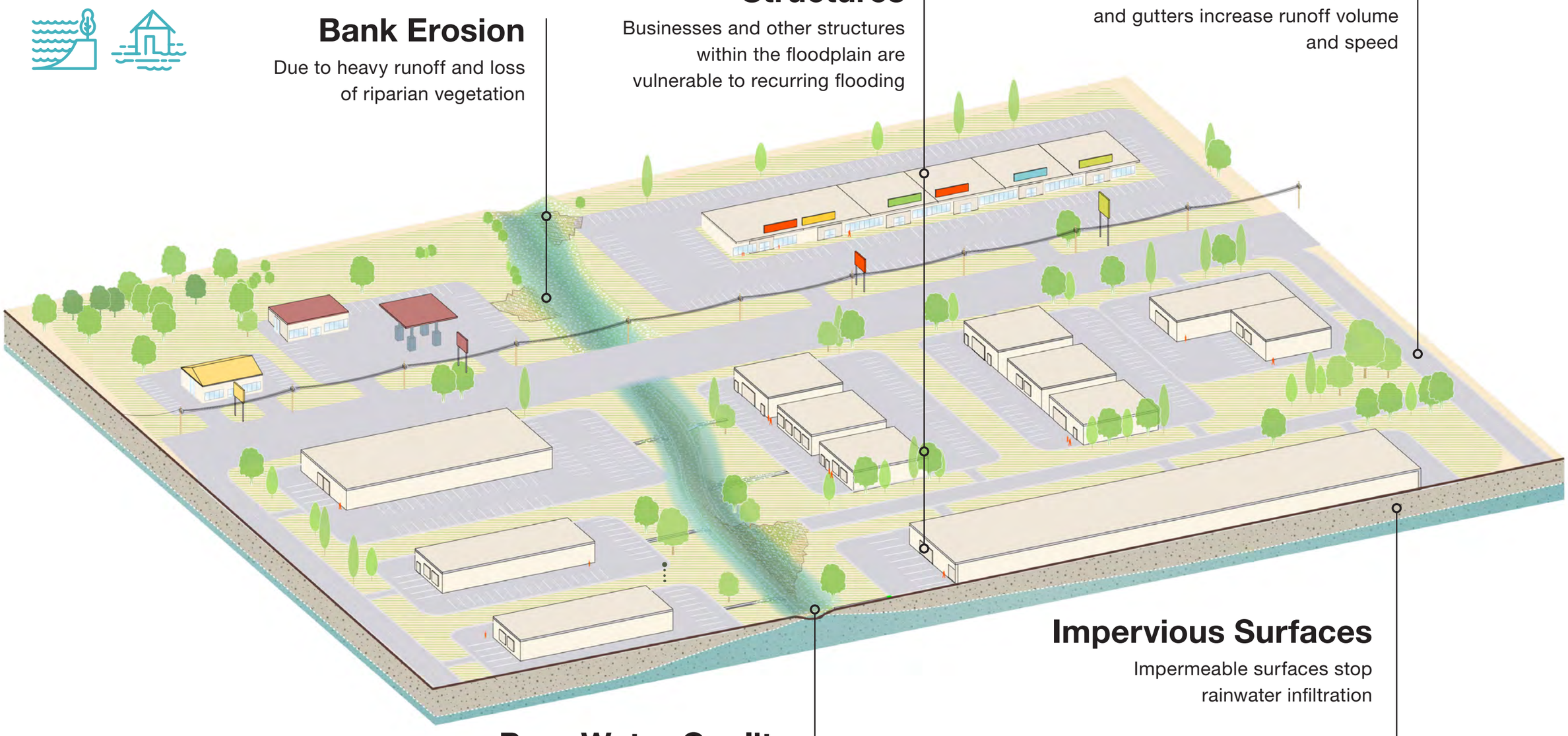

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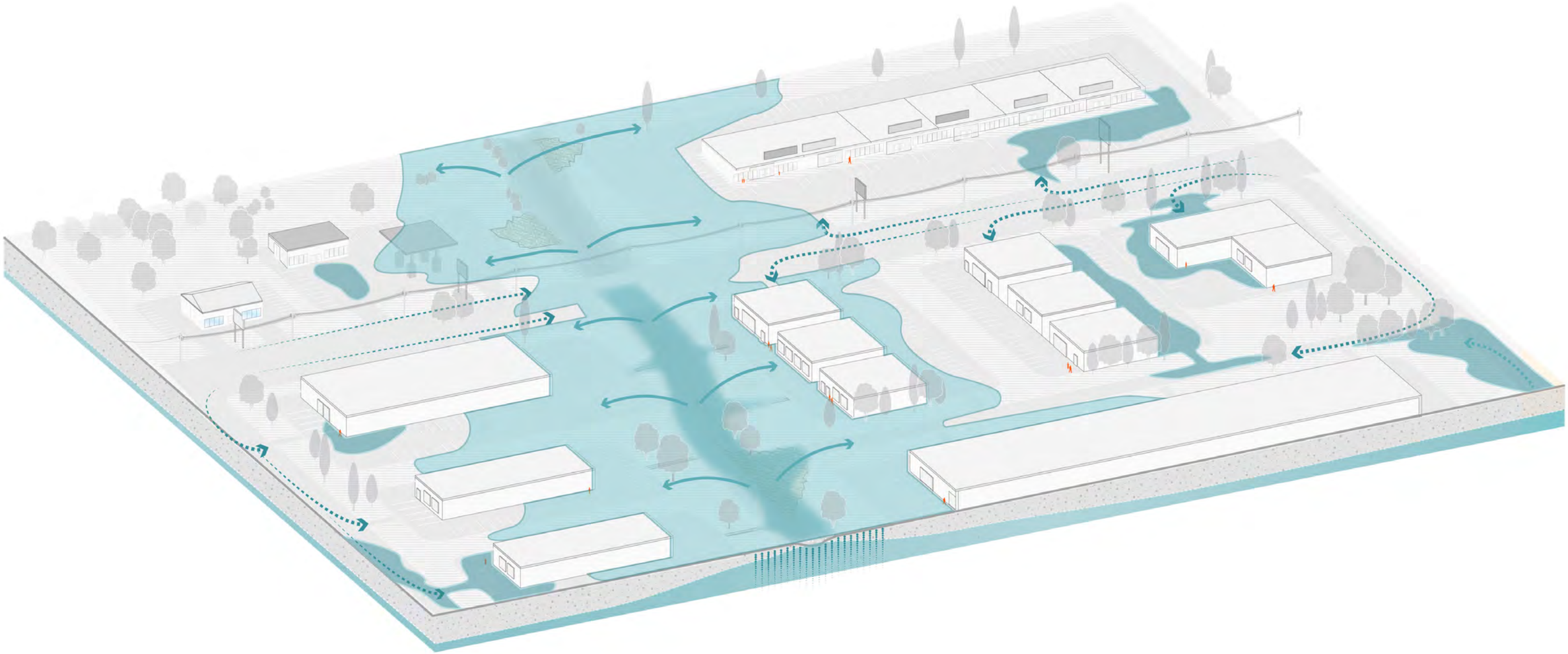

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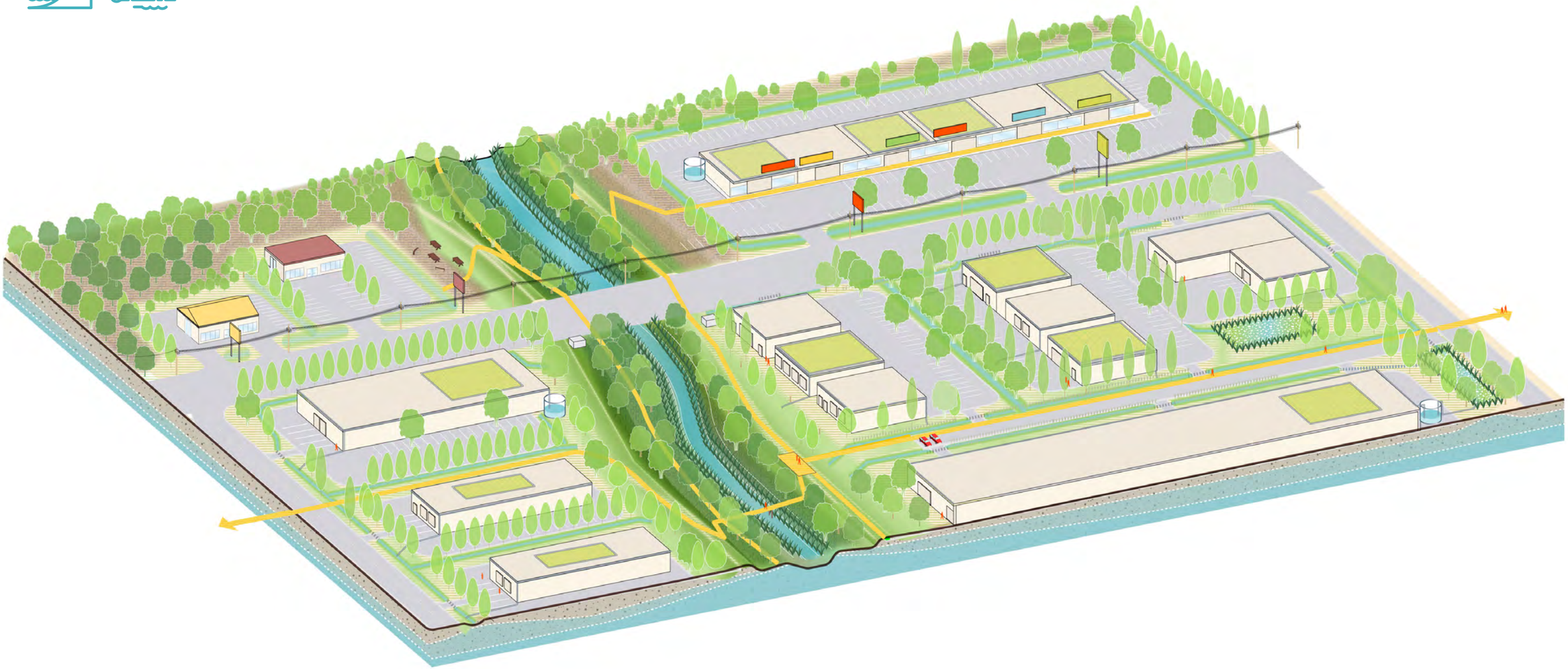
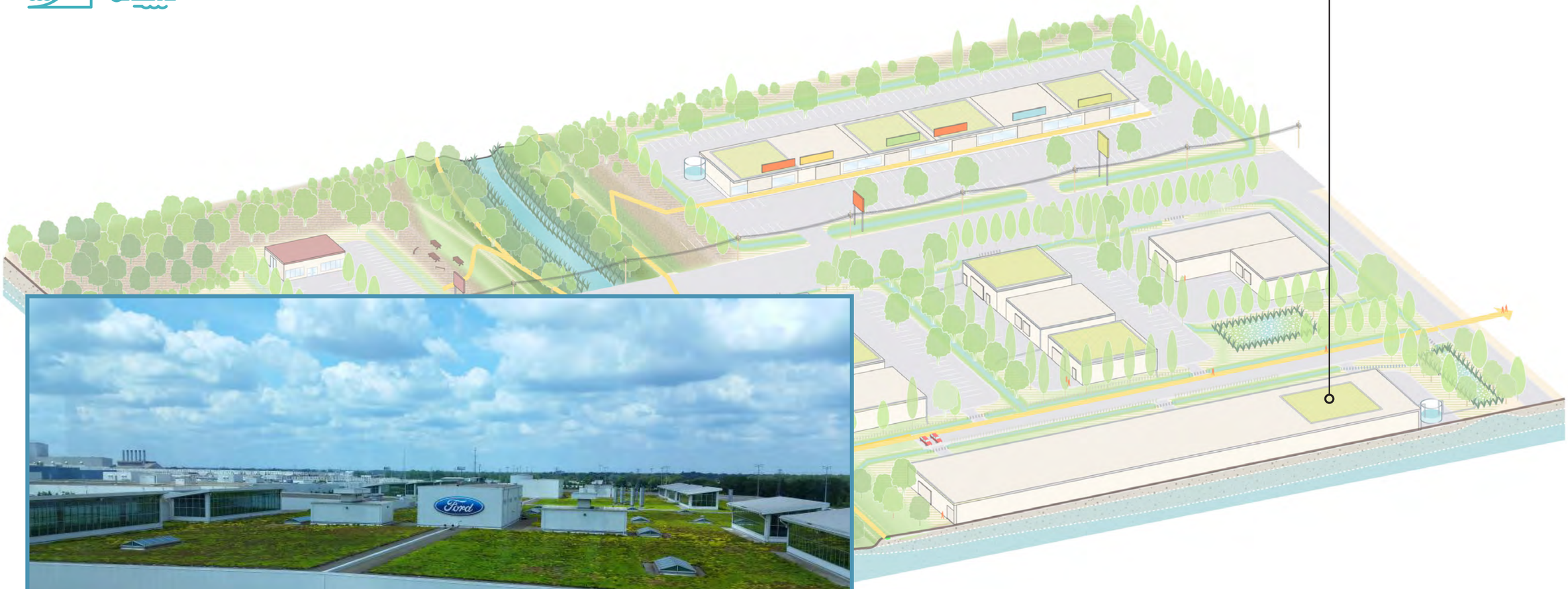


COMMERCIAL FLOOD RESILIENCE

PROPOSED

Green Roofs

Hold rainfall and decrease building temperature.



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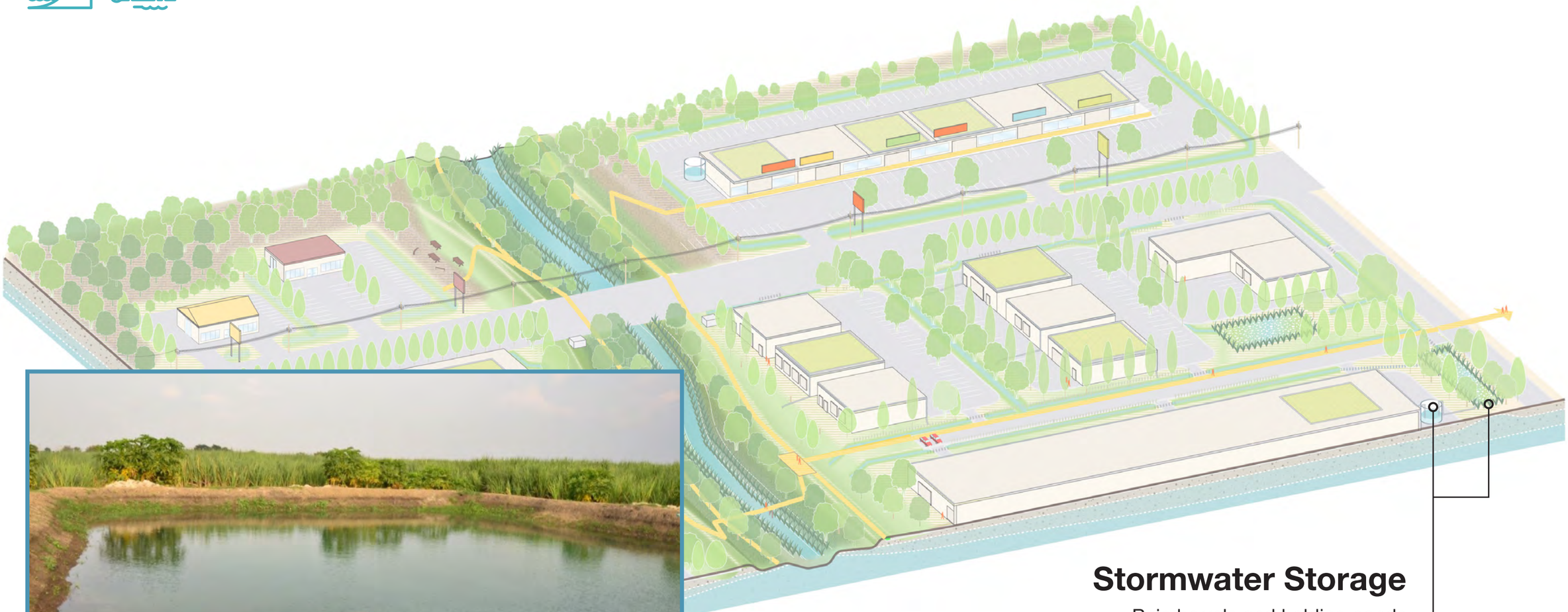

Stormwater Storage

Rain barrels and holding ponds decrease runoff

COMMERCIAL FLOOD RESILIENCE

PROPOSED

Bank Restoration

Stabilizes land, purifies runoff,
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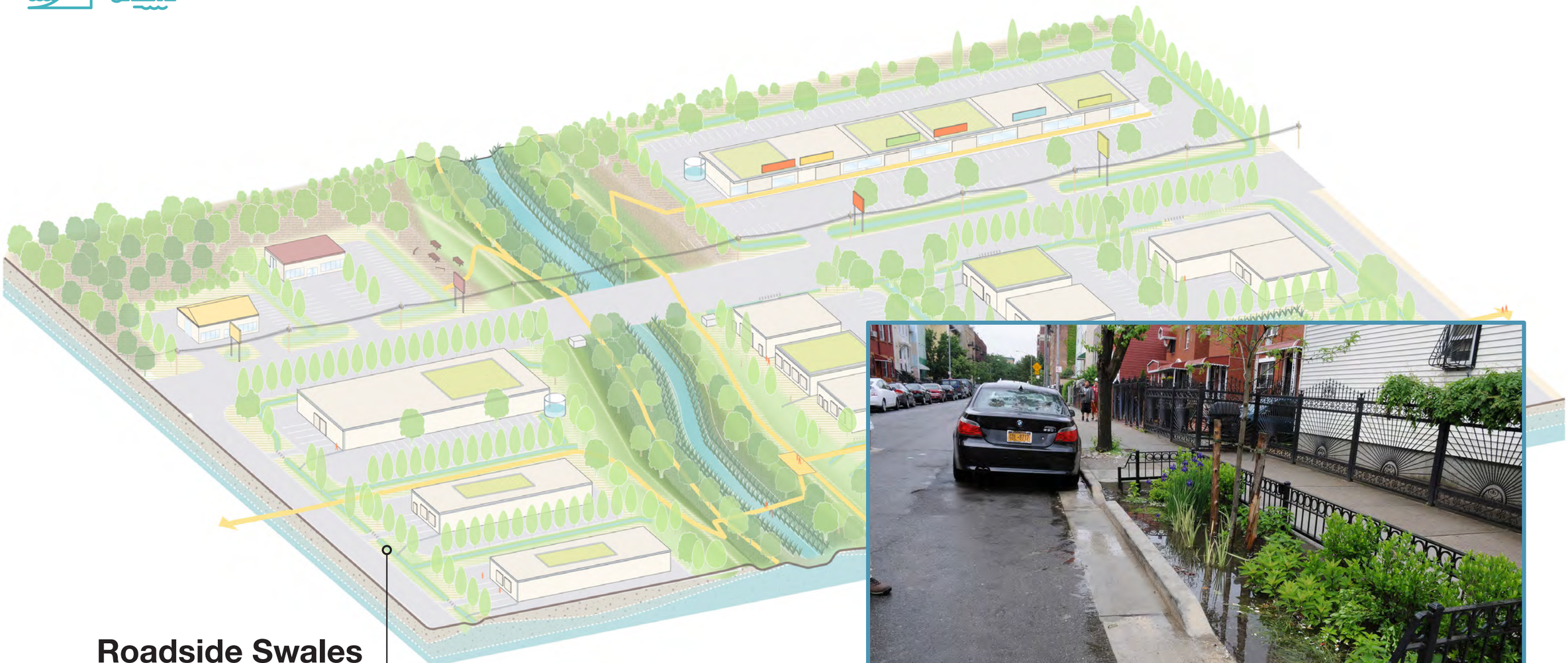

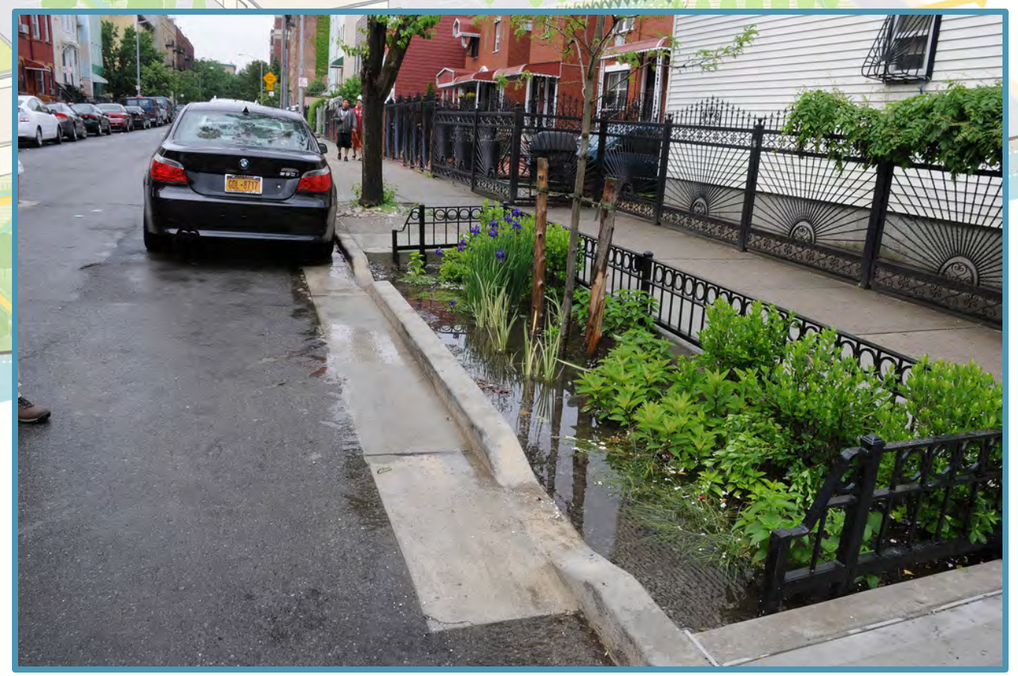

Roadside Swales

Slow road runoff and filter out salts and petrochemicals

COMMERCIAL FLOOD RESILIENCE

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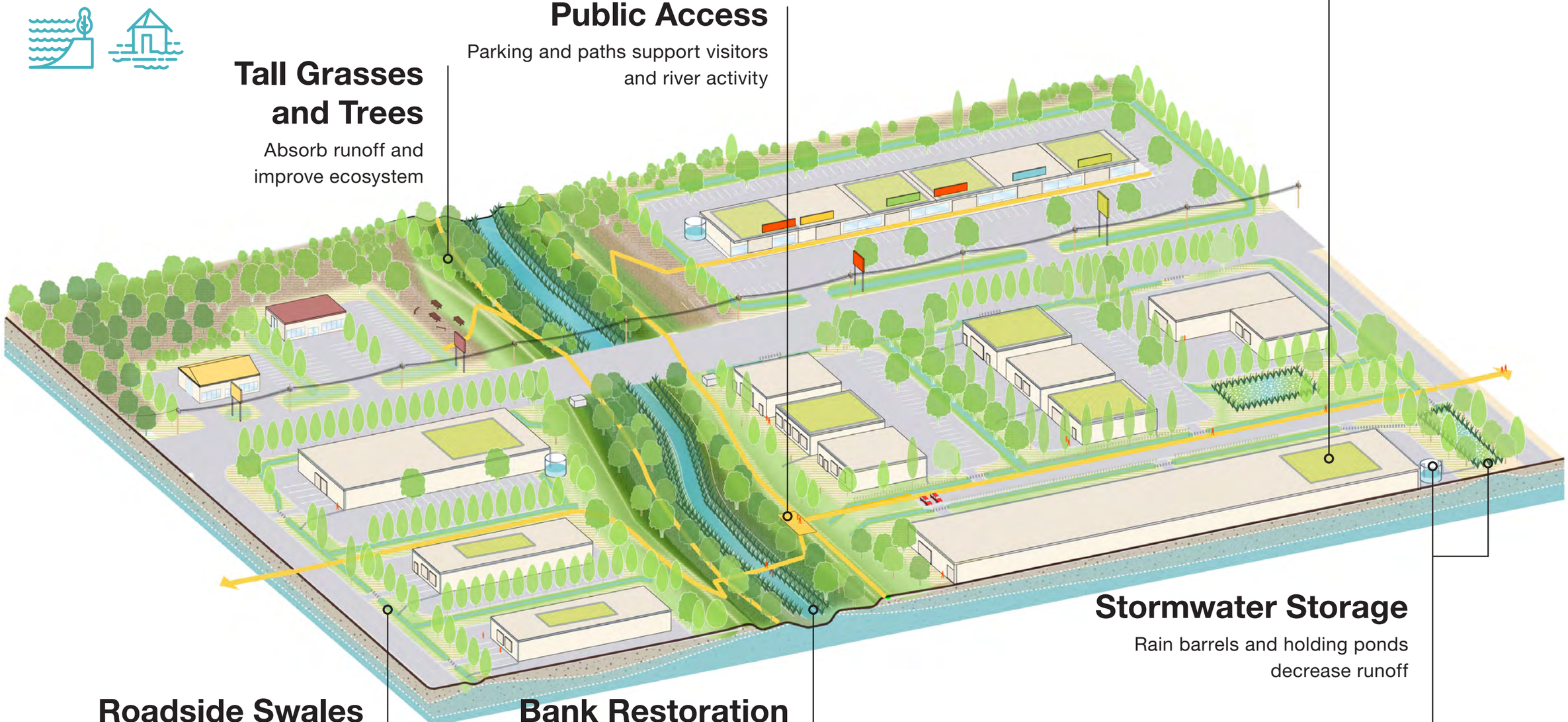

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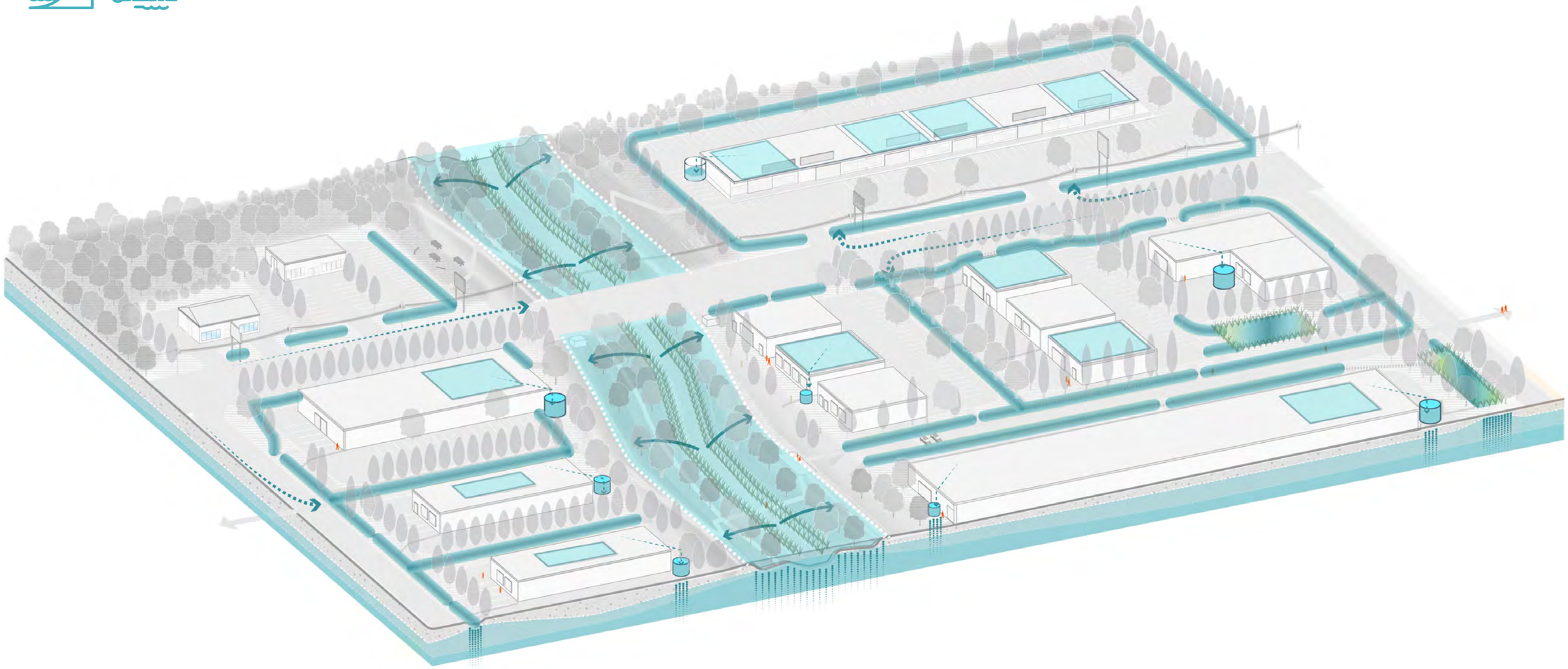

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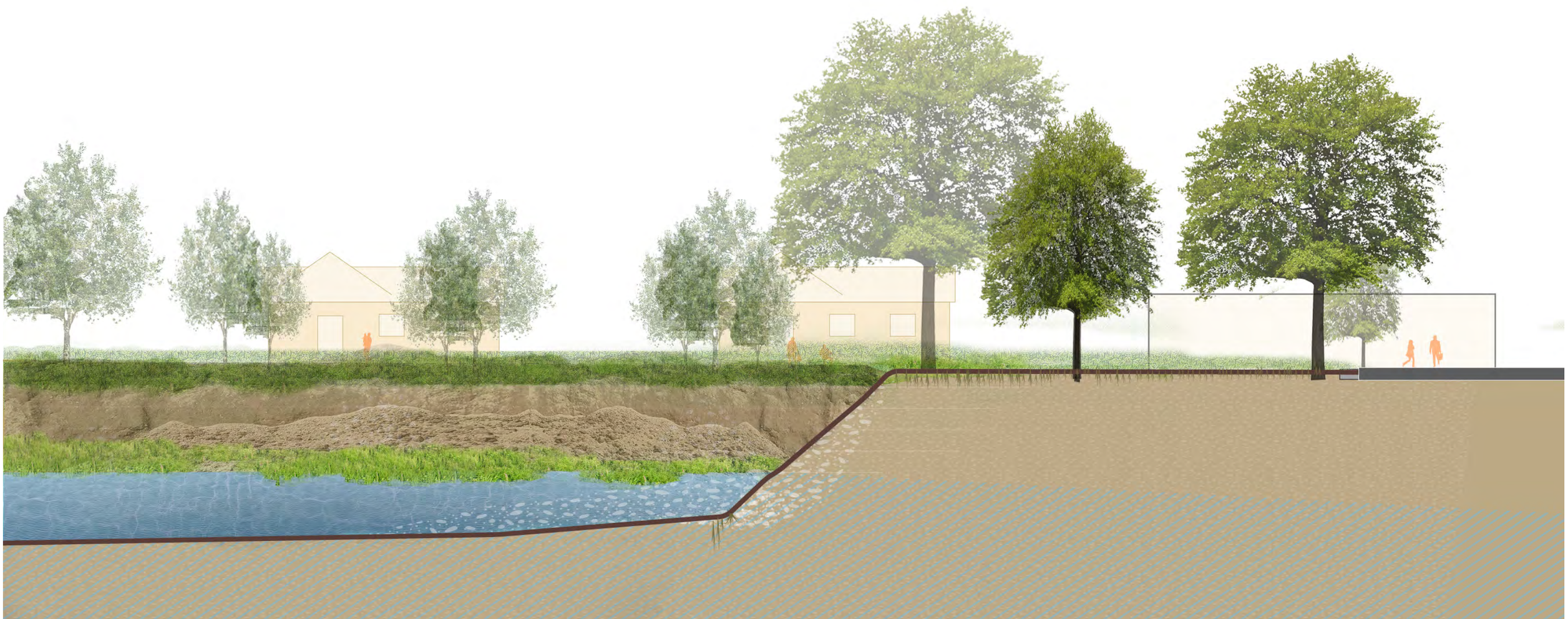

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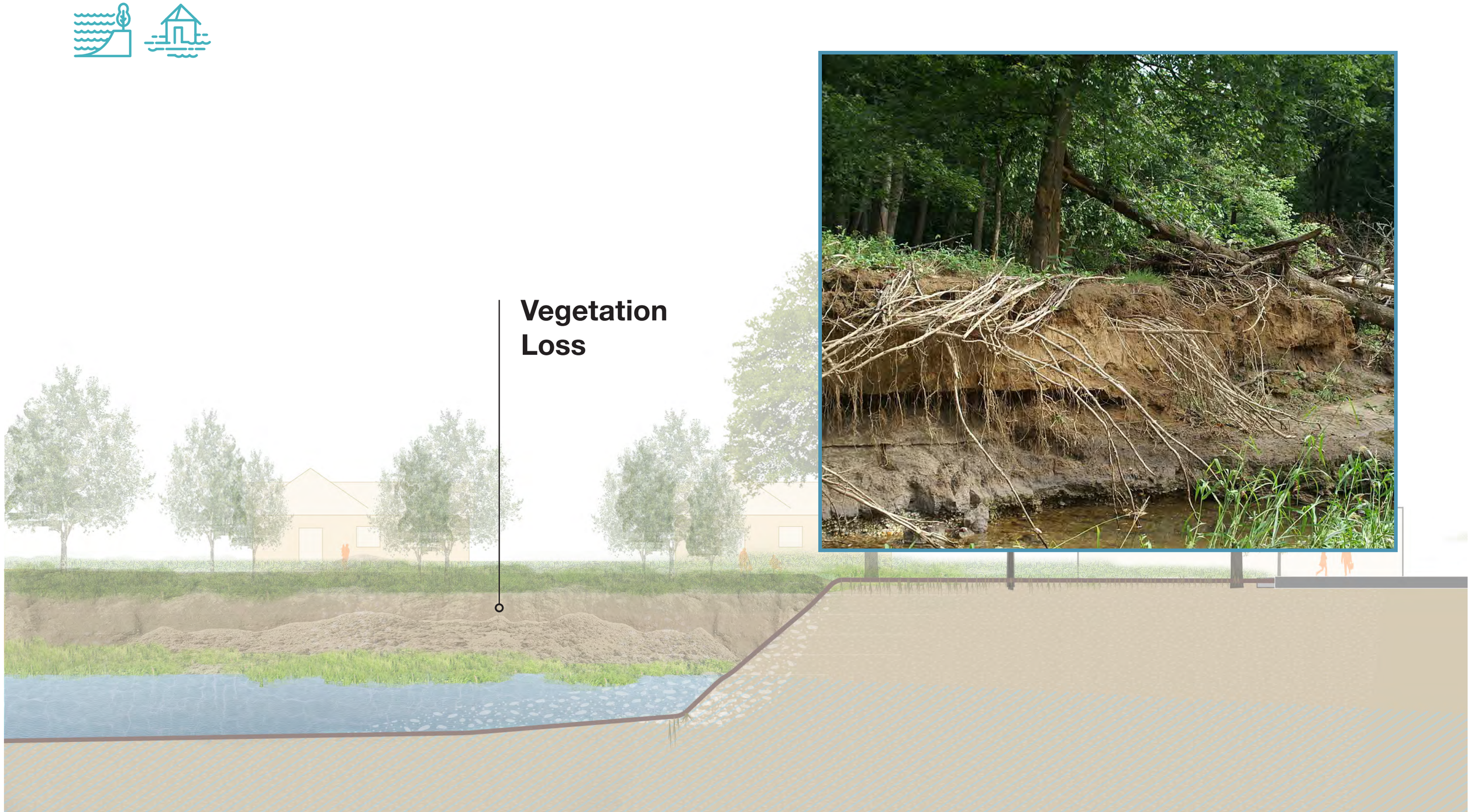
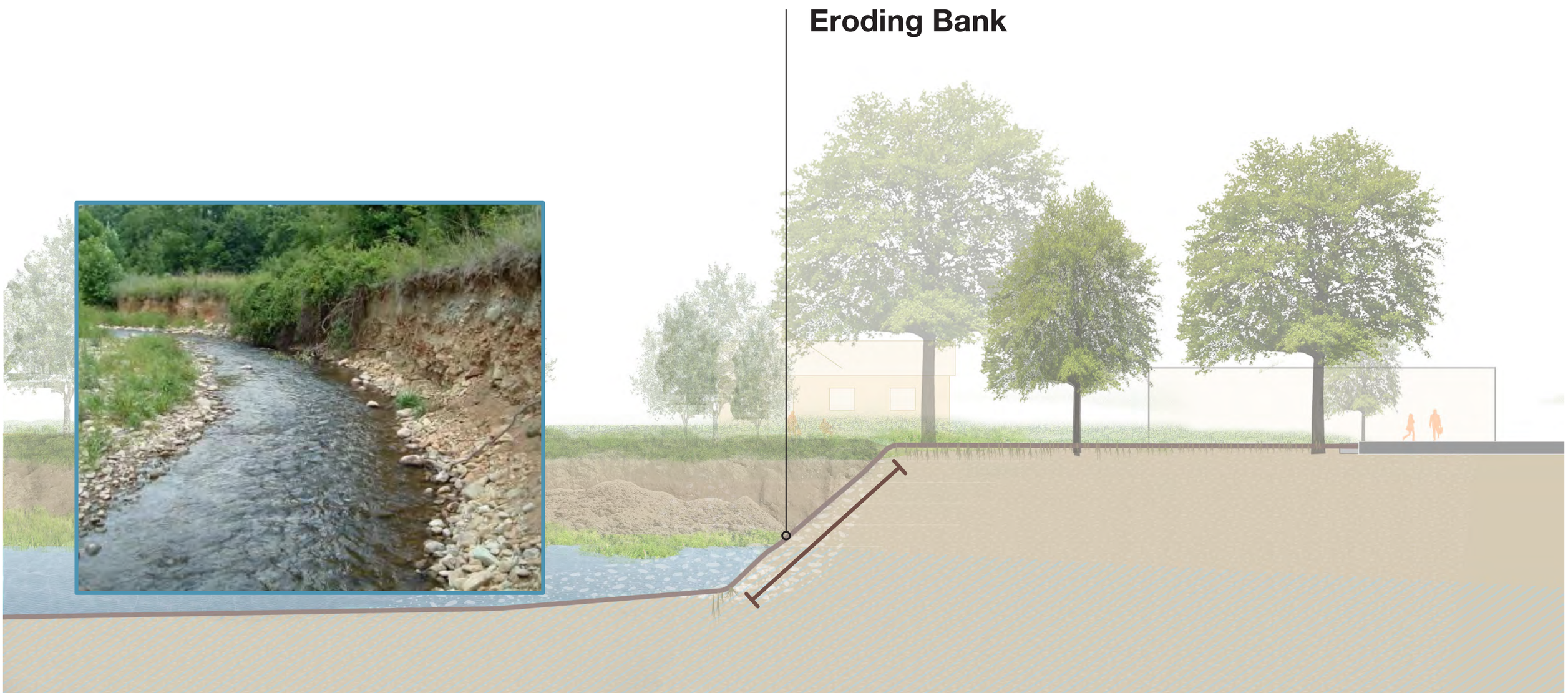


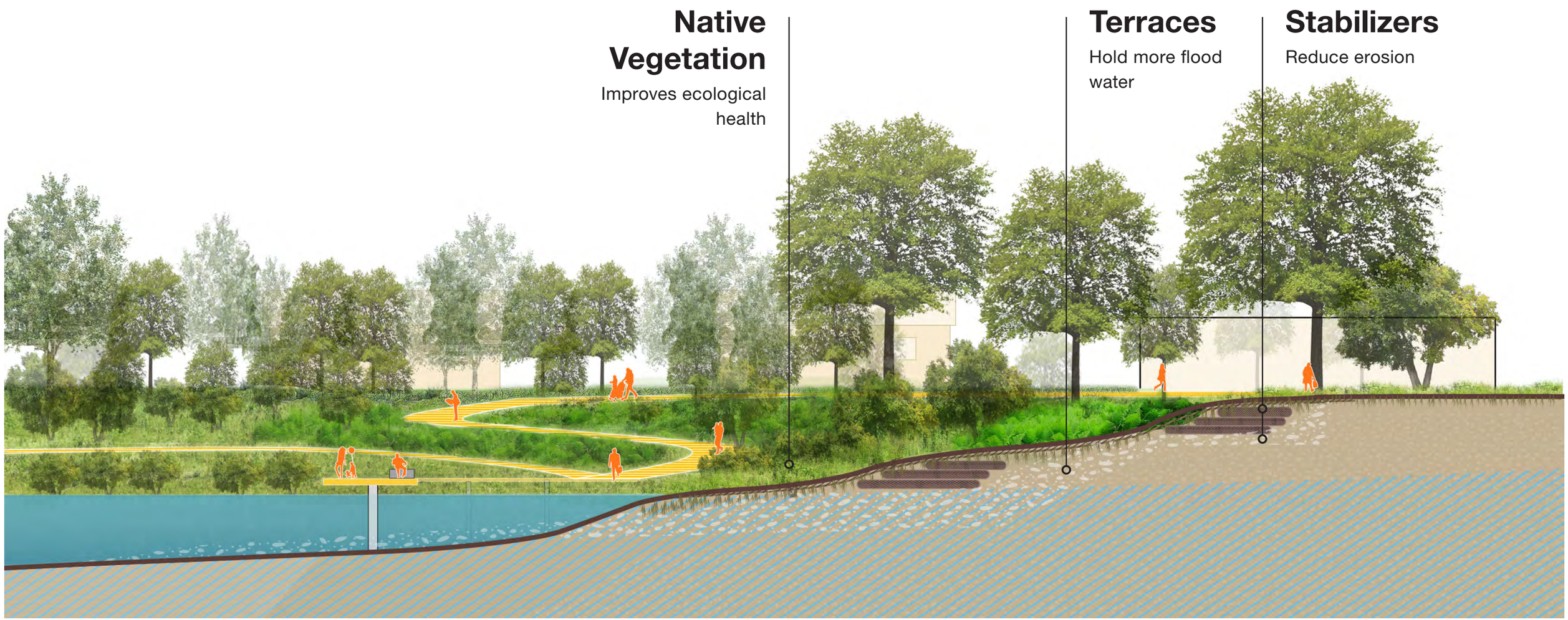
NEIGHBORHOOD STREAM IMPROVEMENTS

EXISTING



NEIGHBORHOOD STREAM IMPROVEMENTS

PROPOSED



NEIGHBORHOOD STREAM IMPROVEMENTS

PROPOSED

NEIGHBORHOOD STREAM IMPROVEMENTS

PROPOSED

Upper Terrace Floodplain Forest

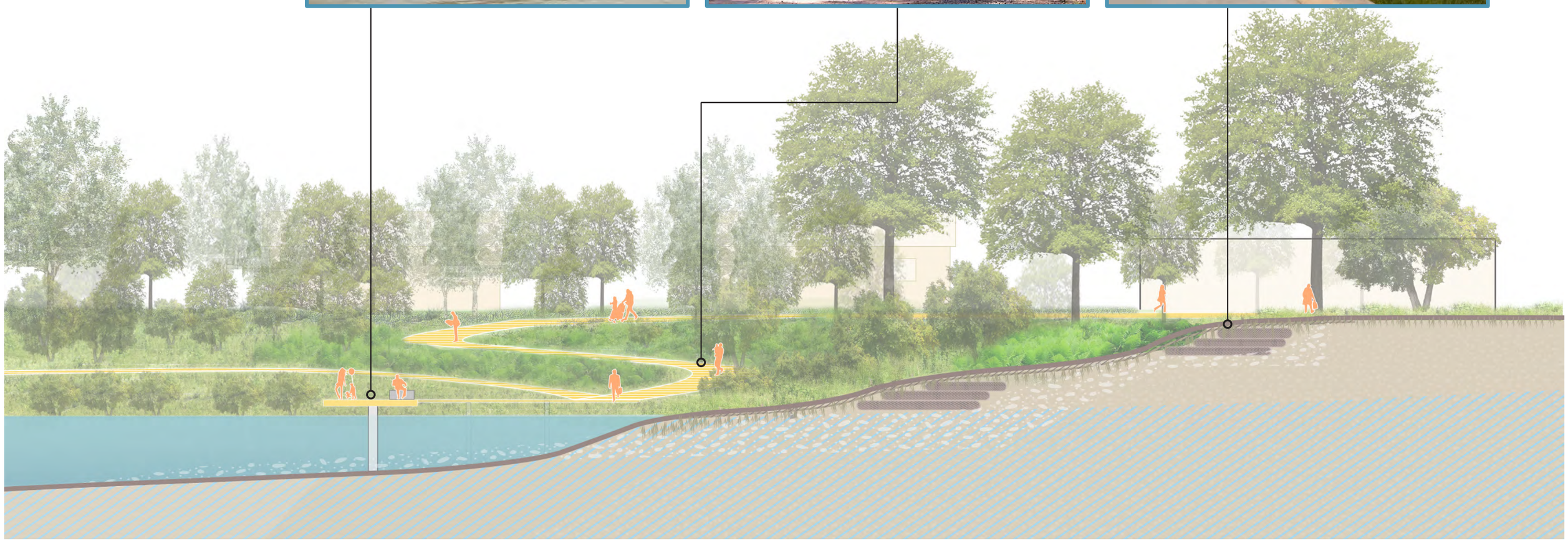
Occasional flooding and drought

STREAM IMPROVEMENTS

NEIGHBORHOOD

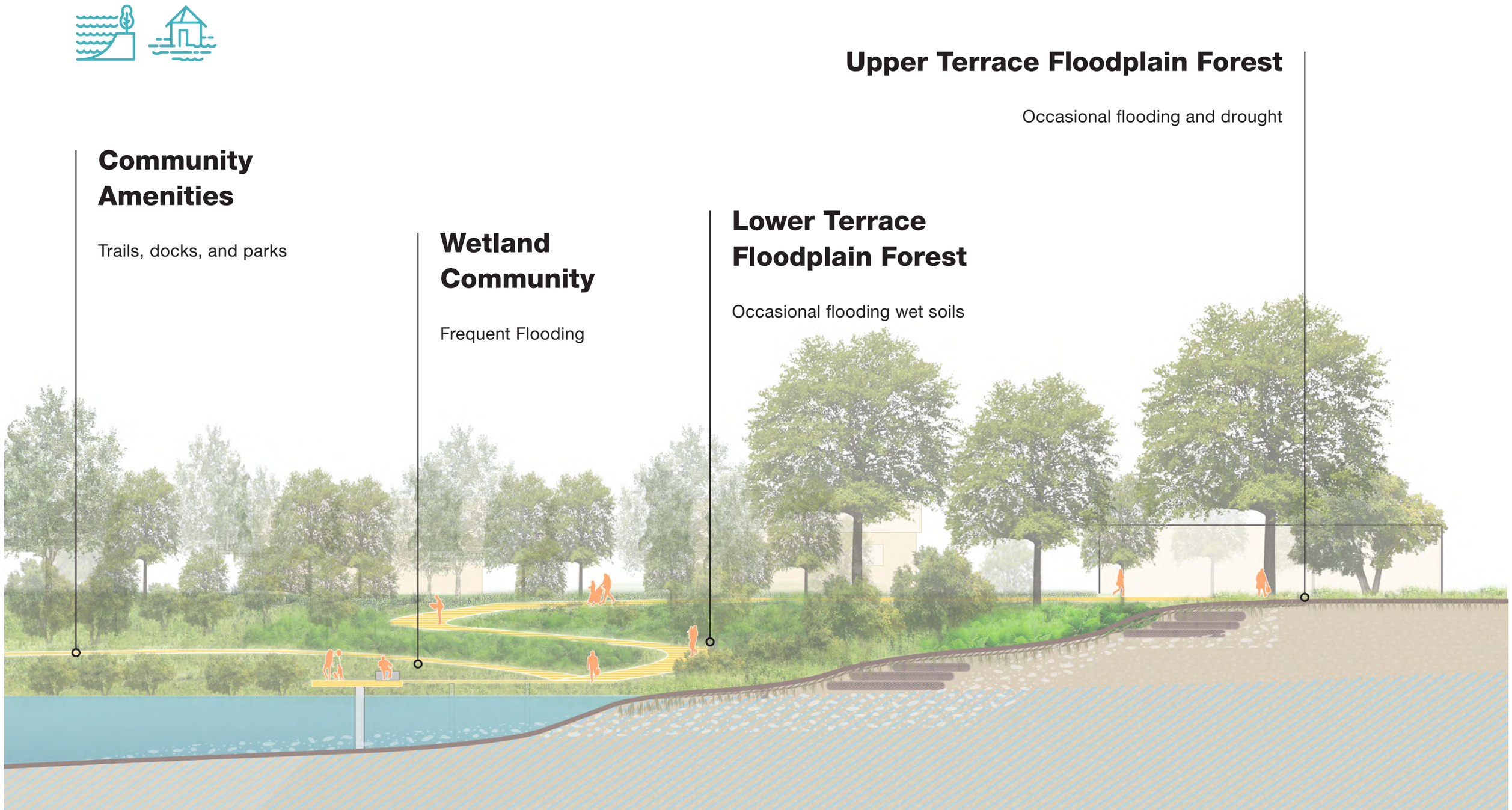
Community Amenities

Trails, docks, and parks



STREAM IMPROVEMENTS

NEIGHBORHOOD



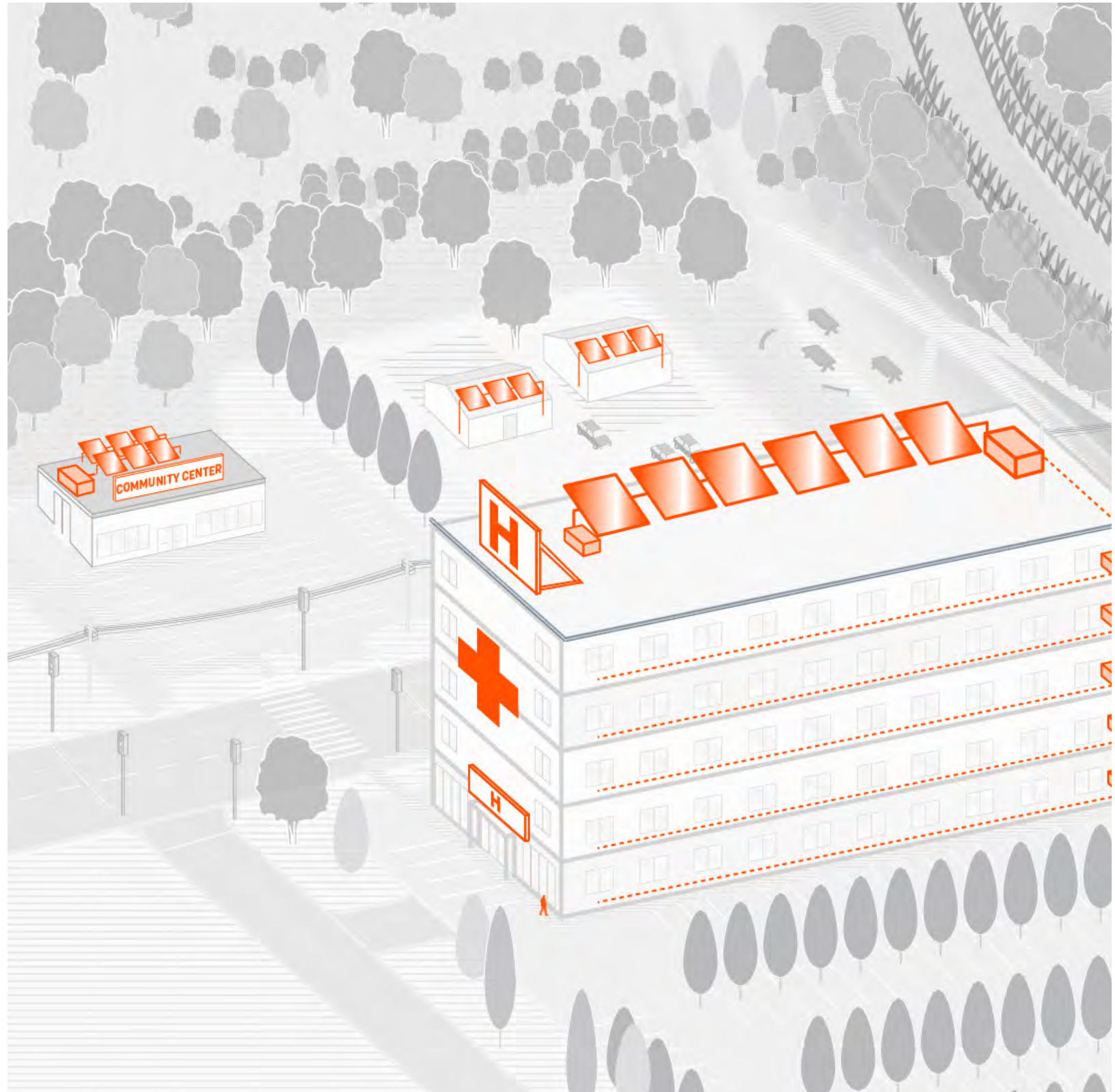
MICRO GRIDS

OVERVIEW

Alternative energy sources that provide local power in the event of a power failure with the larger grid.

PRIORITY SITES:

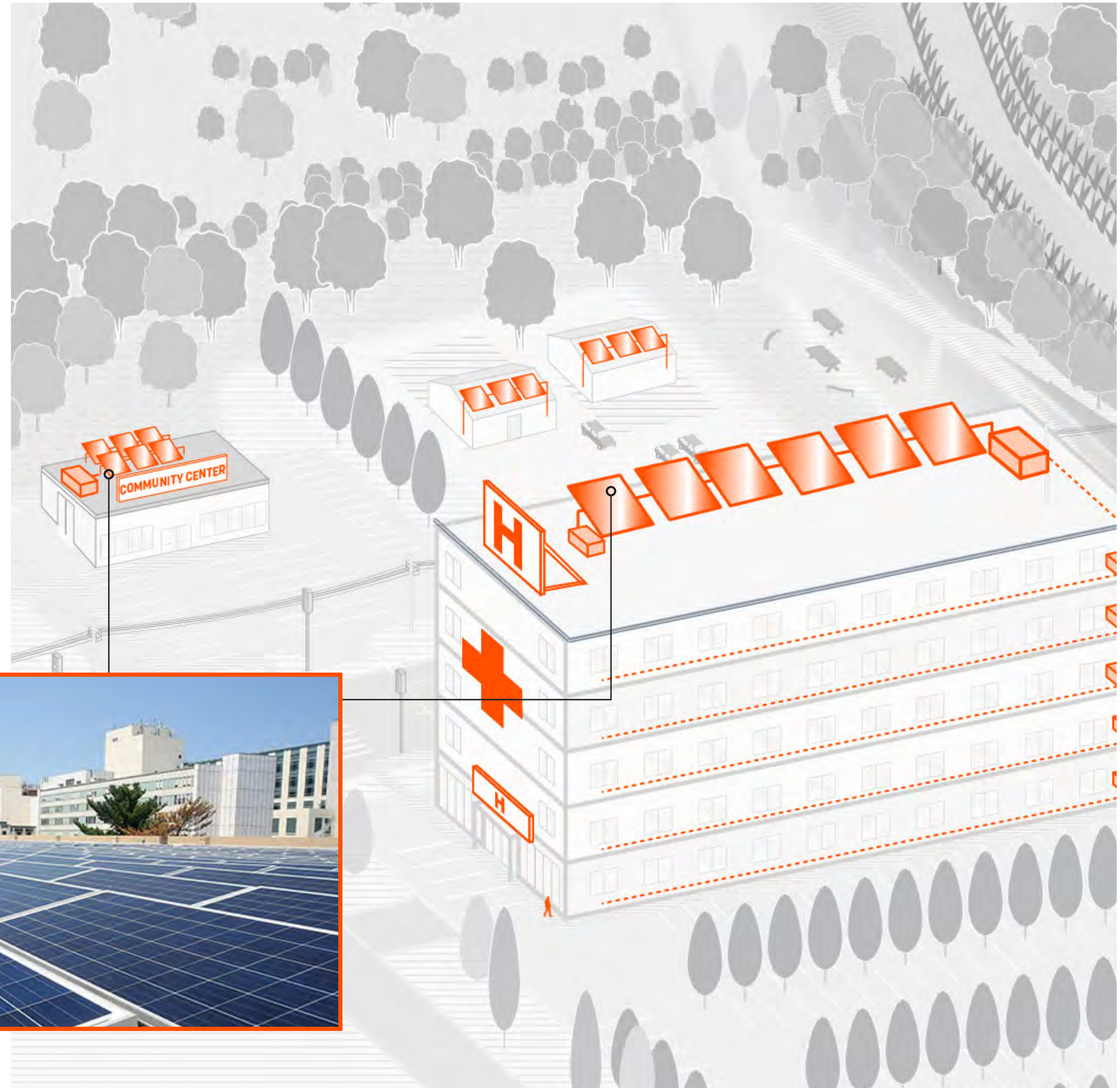
1. Emergency services buildings
2. Memphis International Airport
3. Spaces for large gatherings (schools, stadiums, theaters, community centers)



MICRO GRIDS

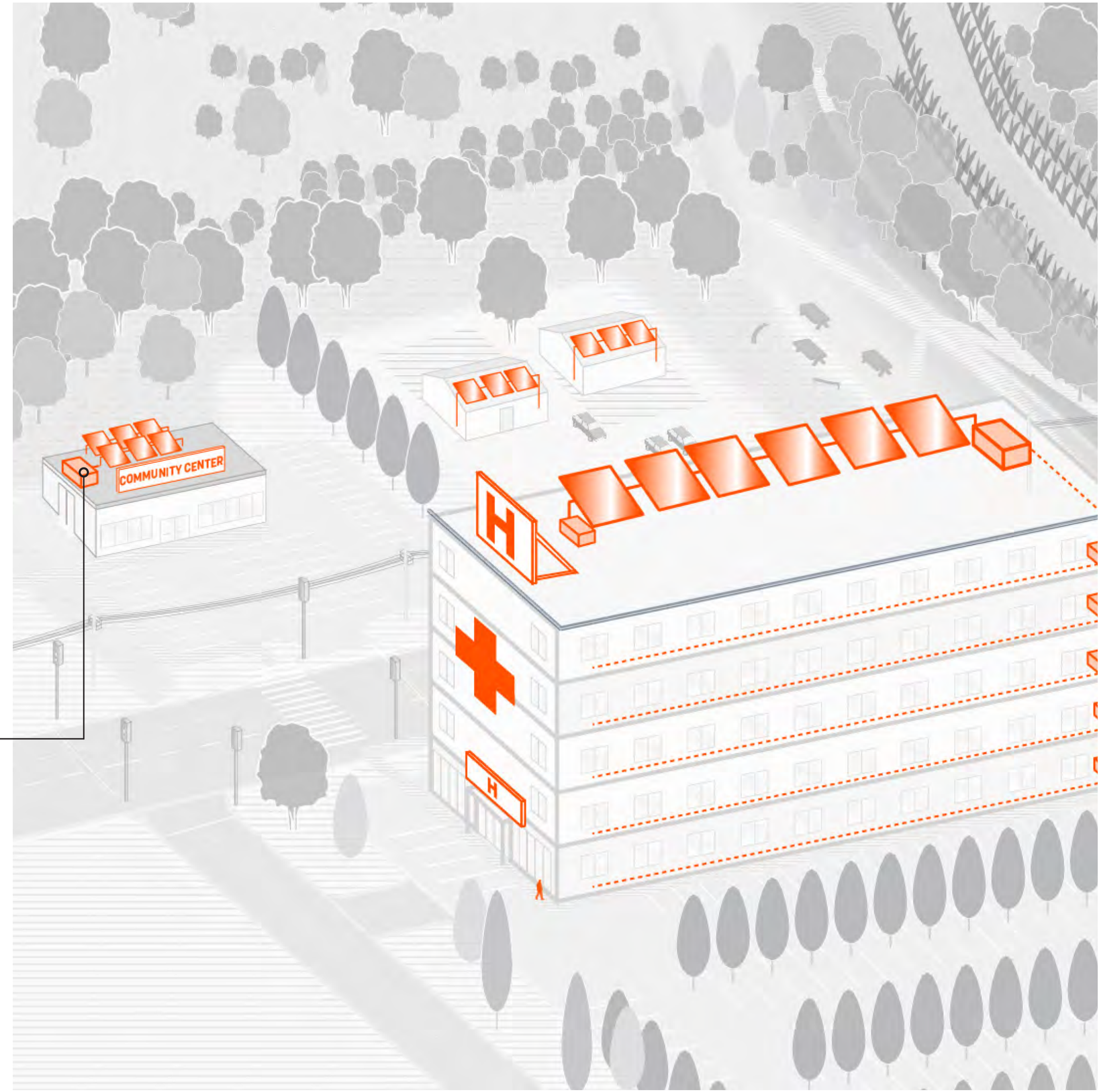
Micro-Grids

Install solar panels through MLGW's Dispersed Power Production program



MICRO GRIDS

Battery energy storage

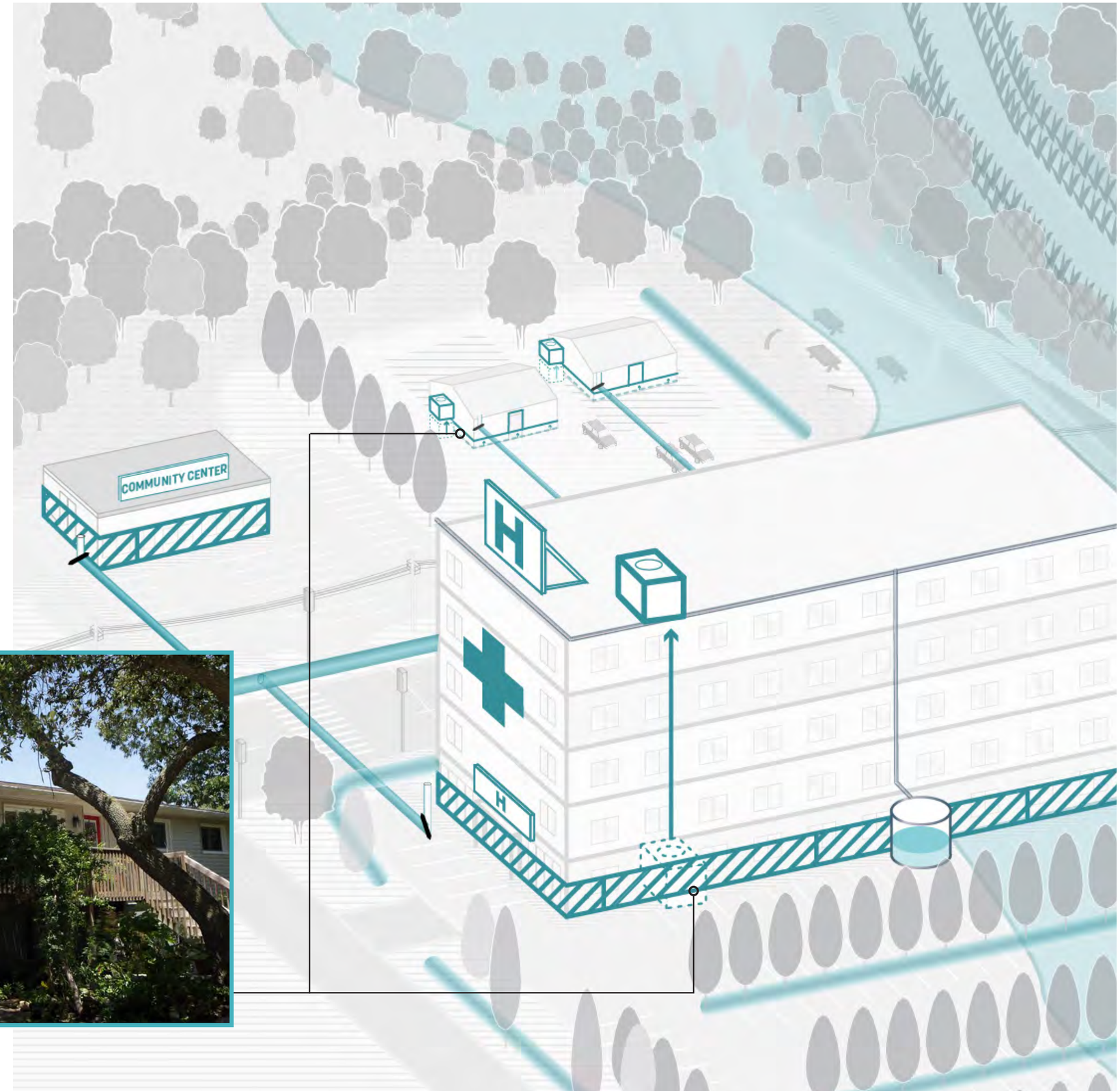


Prepare
Install energy storage

FLOODING RETROFITS

Elevate
HVAC and finished first floor at least 1’ above BFE

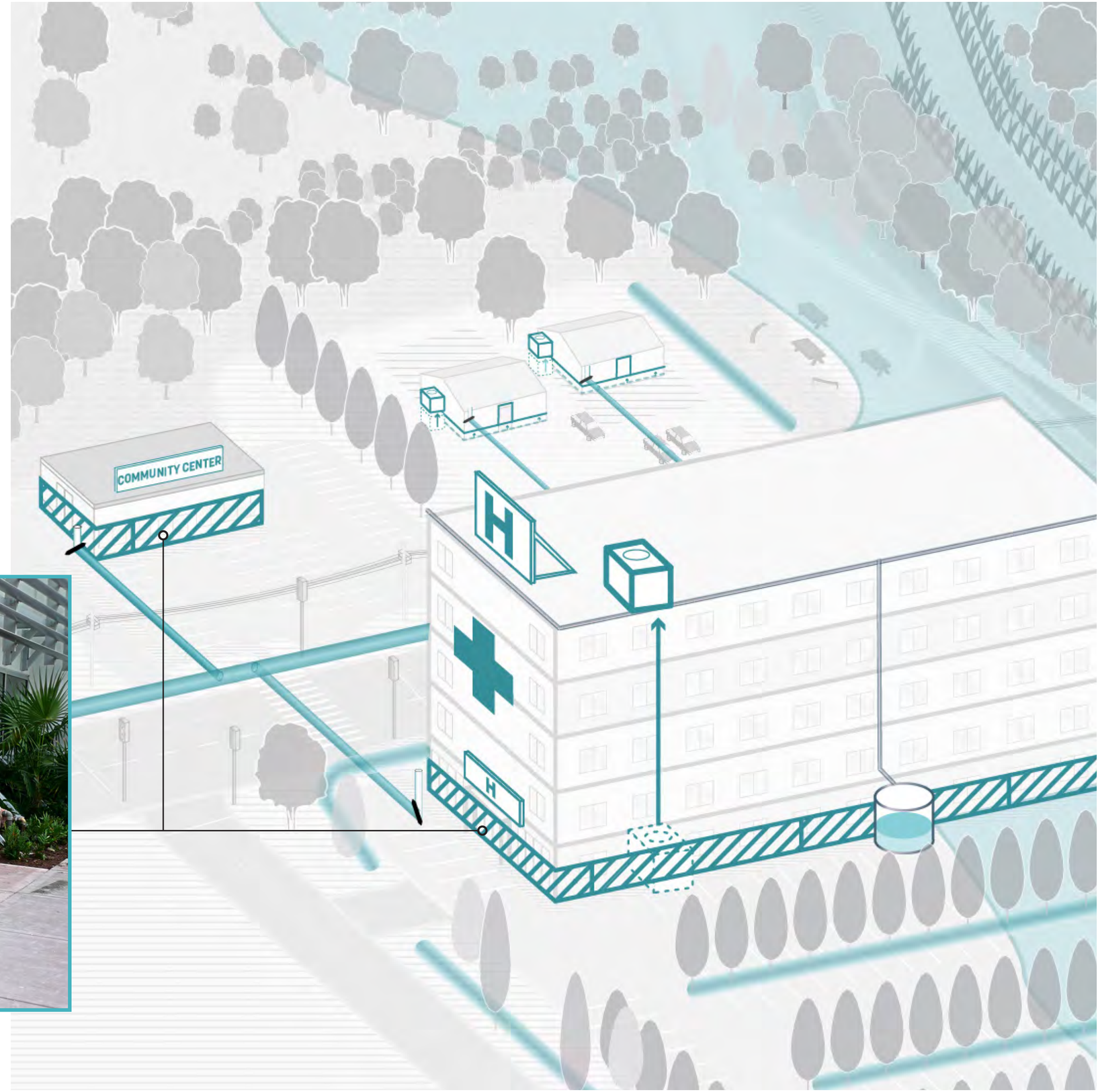
Elevated home



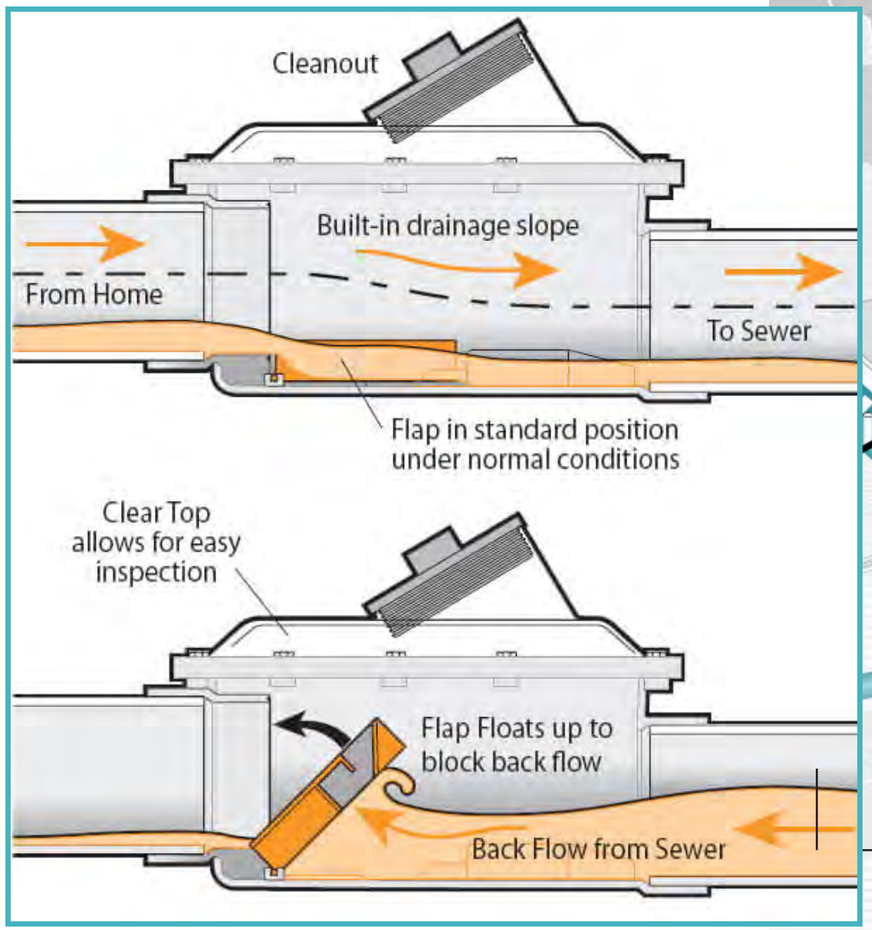
FLOODING RETROFITS

Protect
Install removable flood walls before flood events

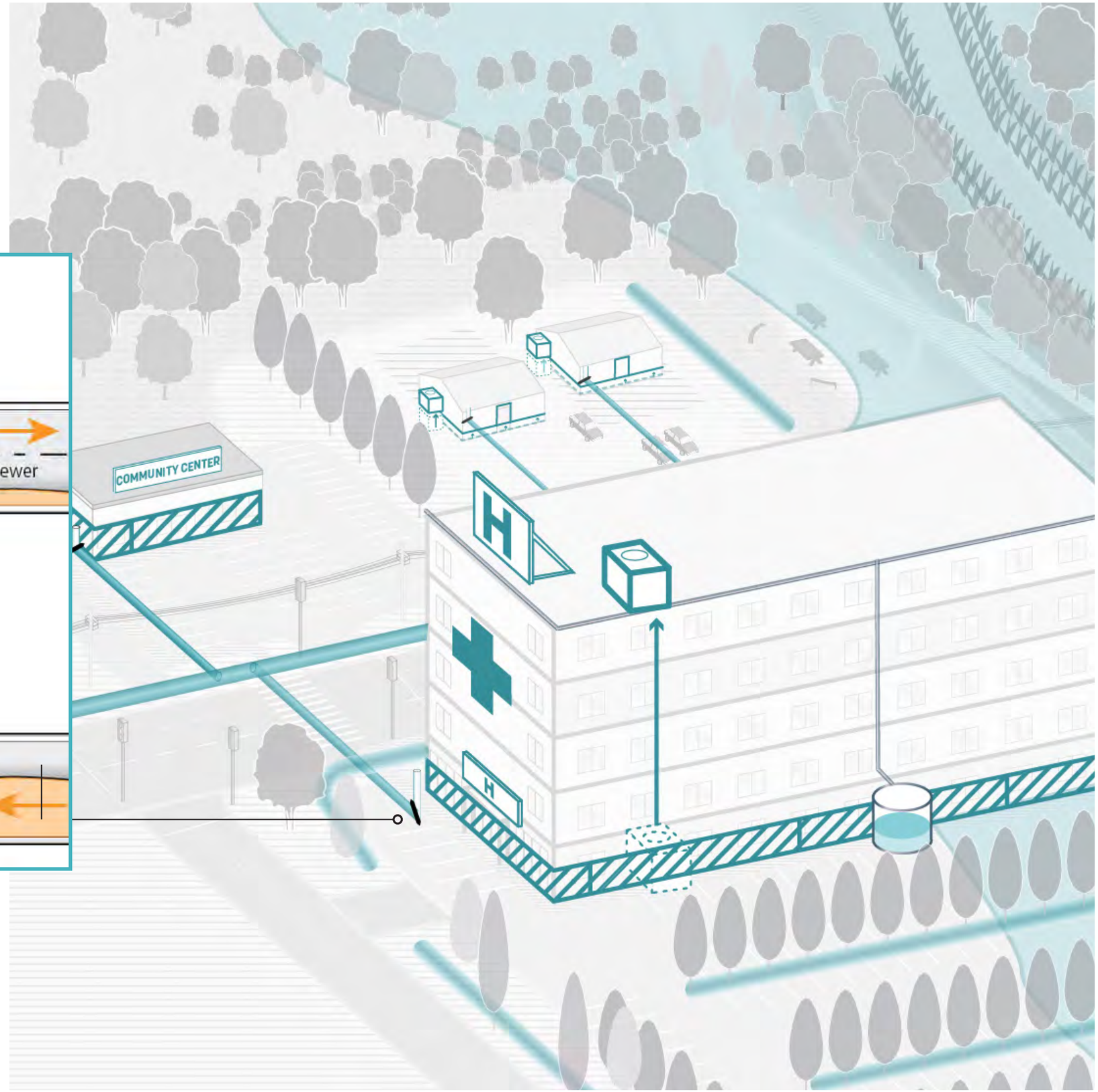
Removable flood wall



FLOODING RETROFITS



Prevent Backflow
Install non-return
plumbing valves

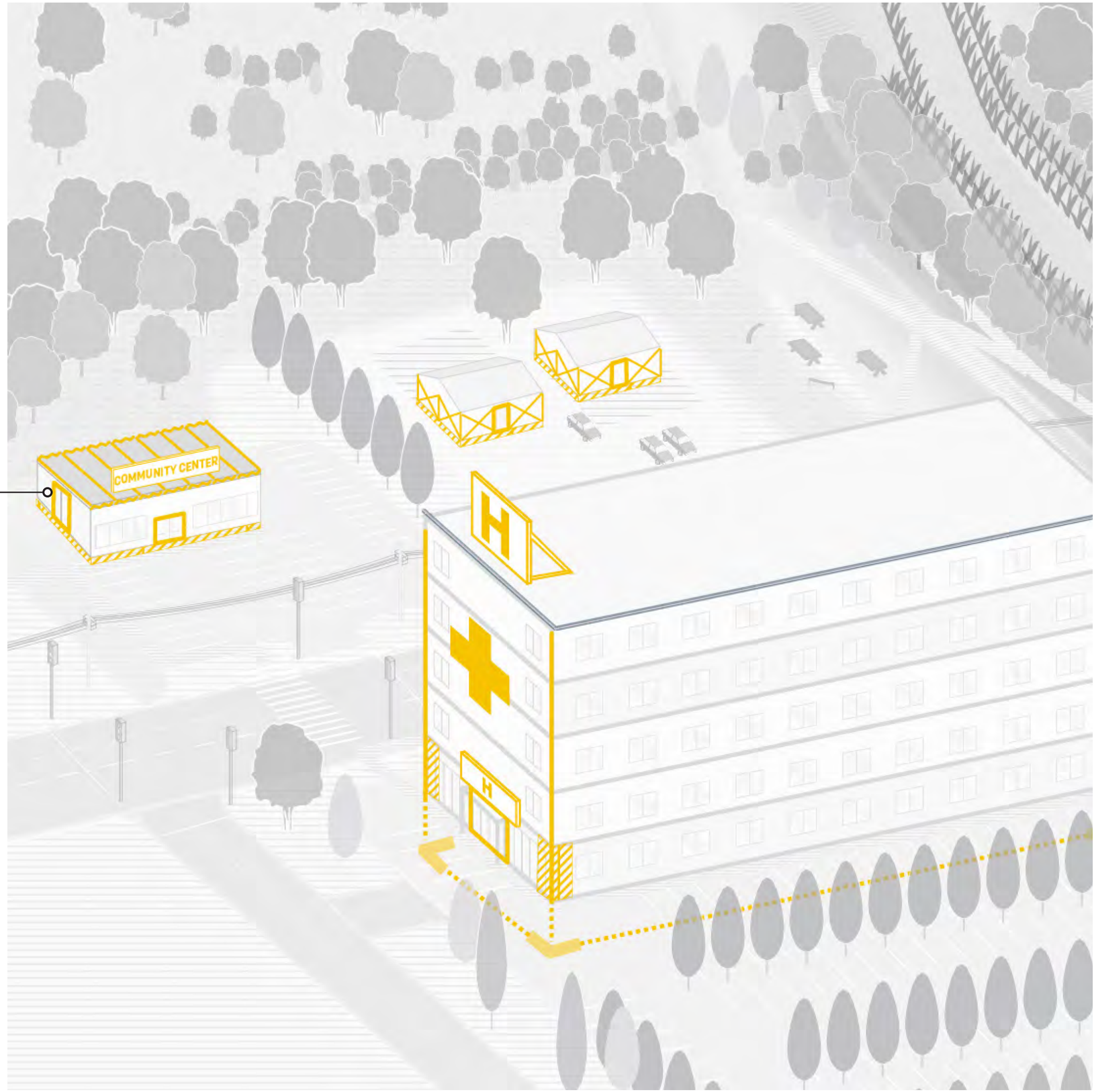


SEISMIC RETROFITS

Stabilize

Appliance wall straps

Large opening braces

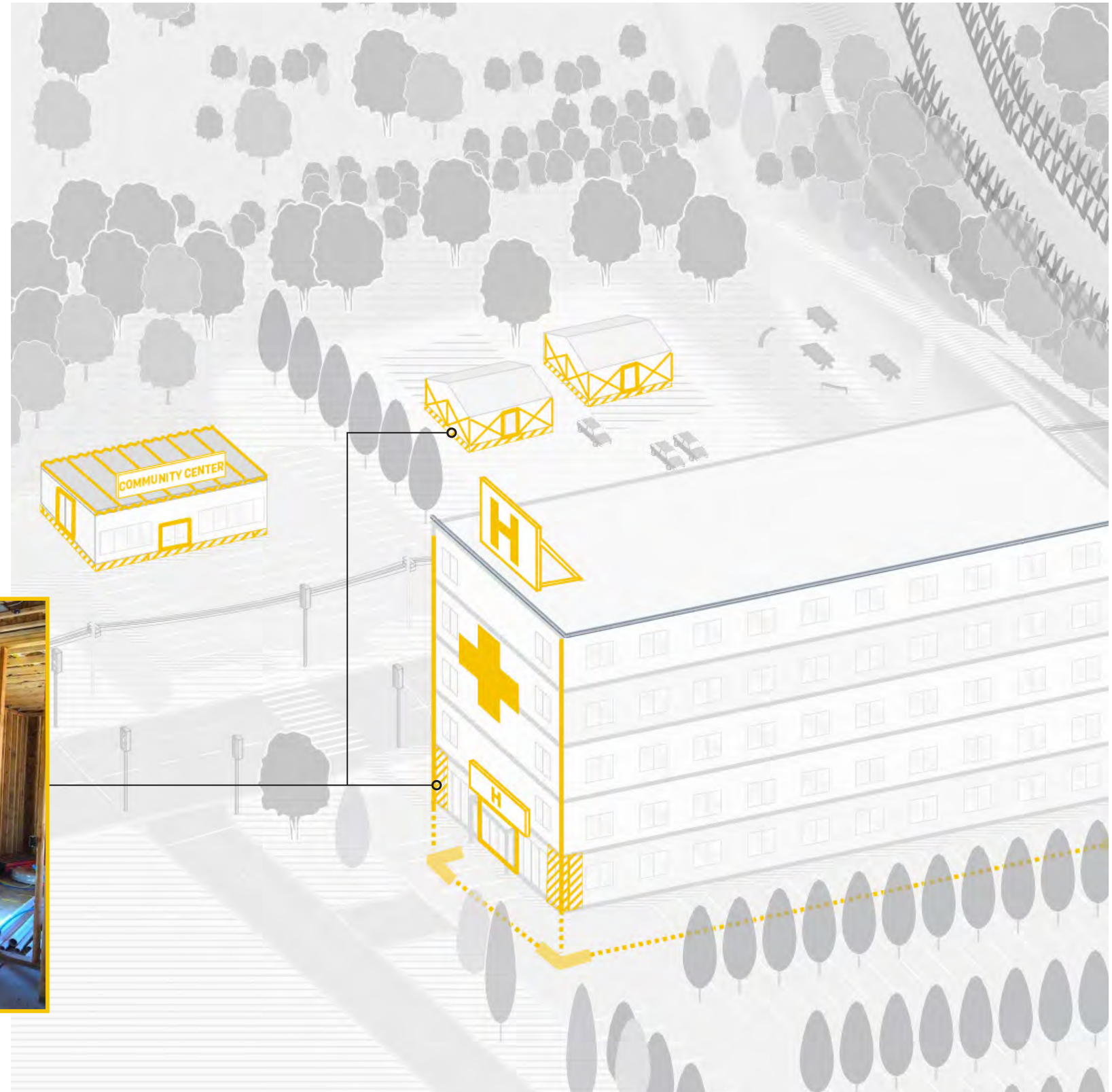


SEISMIC RETROFITS

Strengthen

First floor shear walls

Steel roof diaphragms

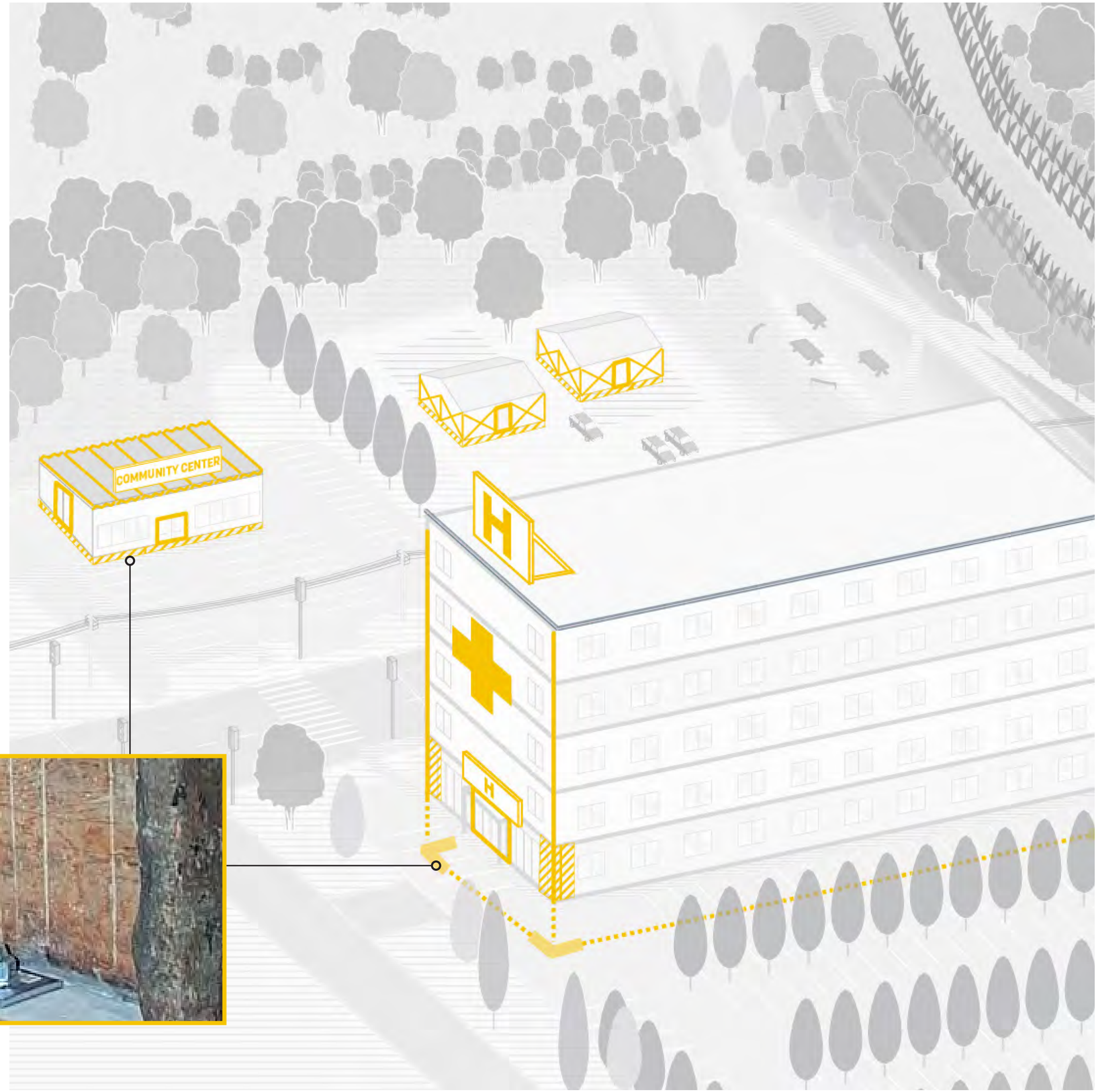


SEISMIC RETROFITS

Reinforce Foundation

Foundation anchors

Continuous perimeter foundation



SCHEDULE

Phase 1

VULNERABILITY ASSESSMENT

- Data Collection
- Plan Review
- Threat Definition
- Vulnerability Analysis

Phase 2

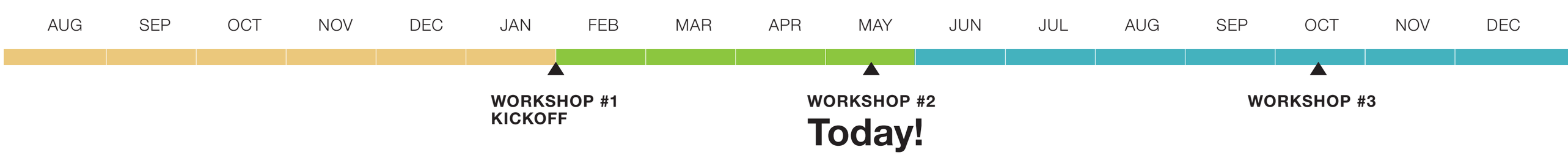
RESILIENCE STRATEGIES

- Site Suitability
- Design Strategies
- Policy Options

Phase 3

FINAL MASTER PLAN

- Refine Recommendations
- Funding and Implementation Research
- Final Revisions and Documentation



GO ONLINE AND TELL US WHERE IT FLOODS!