

REBUILD BY DESIGN
MEADOWLANDS
PUBLIC MEETING

MARCH 11, 2020

WELCOME / INTRODUCTIONS

Linda Fisher, NJDEP

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**Project Team
Manager,
Bureau of Climate
Resilience Design
& Engineering**



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Public Meeting // March 11, 2020 AECOM

WELCOME / INTRODUCTIONS

Chris Benosky, AECOM

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- **Welcome + Introduction**
- **Project History and Build Plan**
- **From Feasibility to Design**
- **Design Phase Infrastructure**
- **Design Phase Landscape + Public Realm**
- **Open House Breakout Session**



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INTRODUCTIONS

Chris Benosky, AECOM

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Presenter

CHRISTOPHER BENOSKY,
Project Executive, AECOM



Presenter

DAVE BLAIR
Project Manager, AECOM



Presenter

ANNA HOCHHALTER
Landscape Architect, AECOM



Presenter

MICHAEL MURPHY
HDR Manager, HDR



STEVE BIUSO
Design Manager,
AECOM



SUSAN BEMIS
Associate Principal,
Landscape Architecture
and Urban Design,
AECOM



HOGAN EDELBERG
Landscape Architect,
AECOM



CAITLIN CAVANAGH
Water Resources Engineer,
AECOM



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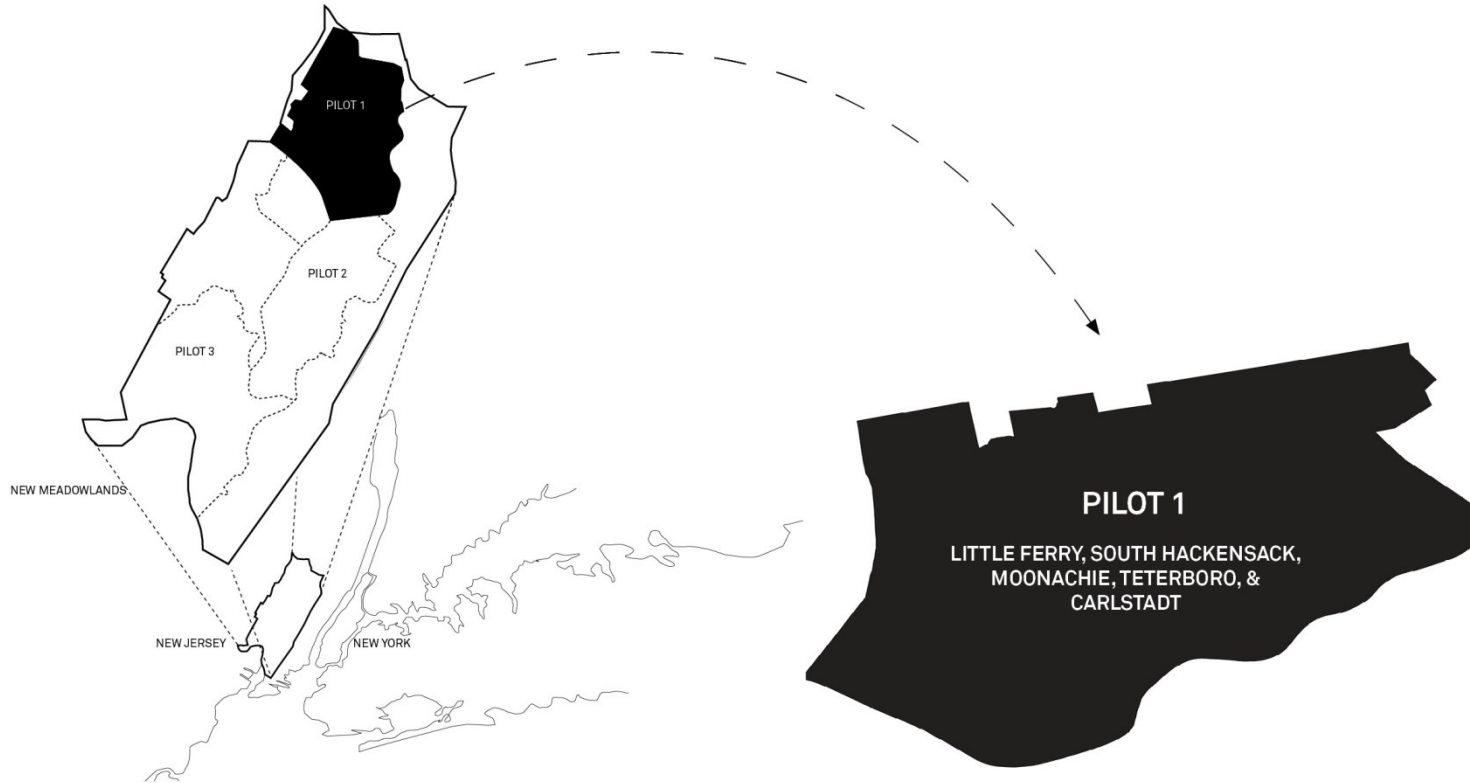
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PROJECT HISTORY + BUILD PLAN

CHRIS BENOSKY, AECOM

REBUILD BY DESIGN COMPETITION & AWARD

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- HUD awarded State of New Jersey **\$150M for Phase 1 Pilot Area only**
- Project must be functional and **completed by September 2022**



Address flood risk

Increase resiliency of the communities and ecosystems

Reduce impacts to critical infrastructure, residences, businesses,
and ecological resources

Protect life, public health, and property

Increase **community resiliency**

Enhance water quality and protect ecological resources

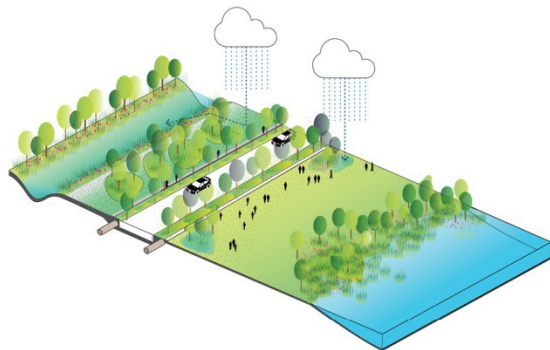
Address systemic **inland flooding & coastal flooding**
from storm surges

Integrate flood hazard risk reduction strategies with **civic, cultural, & recreational benefits**

ALTERNATIVE 3 HYBRID - THE BUILD & FUTURE PLAN

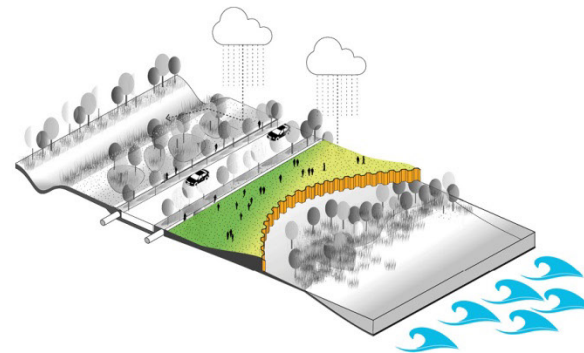
PREFERRED ALTERNATIVE

9



Build Plan

The *Build Plan* represents a feasible project that can be **constructed by 2022**. Components include flood reduction strategies to address frequent rain flooding



Future Plan

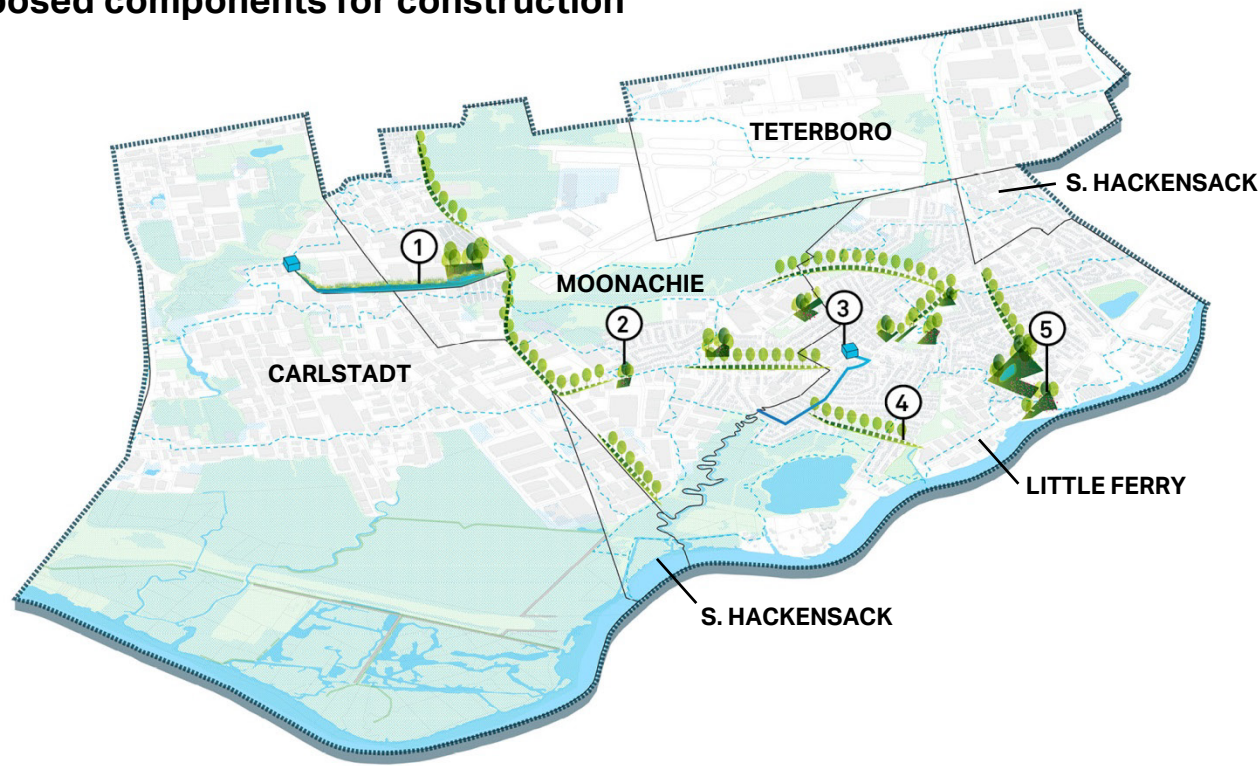
Components that were not selected for the *Build Plan* became elements of a *Future Plan*. These elements could **be implemented** by others **over time** as new funding sources become available

SELECTED ALTERNATIVE - BUILD PLAN

DOCUMENTED IN RECORD OF DECISION

Proposed components for construction

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- ① Pump station + Channel Improvements + New Park
- ② Green Infrastructure + New Park
- ③ Pump Station + Force Main + Public Facility Improvements
- ④ Green Infrastructure
- ⑤ Park Improvements + 1 New Park + Green Infrastructure

Stormwater Management Features

- ① East Riser: Channel Improvements + Enhanced Wetland Open Space
- ② Avanti Park: Street Green Infrastructure + Enhanced Open Space
- ③ Losen Sote: Force Main + Public Facility Improvements
- ④ Green Infrastructure + Enhanced Wetland Open Space
- ⑤ GI Improvements to Willow Lake Park + 1 New Wetland / Open Space along Hackensack River



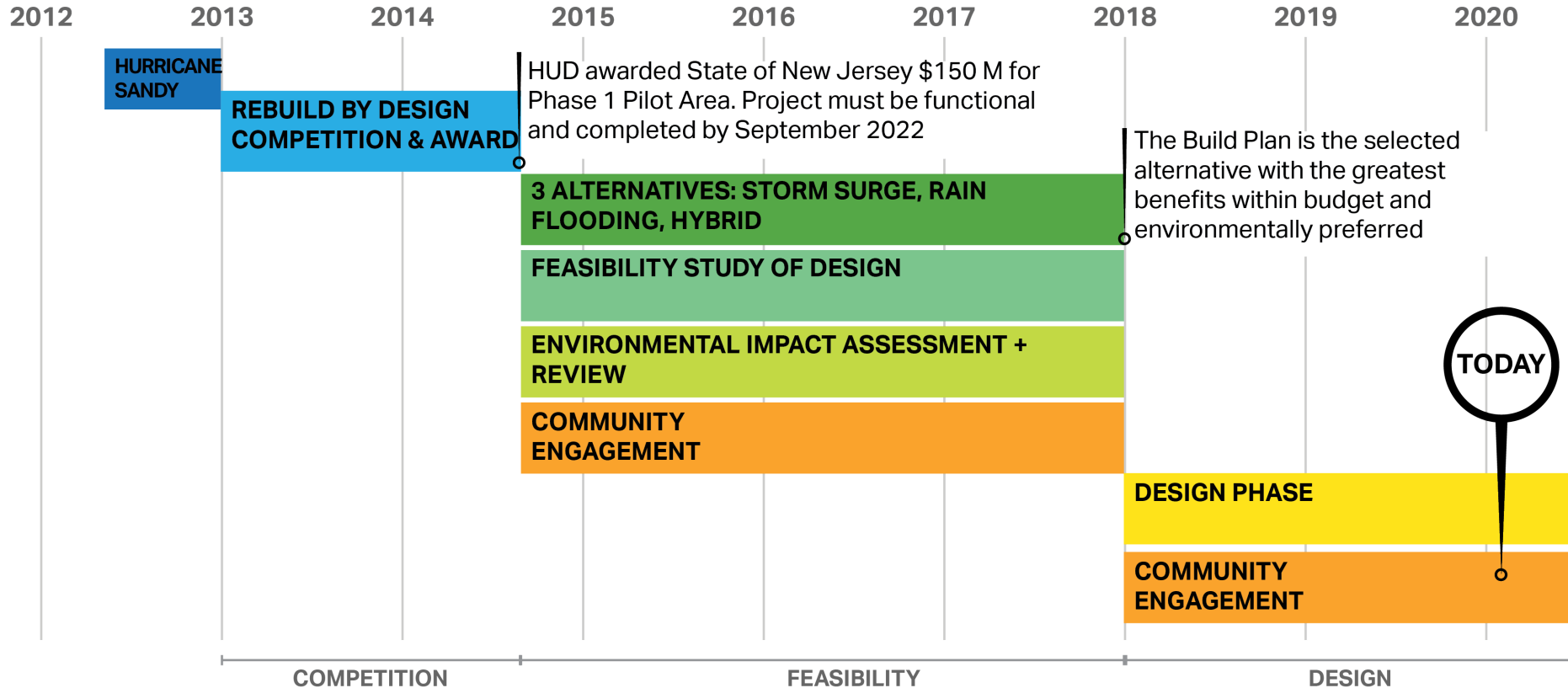
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THE FEASIBILITY + NEPA PROCESS

EXTENSIVE ALTERNATIVE ANALYSIS FOR IMPROVED RESILIENCE

11



FROM FEASIBILITY TO DESIGN

ANNA HOCHHALTER, AECOM

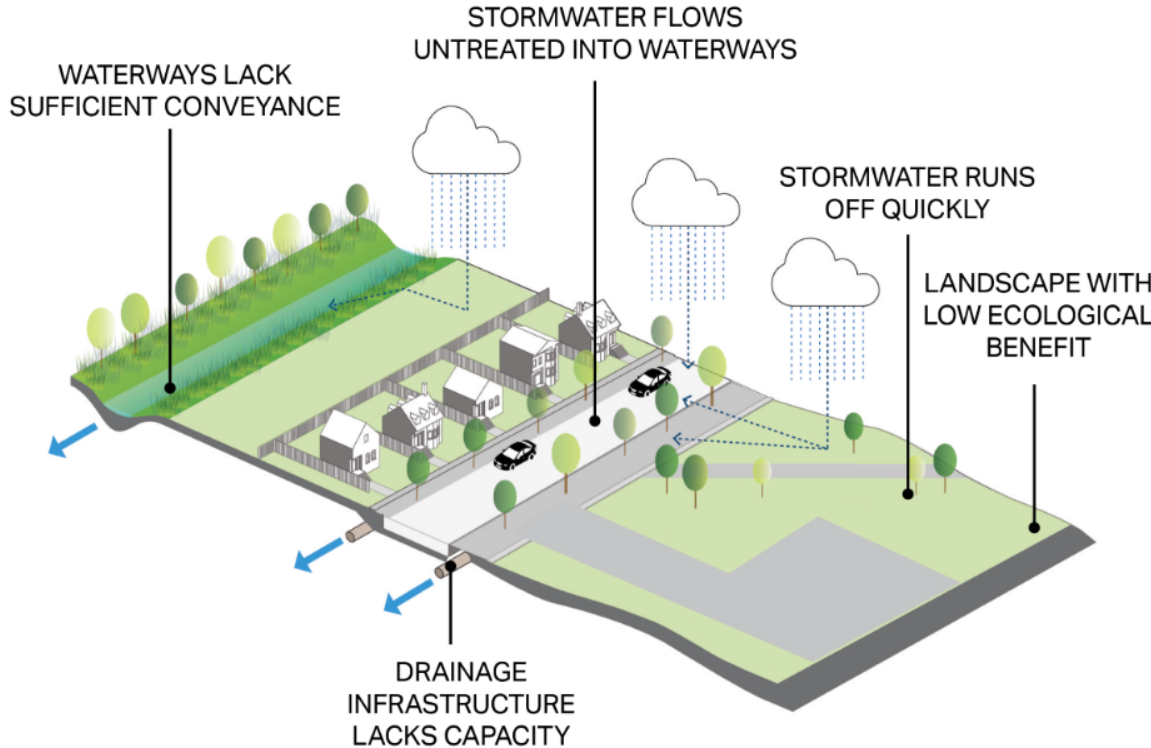
DESIGNING FOR FREQUENT RAIN FLOODING

FLOOD RISK + EXISTING CONDITIONS CHALLENGES

13

Major Challenges

- Over-burdened infrastructure
- Lack of drainage capacity
- Low-lying elevations with minimal grade changes
- Densely developed area
- Stormwater runoff carries pollutants into waterways

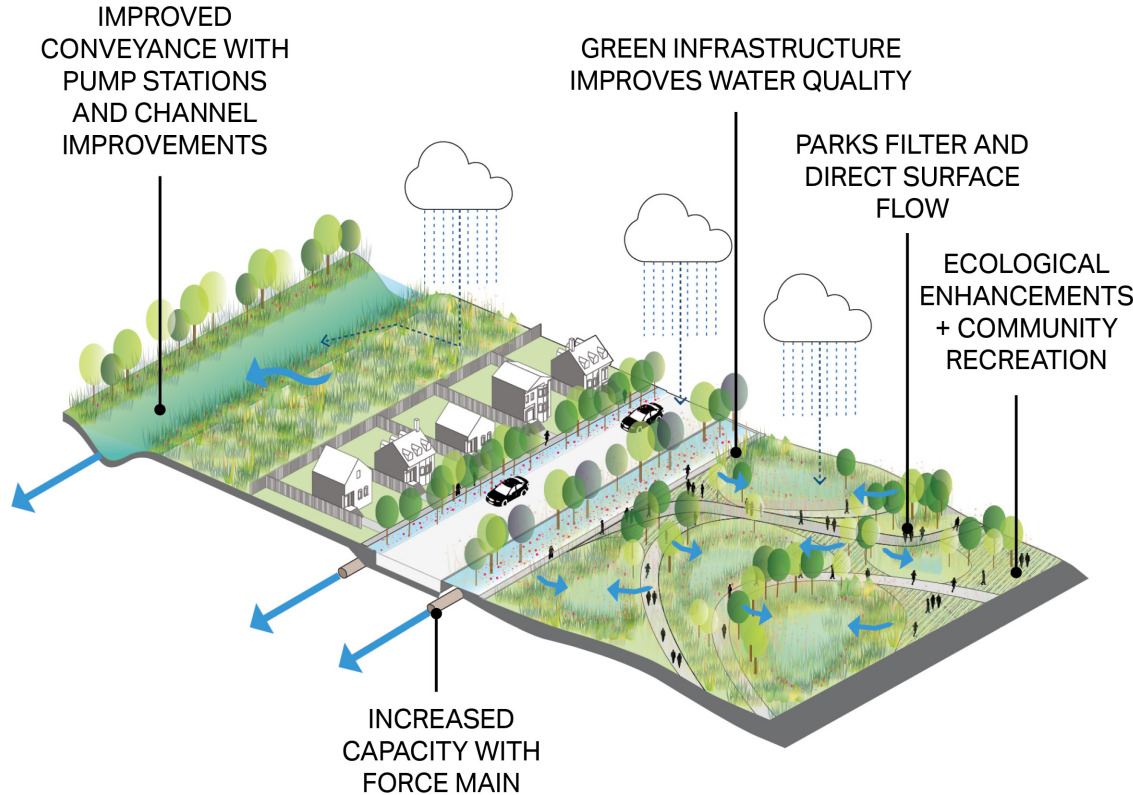


DIAGRAMS NOT TO SCALE

PROJECT DESIGN APPROACH + GOALS

FLOOD RISK REDUCTION + CO-BENEFITS

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+ INFRASTRUCTURE

Primary flood risk reduction achieved through grey infrastructure

+ LANDSCAPE + PUBLIC REALM IMPROVEMENTS

Landscape improvements to provide additional water quality + parks + open space improvements

DIAGRAMS NOT TO SCALE



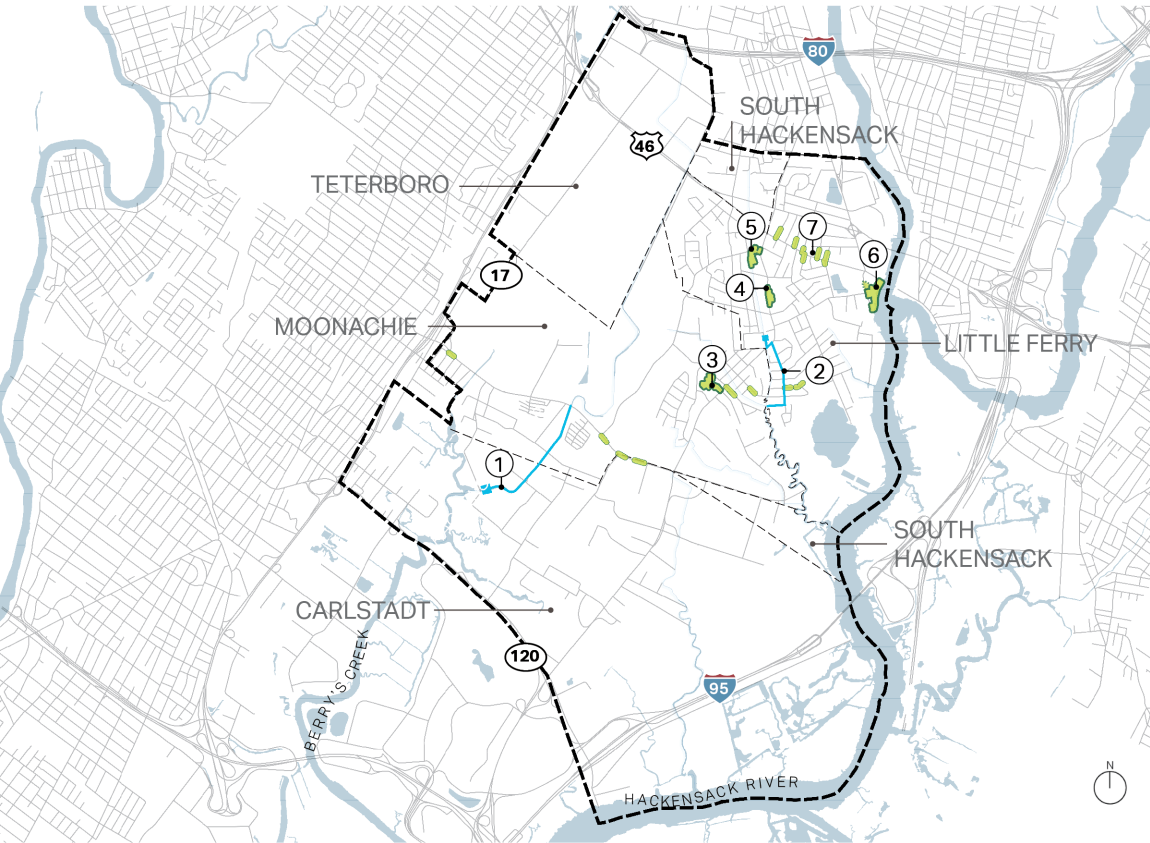
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PROJECT FEATURE TYPES

INFRASTRUCTURE + LANDSCAPE / PUBLIC REALM

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+ INFRASTRUCTURE

- ① East Riser Channel Improvements + Pump Station
- ② Losen Slote Force Main + Pump Station

+ LANDSCAPE / PUBLIC REALM

- ③ Joseph St. Park
- ④ Memorial Middle School
- ⑤ Little Ferry Library + Municipal Bldg
- ⑥ New Riverfront Park
- ⑦ Streetside Green Infrastructure -Type Improvements

DIAGRAMS NOT TO SCALE



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PROPOSED PROJECT FEATURES

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PUMP STATIONS + STORMWATER FORCE MAIN + CHANNEL IMPROVEMENTS



Pump Stations

Provide additional force to stormwater conveyance



Stormwater Force Main

Increases capacity for conveyance



Channel Improvements

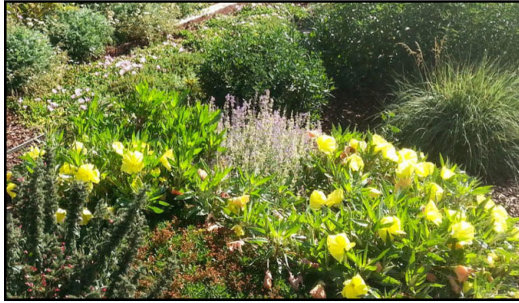
Dredging + widening to improve conveyance



PROPOSED PROJECT FEATURES

LANDSCAPE + PUBLIC REALM IMPROVEMENTS

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Native Planting

Planting native species improves ecological biodiversity and improves rain water uptake

Green Infrastructure

Methods of filtering and slowing stormwater to improve water quality + reduce burden on drainage system

Improved or New Parks

Designing ecological, community + recreational benefits



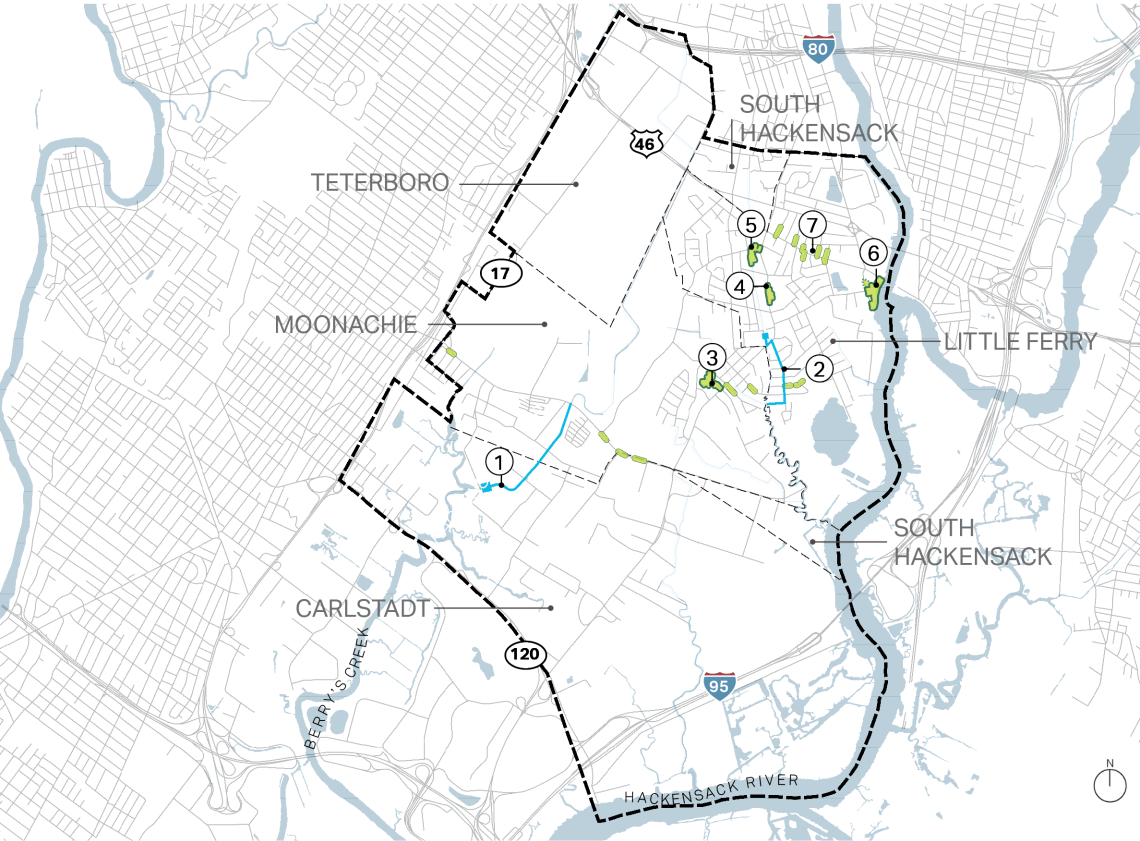
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PROJECT IMPROVEMENTS

DESIGN PHASE PROJECT FEATURES

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+ INFRASTRUCTURE

- ① East Riser Channel Improvements + Pump Station
- ② Losen Slote Force Main + Pump Station

+ LANDSCAPE / PUBLIC REALM

- ③ Joseph St. Park
- ④ Memorial Middle School
- ⑤ Little Ferry Library + Municipal Bldg
- ⑥ New Riverfront Park
- ⑦ Streetside Green Infrastructure -Type Improvements

DIAGRAMS NOT TO SCALE



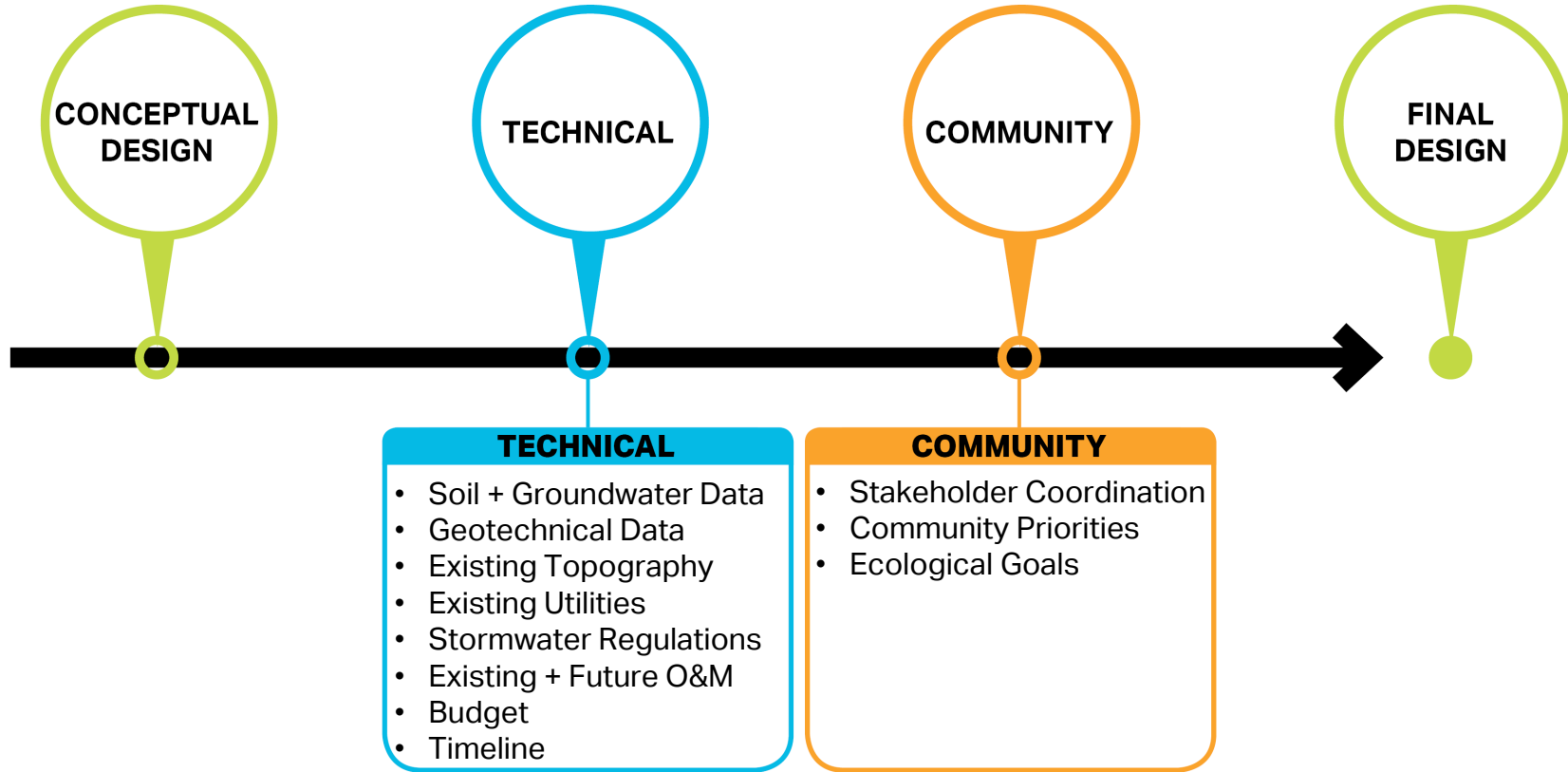
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DESIGN DRIVERS

DESIGN PROCESS OVERVIEW

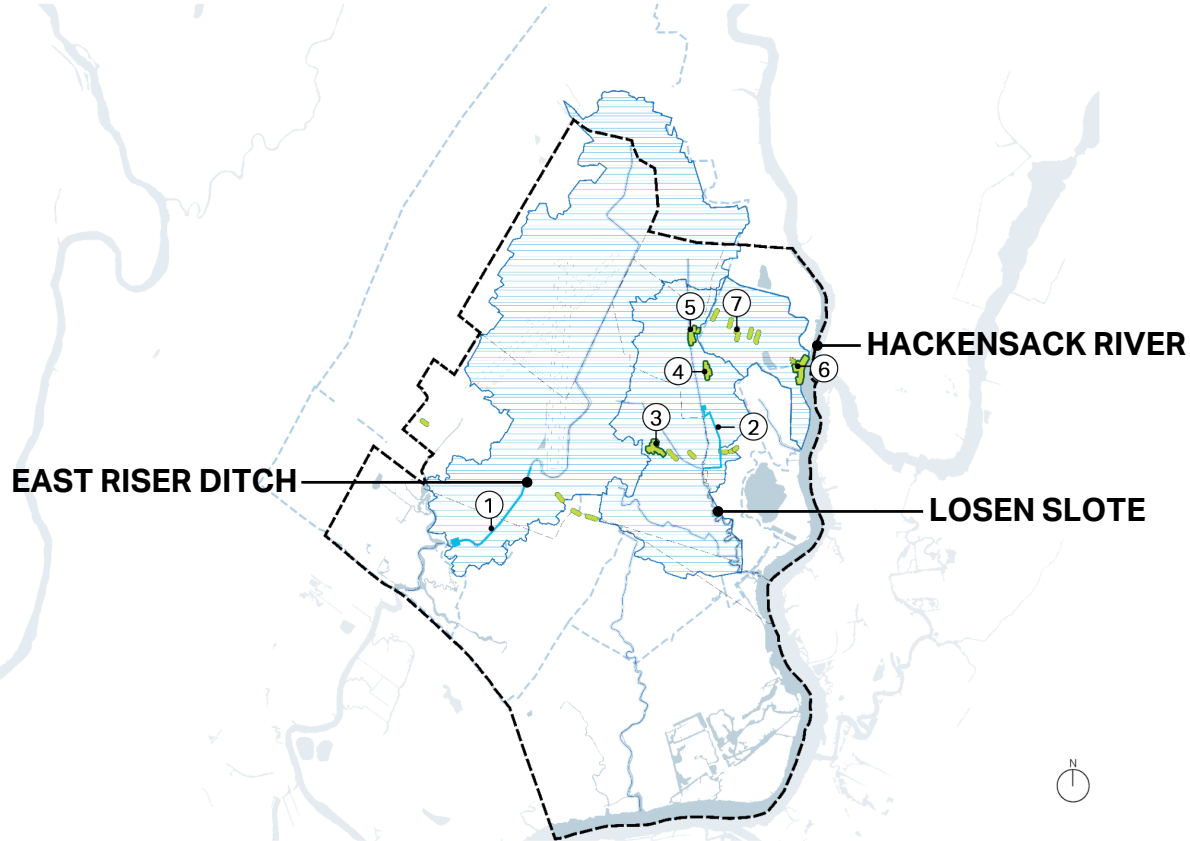
19



DESIGN PHASE PROJECT IMPROVEMENTS

SHOWN WITHIN DRAINAGE AREAS

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East Riser Ditch

- ① Channel Improvements + Pump Station

Losen Slose

- ② Force Main + Pump Station
- ③ Joseph St. Park
- ④ Memorial Middle School
- ⑤ Little Ferry Library+ Municipal Building

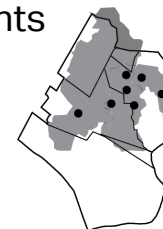
Hackensack River

- ⑥ Riverfront Park

Multiple Drainage Areas

- ⑦ Streetside Green Infrastructure-Type Improvements

- Project Features
 - Focus Drainage Area
 - Project Area
 - Sub-basin boundaries
 - Municipal boundaries
 - Channels and Waterways
- DIAGRAMS NOT TO SCALE



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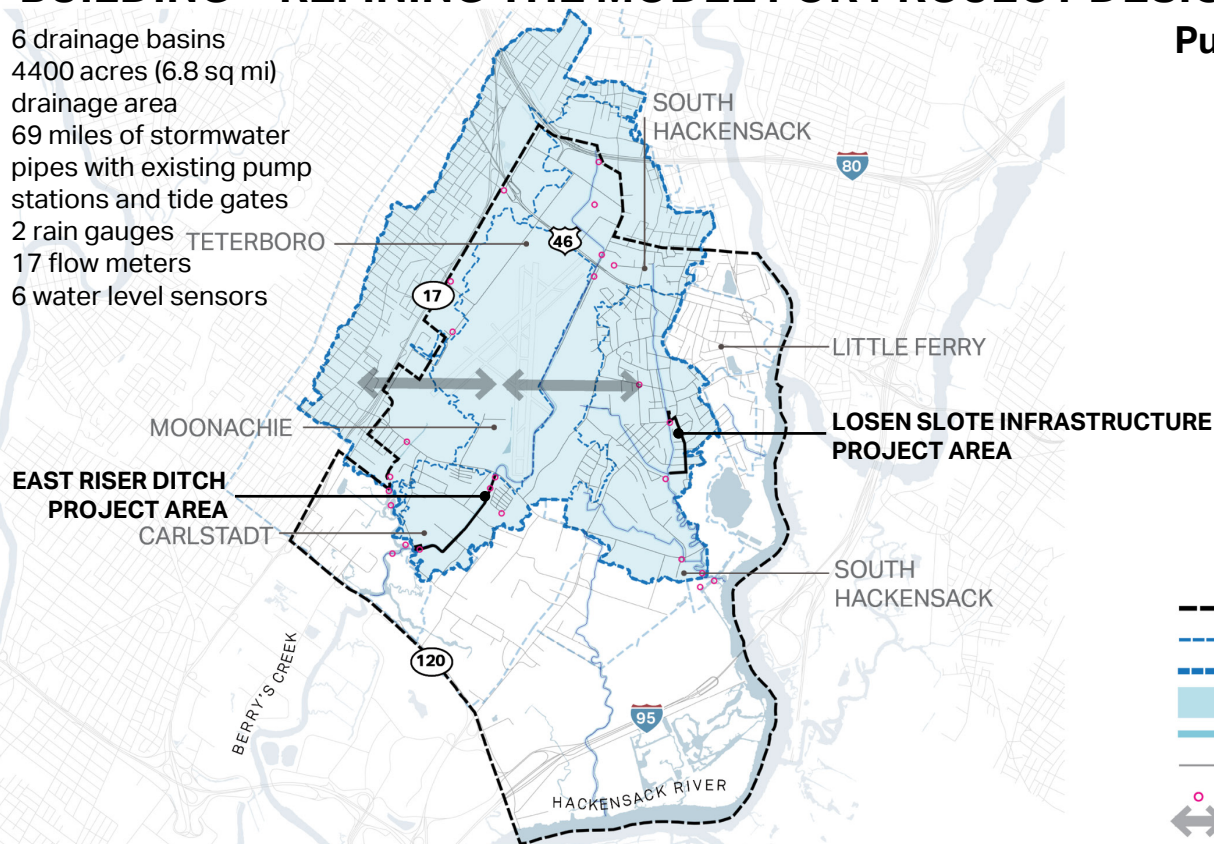
DESIGN PHASE INFRASTRUCTURE

MIKE MURPHY, HDR
DAVID BLAIR, AECOM

INFOWORKS ICM MODEL DESIGN

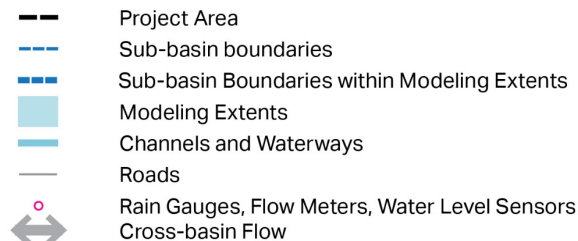
BUILDING + REFINING THE MODEL FOR PROJECT DESIGN

- 6 drainage basins
- 4400 acres (6.8 sq mi) drainage area
- 69 miles of stormwater pipes with existing pump stations and tide gates
- 2 rain gauges
- 17 flow meters
- 6 water level sensors



Purpose

- Comparing existing and proposed conditions WSEL for rainfall events of varying sizes (2-yr to 100-yr)
- Extensive network of stormwater drainage infrastructure
- Cross-basin flow during large flooding events



EAST RISER DITCH FLOOD RISK REDUCTION PUMP STATION + CHANNEL IMPROVEMENTS

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EAST RISER DITCH



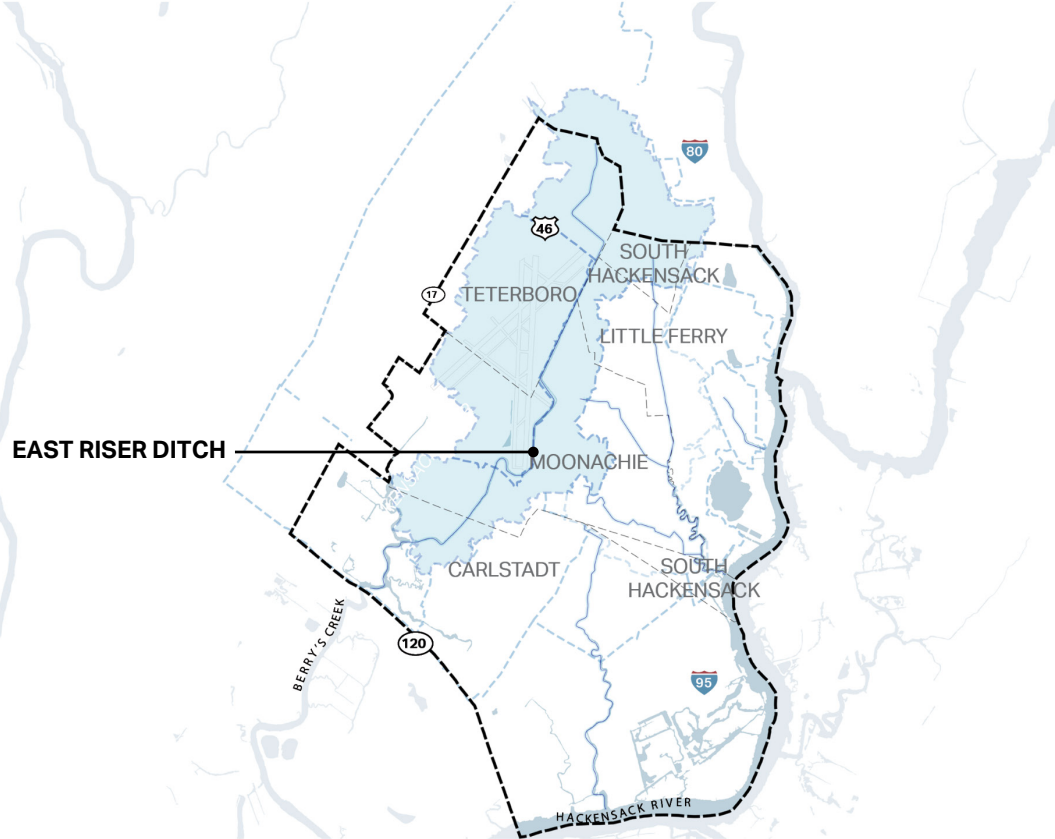
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EAST RISER DITCH

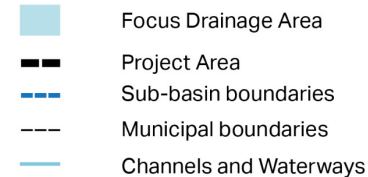
EAST RISER DITCH IMPROVEMENTS

24



Major Challenges

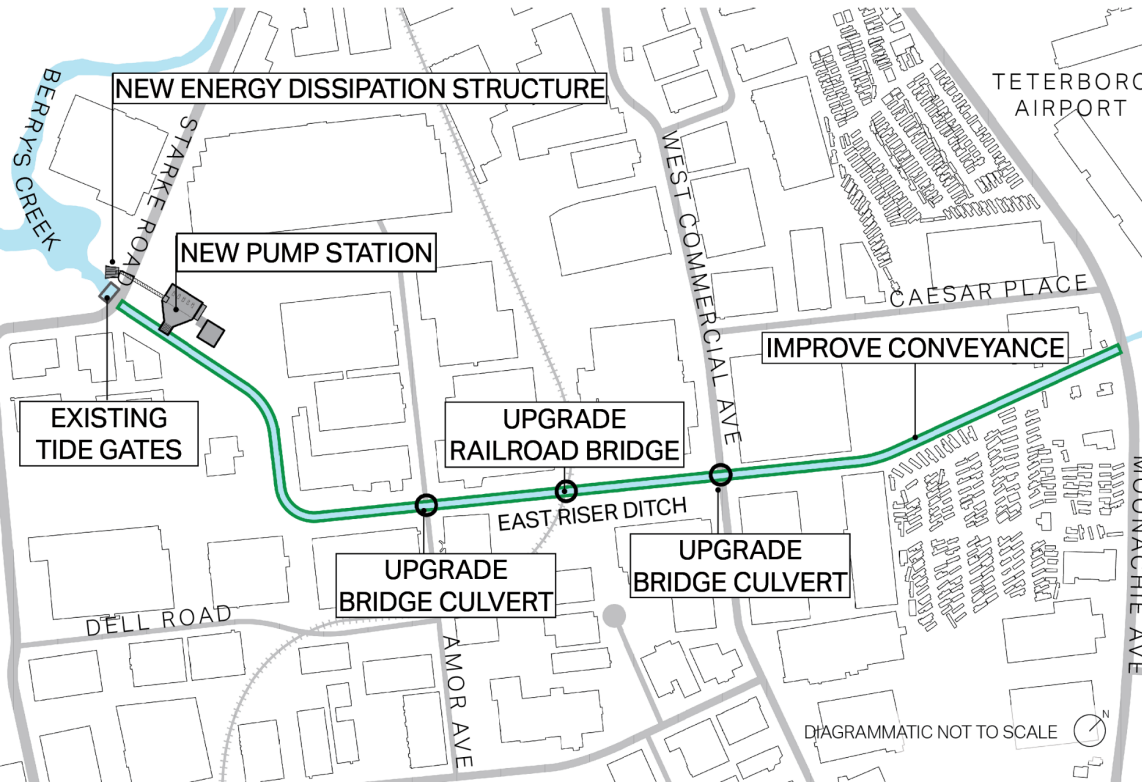
- Over-burdened infrastructure
- Lack of channel capacity
- Water flow regulated by tide gate
- Low-lying elevations with minimal grade changes
- Densely developed project area
- Flooding occurs frequently



EAST RISER DITCH FLOOD RISK REDUCTION

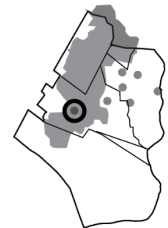
AREA OF IMPROVEMENTS

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Proposed Flood Reduction

- Channel design improves conveyance and reduces flood risk
- Located between Moonachie Ave and Starke Road



DIAGRAMS NOT TO SCALE



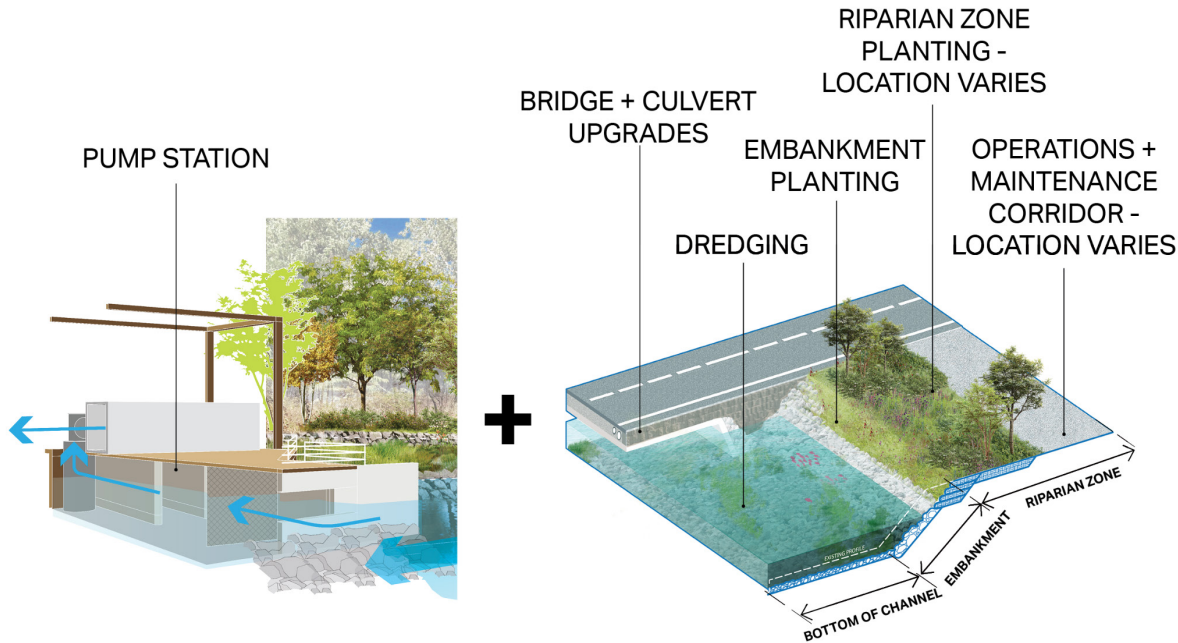
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EAST RISER DITCH FLOOD RISK REDUCTION

PUMP STATION + CHANNEL IMPROVEMENTS

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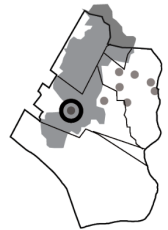


Pump Station

- Mostly underground station with submersible pumps
- Activates and pumps water beyond tide gates

Channel Improvements

- Dredging and embankment stabilization
- Bridge culvert and railroad bridge upgrades
- O&M corridor
- Native planting



DIAGRAMS NOT TO SCALE



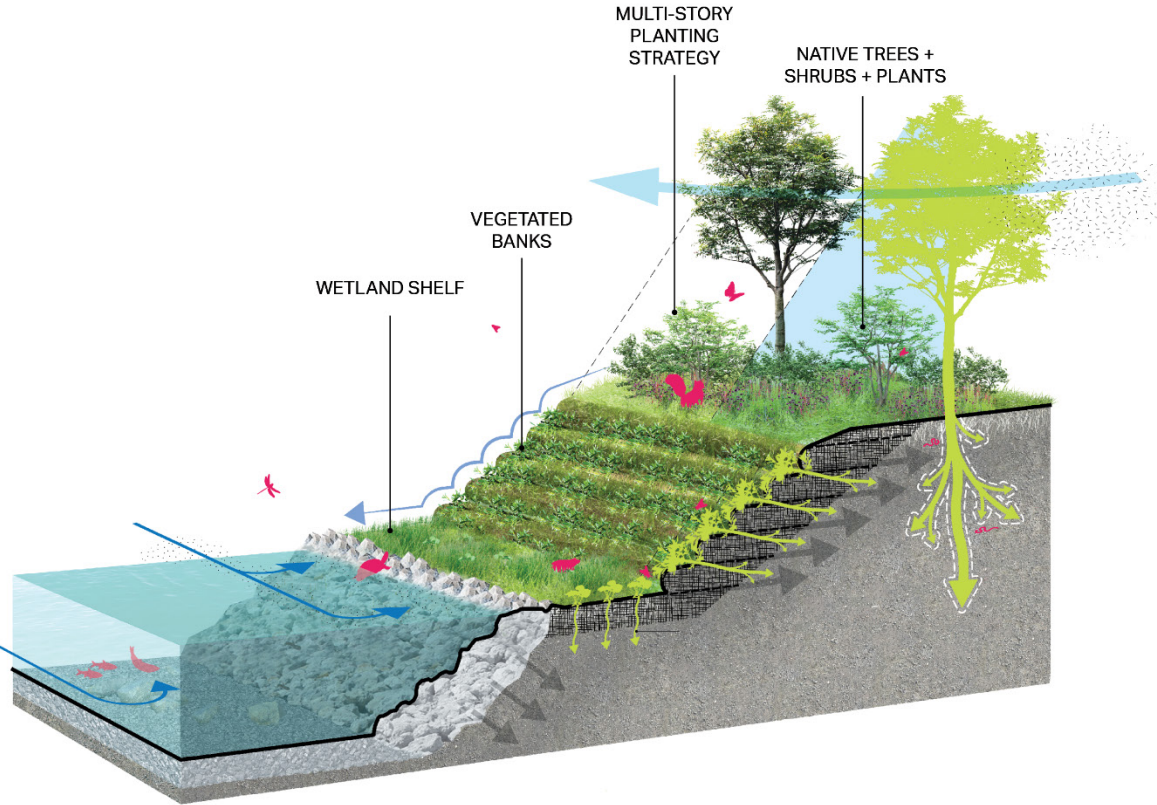
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EAST RISER DITCH ECOLOGICAL BENEFITS

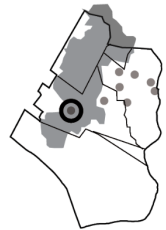
DESIGNED FOR ECOLOGICAL ENHANCEMENT

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Integrated Channel Ecology

- Native planting
- Biodiversity and improved air quality
- Cooler micro-climate
- Stormwater filtration reduces sediment loads
- Riparian and wetland plantings



LOSEN SLOTE

FORCE MAIN + PUMP STATION

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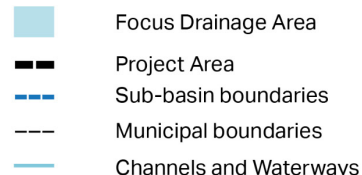
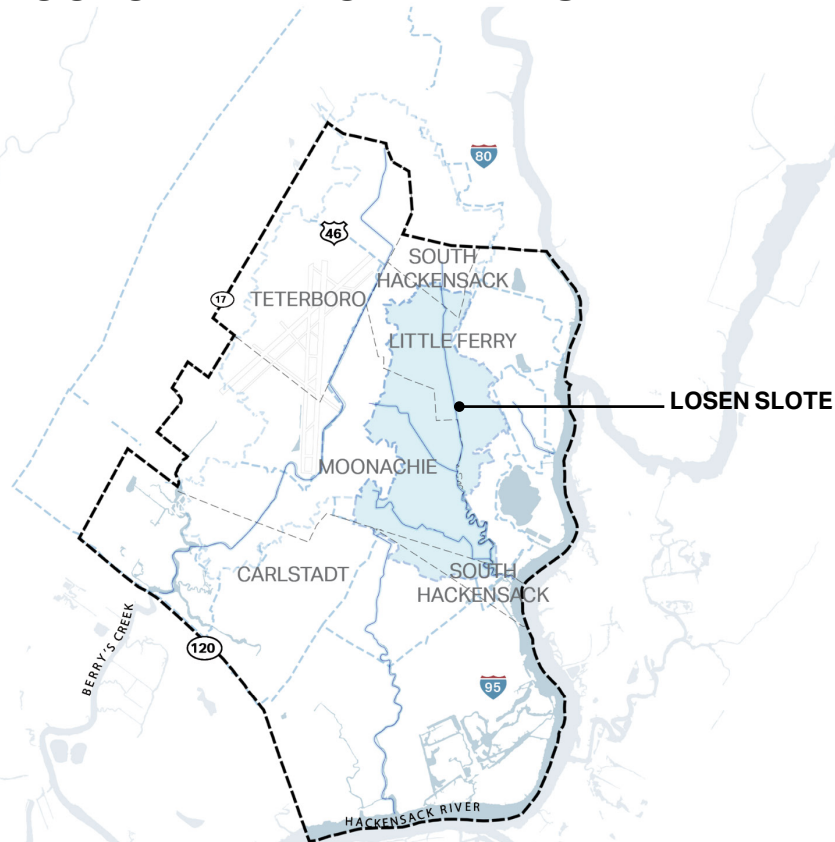
LOSEN SLOTE FLOOD RISK REDUCTION + BENEFITS

INFRASTRUCTURE IMPROVEMENTS

30

Major Challenges

- Losen Slote drainage bottleneck results in frequent flooding
- Limited capacity in existing channel + pipe network
- Densely developed area



DIAGRAMS NOT TO SCALE



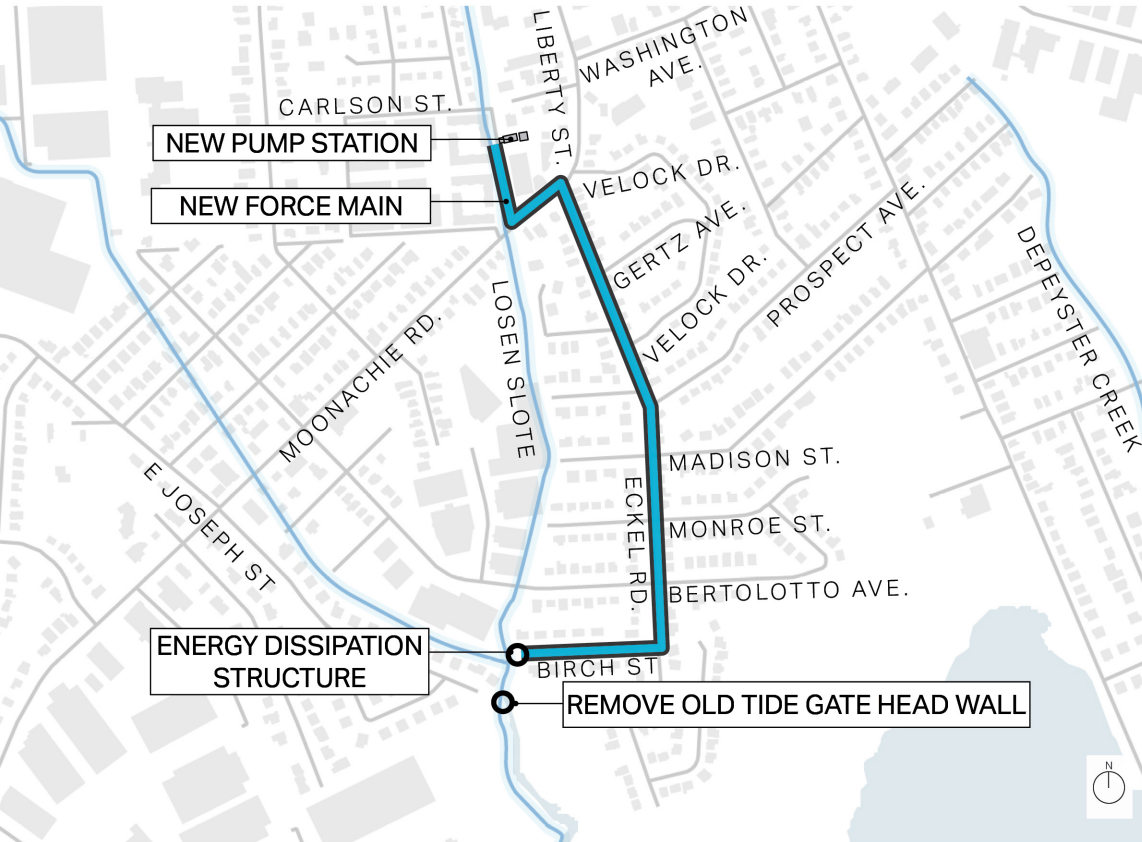
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LOSEN SLOTE FLOOD RISK REDUCTION

AREA OF FORCE MAIN + PUMP STATION

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Northern Pump Station

- Located near Lorena St. and Liberty St.

Force Main to improve flow capacity

- The Force Main runs ~2,900 feet
- Located within Liberty St., Eckel Rd. and Birch St.

Existing Abandoned Tide Gate

- Existing Abandoned Tide Gate to be removed
- Channel restored



DIAGRAMS NOT TO SCALE



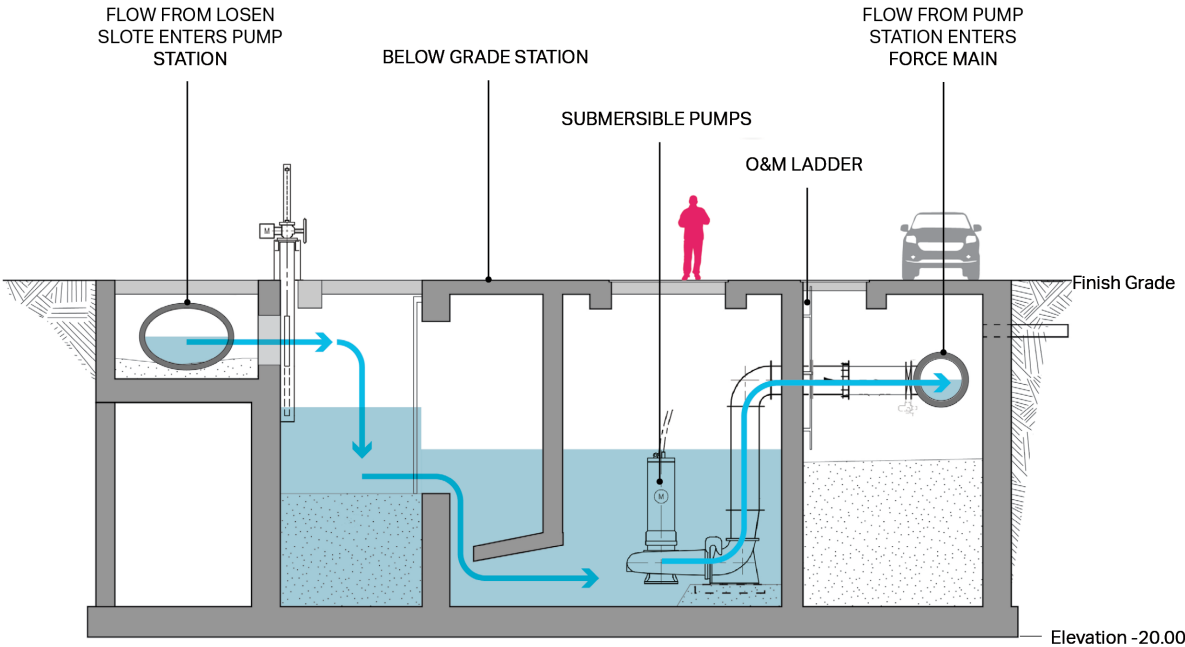
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LOSEN SLOTE PUMP STATION FLOOD RISK REDUCTION

REDIRECTS FLOW OUT OF UNDERGROUND LOSEN SLOTE CONDUIT

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CROSS SECTION

Proposed Flood Reduction

- Pump Station capacity is 50 cfs
- Activates and pump into force main when water elevation in existing conduit pipe is ~75% of pipe diameter



DIAGRAMS NOT TO SCALE



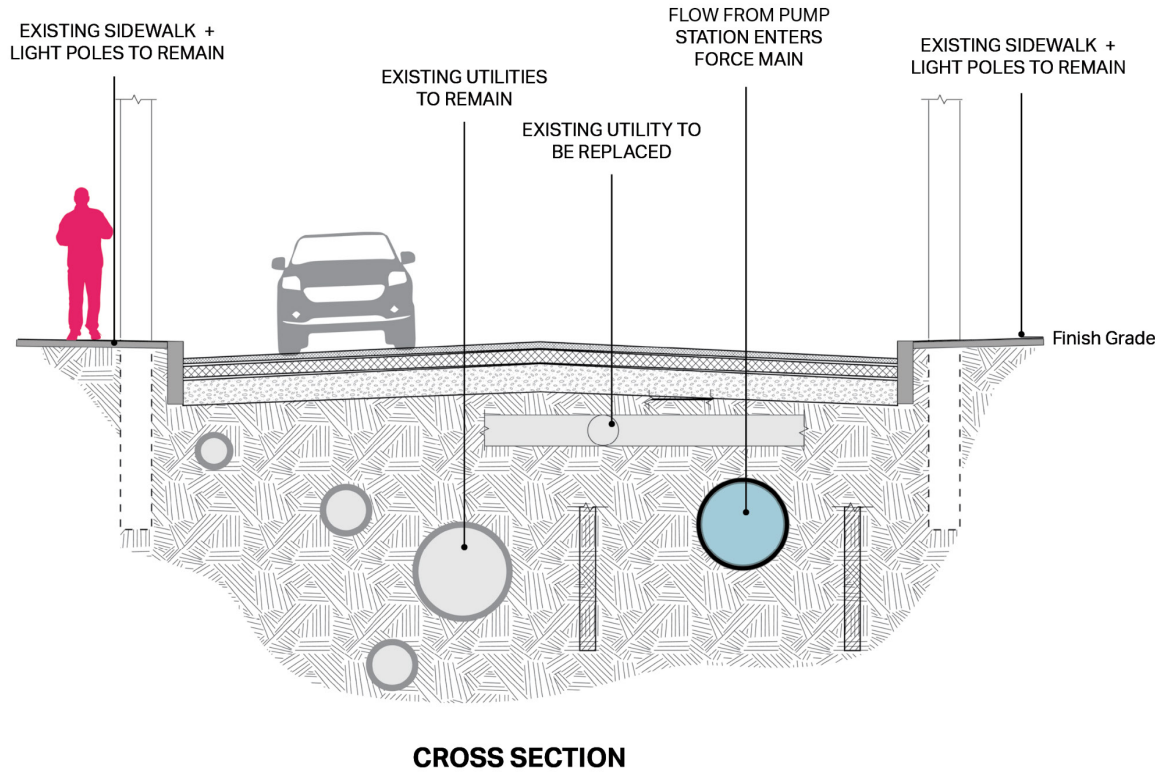
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LOSEN SLOTE FORCE MAIN FLOOD RISK REDUCTION

INCREASE STORMWATER CONVEYANCE

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Proposed Flood Reduction

- Force main inlet connected to pump station
- Large 36-in diameter pipeline
- Energy dissipation at outflow into Losen Sote



DIAGRAMS NOT TO SCALE

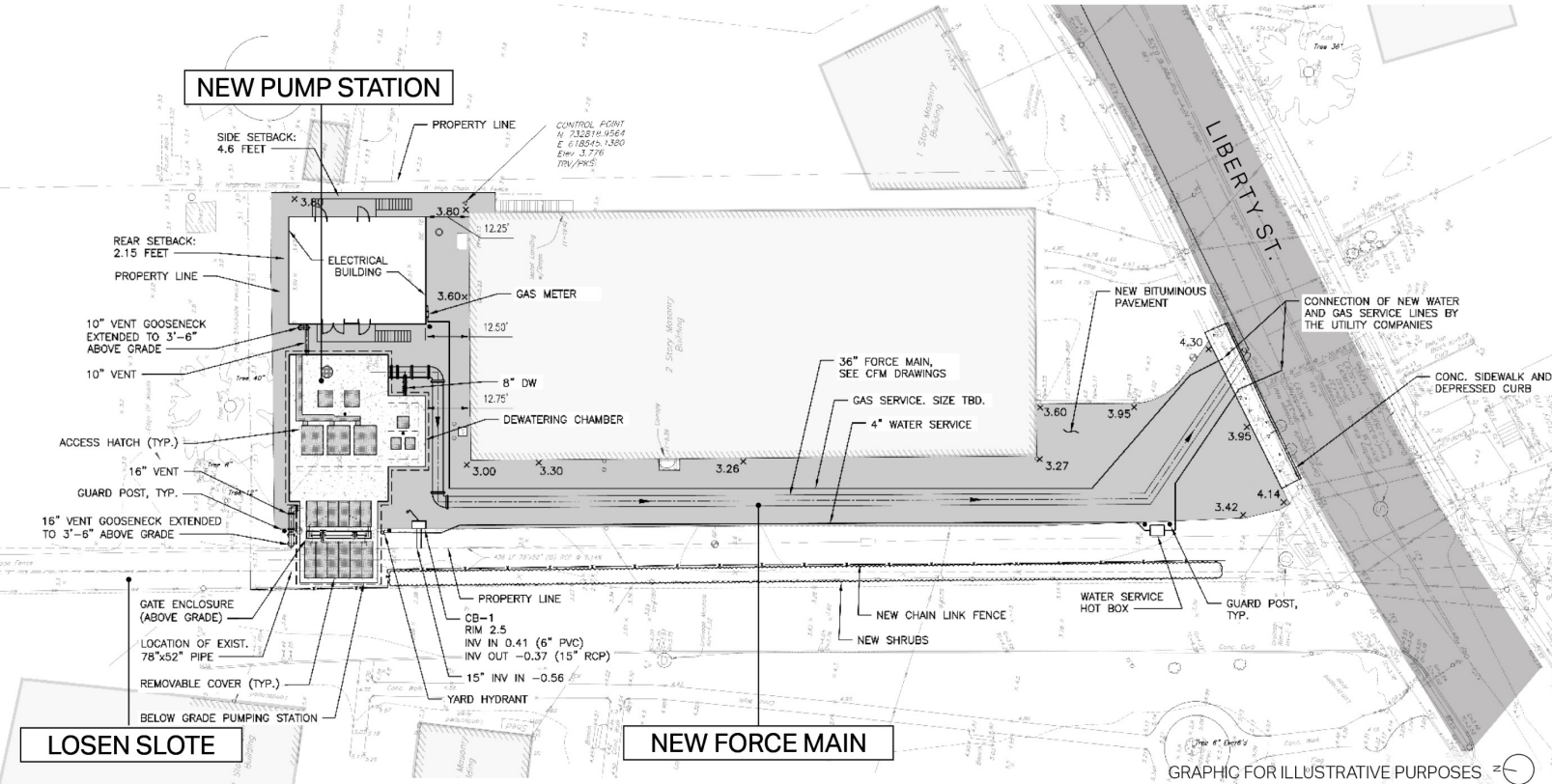


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LOSEN SLOTE FORCE MAIN FLOOD RISK REDUCTION PUMP STATION SITE PLAN

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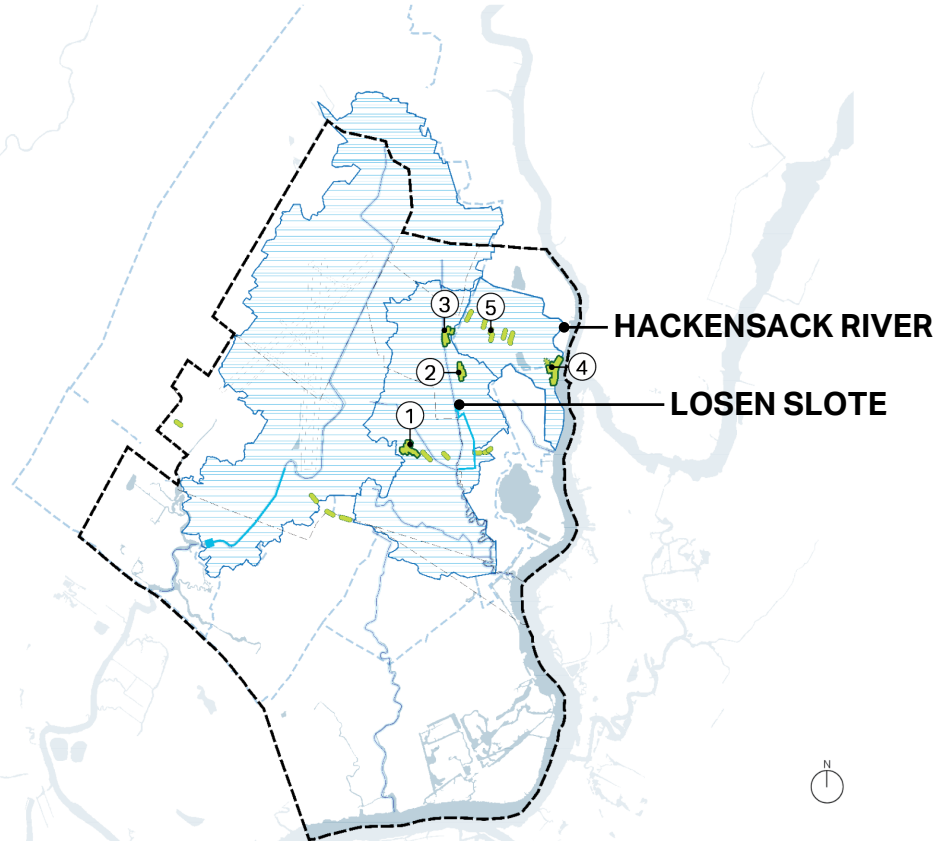
DESIGN PHASE LANDSCAPE + PUBLIC REALM

ANNA HOCHHALTER, AECOM

LANDSCAPE + PUBLIC REALM

UNDER CONSIDERATION WITH FLOOD-RISK REDUCTION FEATURES

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Losen Sote







- ① Joseph St. Park
- ② Memorial Middle School
- ③ Little Ferry Library+ Municipal Building

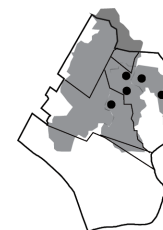
Hackensack River

- ④ Riverfront Park

Multiple Drainage Areas

- ⑤ Streetside Green Infrastructure-Type Improvements

-  Project Features
 -  Focus Drainage Area
 -  Project Area
 -  Sub-basin boundaries
 -  Municipal boundaries
 -  Channels and Waterways
- DIAGRAMS NOT TO SCALE



LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

MEMORIAL MIDDLE SCHOOL

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MEMORIAL MIDDLE SCHOOL



LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

MEMORIAL MIDDLE SCHOOL CONCEPT

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Existing Conditions

- School yard
- Memorial
- Existing trees
- Lawn

Proposed Project Improvements

- Existing trees and memorial to remain
- Native planting
- Learning gardens
- Green infrastructure-type improvements



LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

LITTLE FERRY LIBRARY

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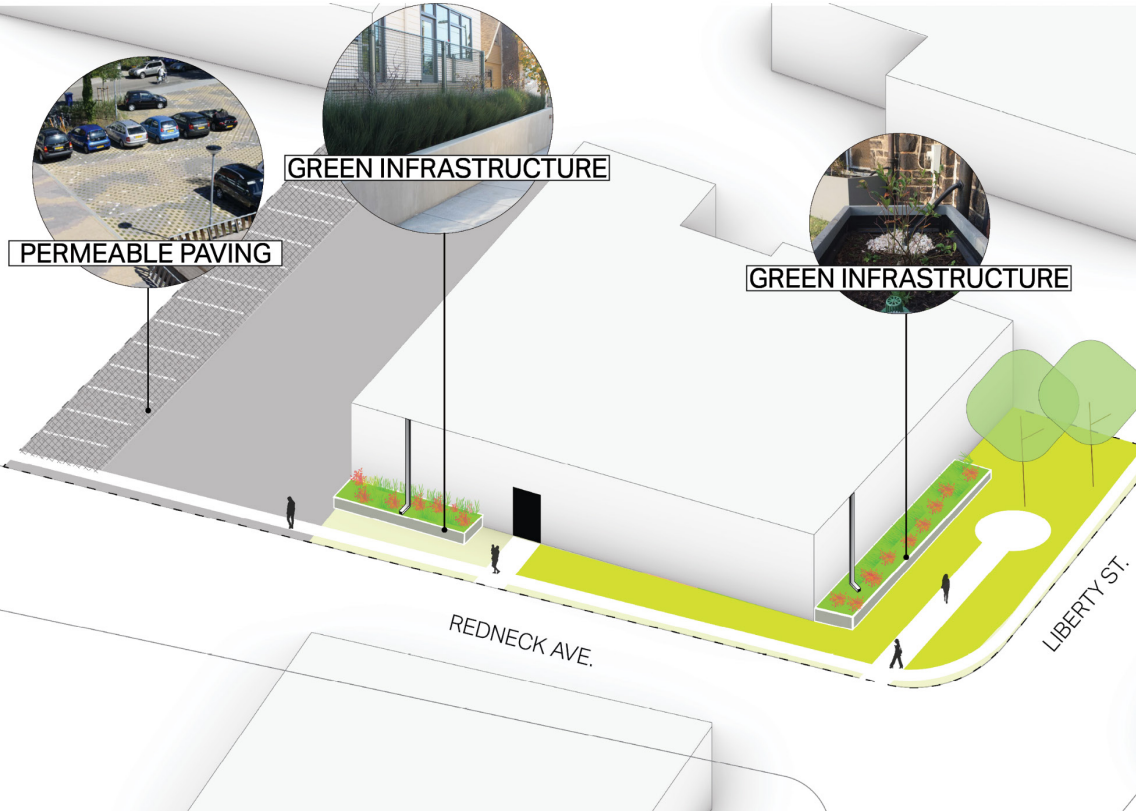
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LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

LITTLE FERRY LIBRARY CONCEPT

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Existing Site

- Public Library
- Asphalt parking
- Ornamental shrubs

Proposed Project Improvements

- Native planting
- Green infrastructure-type improvements
- Permeable paving



LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

LITTLE FERRY MUNICIPAL BUILDING

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LITTLE FERRY MUNICIPAL BUILDING



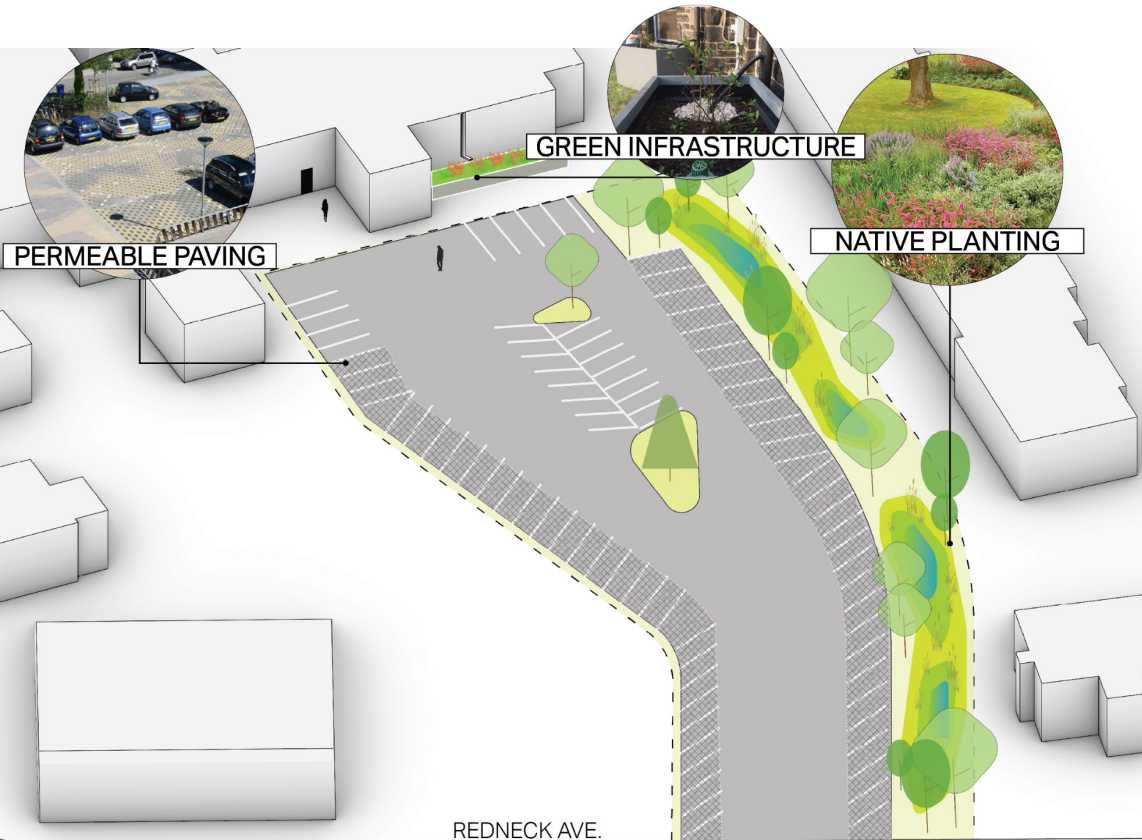
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LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

LITTLE FERRY MUNICIPAL BUILDING

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Existing Site

- Borough Hall and Police Department
- Asphalt parking
- Parking landscape islands

Proposed Project Improvements

- Native planting
- Green infrastructure-type improvements
- Permeable paving



LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

JOSEPH ST. PARK

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LOSEN SLOTE COMMUNITY + ECOLOGICAL BENEFITS

JOSEPH ST. PARK CONCEPT

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Existing Site

- Civic Center + Senior Center
- Sports courts
- Playground equipment
- Pavilion

Proposed Project Improvements

- Native planting
- Green infrastructure-type improvements
- Permeable paving



HACKENSACK RIVER COMMUNITY BENEFITS

COMMUNITY + ECOLOGICAL BENEFITS

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A photograph of a riverbank with a rocky shore in the foreground, a body of water in the middle ground, and a dense line of green trees and vegetation in the background. Several wooden pilings are visible in the water, and a small structure is partially visible on the right side. The text "RIVERFRONT PARK" is overlaid in white, bold, sans-serif font.

RIVERFRONT PARK

HACKENSACK RIVER COMMUNITY BENEFITS

RIVERFRONT PARK CONCEPT

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Existing Site

- Private waterfront
- Private boat access + storage
- Church development in-progress

Proposed Project Improvements

- New Park (park boundary currently under consideration)
- Ecological enhancement
- Public waterfront access



PROJECT-WIDE COMMUNITY + ECOLOGICAL BENEFITS

STREETSIDE GREEN INFRASTRUCTURE-TYPE IMPROVEMENTS

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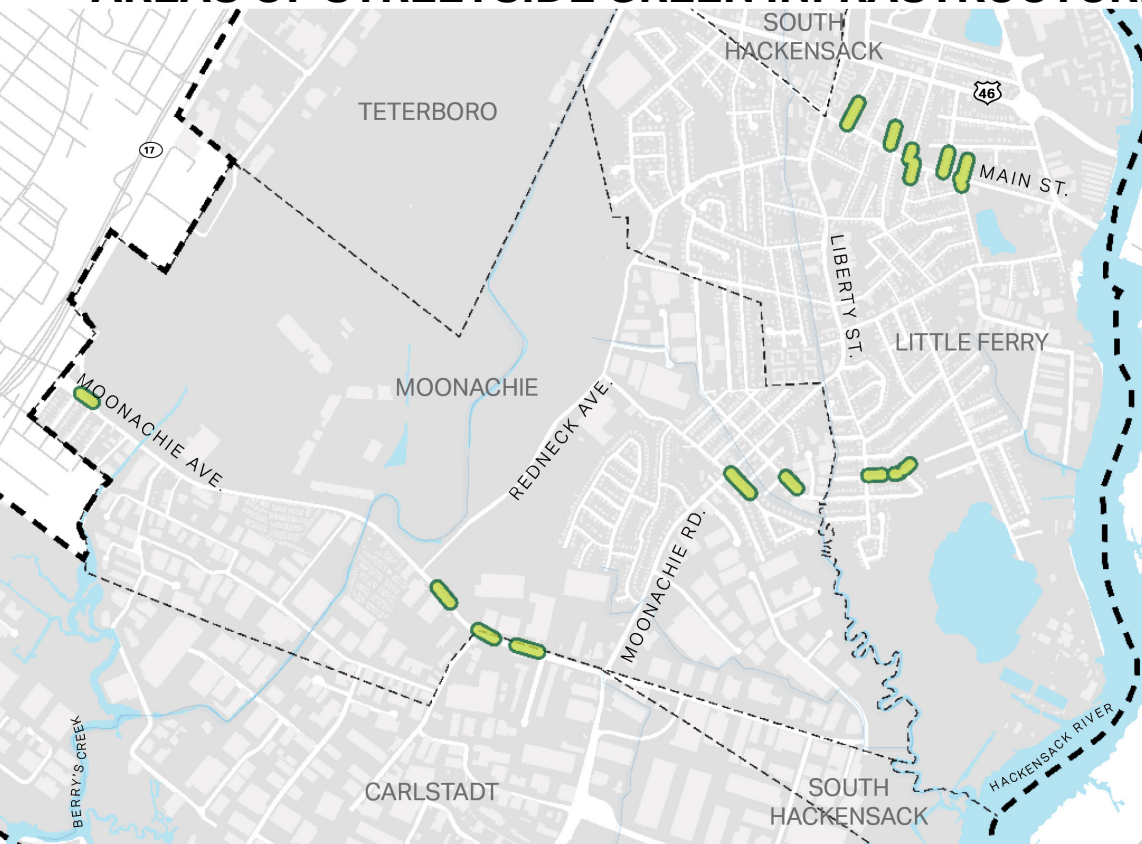
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PROJECT-WIDE COMMUNITY + ECOLOGICAL BENEFITS

AREAS OF STREETSIDE GREEN INFRASTRUCTURE-TYPE IMPROVEMENTS

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Improvements being considered

- ~20 systems being assessed
- Filtering nearly roadway runoff
- Designed to capture stormwater and then slowly release into grey infrastructure, reducing peak flow in the storm sewer mains
- Located within public right-of-way
- Native soils have poor infiltration capacity and high groundwater limits application in some areas



DIAGRAMS NOT TO SCALE



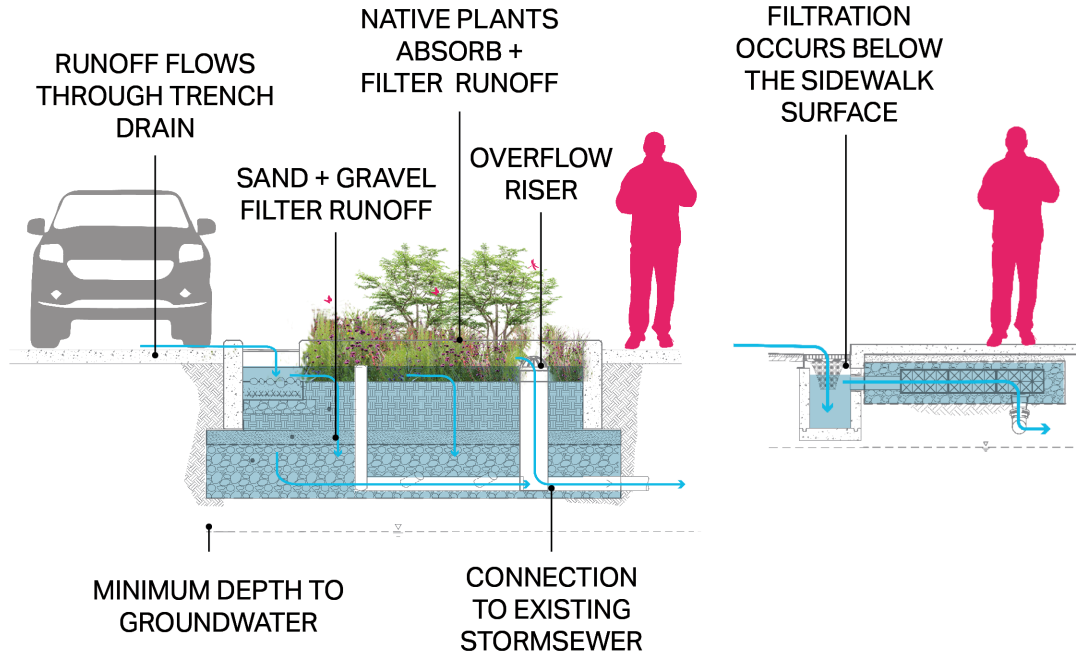
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PROJECT-WIDE COMMUNITY + ECOLOGICAL BENEFITS

STREETSIDE GREEN INFRASTRUCTURE-TYPE IMPROVEMENTS FEATURES

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TYPICAL SECTIONS

Improvements being considered

- Treats smaller, more frequent storms
- 4 primary types:
 - Bioretention basins*
 - Bioretention planters*
 - Storage Trenches
 - Tree Trenches
- Some types include vegetation or trees, while others are below the surface.

*Alternative designs being considered where shallow groundwater is present. Final designs are not yet confirmed.



DIAGRAMS NOT TO SCALE



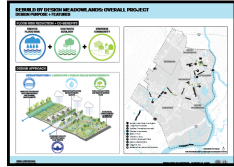
OPEN HOUSE BREAKOUT SESSION

ANNA HOCHHALTER, AECOM

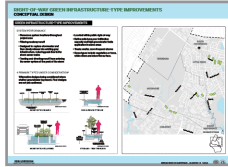
OPEN HOUSE SESSION OVERVIEW

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OVERALL PROJECT INFO



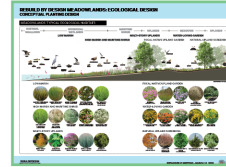
GREY INFRASTRUCTURE



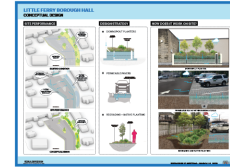
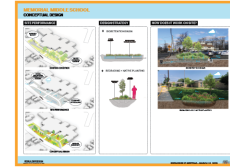
RIGHT-OF-WAY GREEN INFRASTRUCTURE



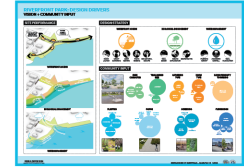
OVERALL ECOLOGICAL DESIGN STRATEGY



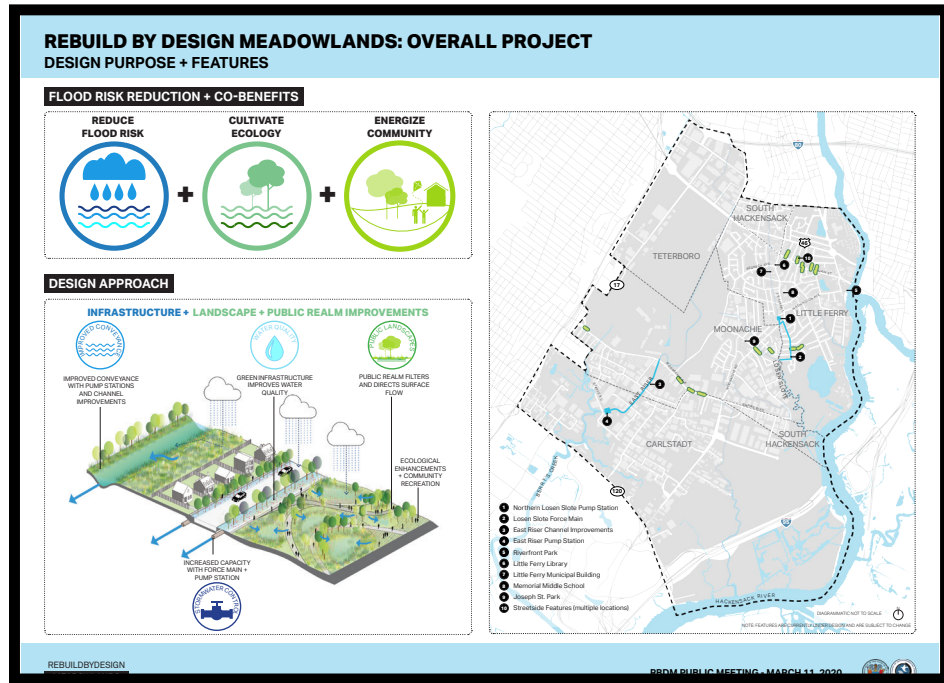
MUNICIPAL SITES



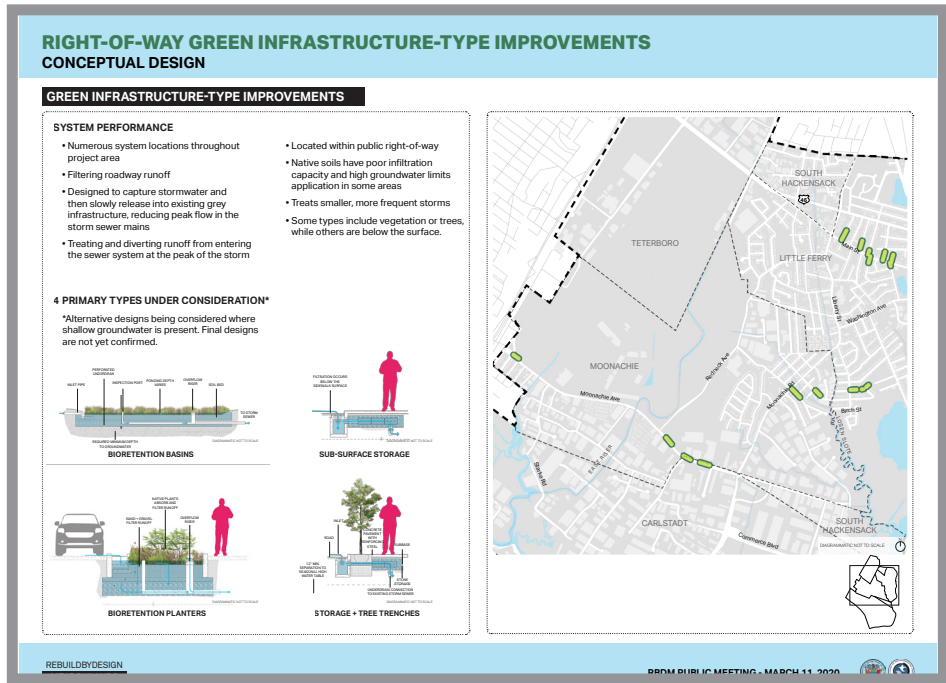
RIVERFRONT PARK



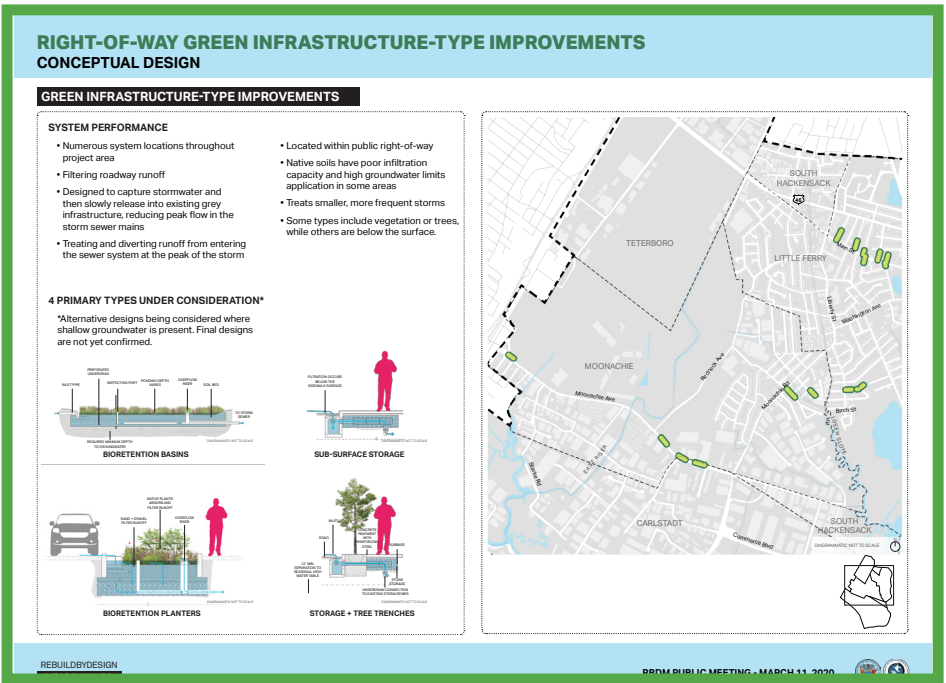
OVERALL
PROJECT INFO



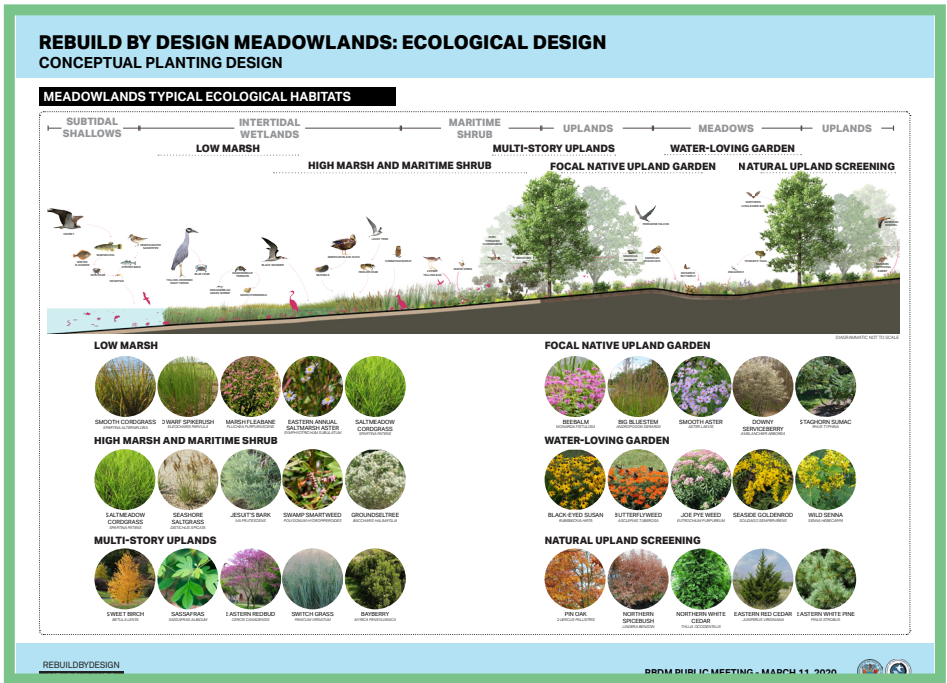
GREY
INFRASTRUCTURE



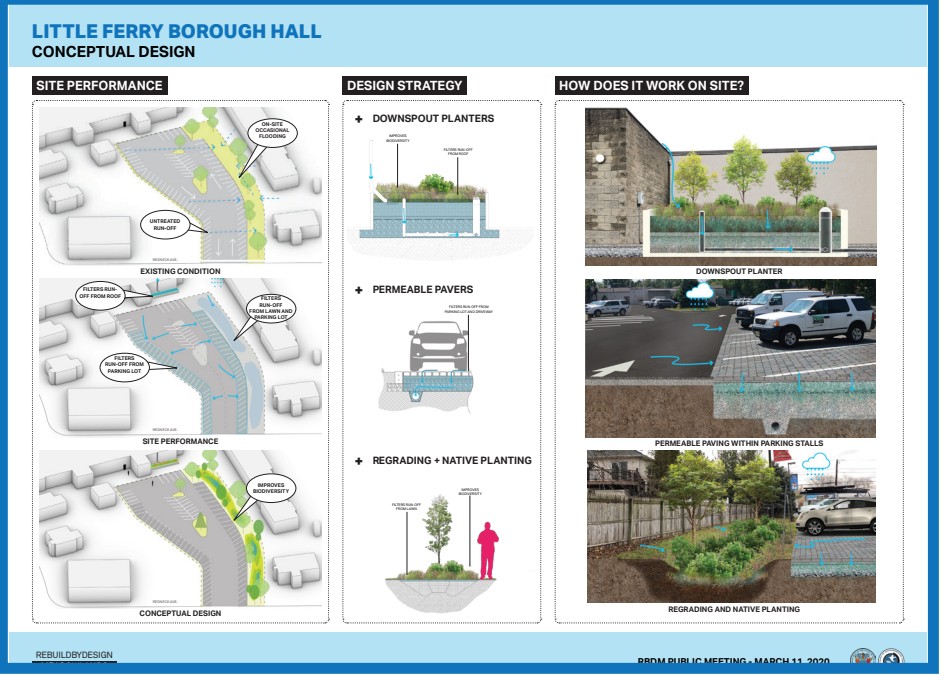
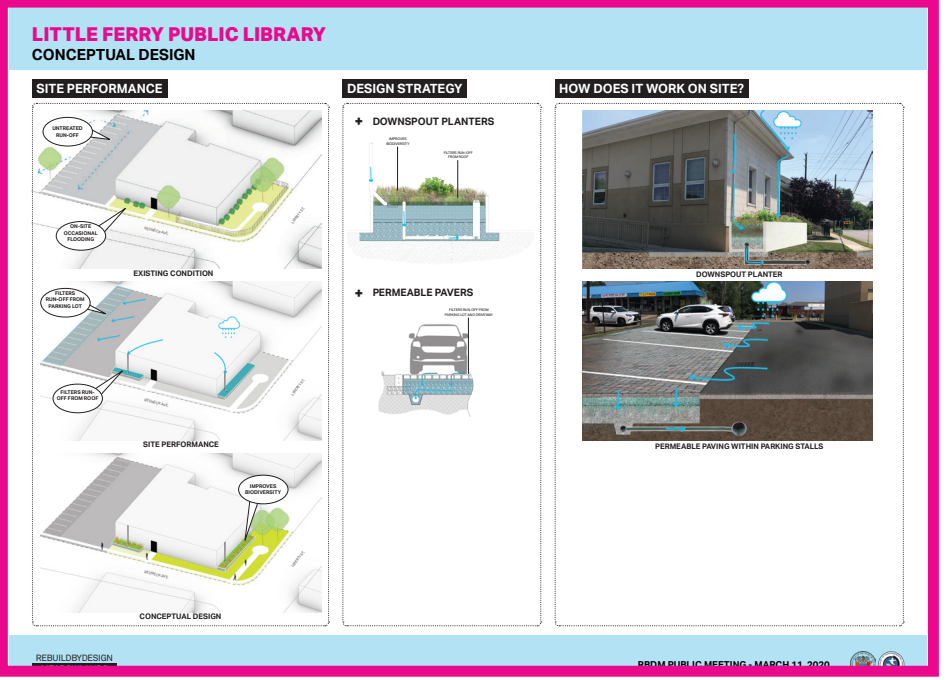
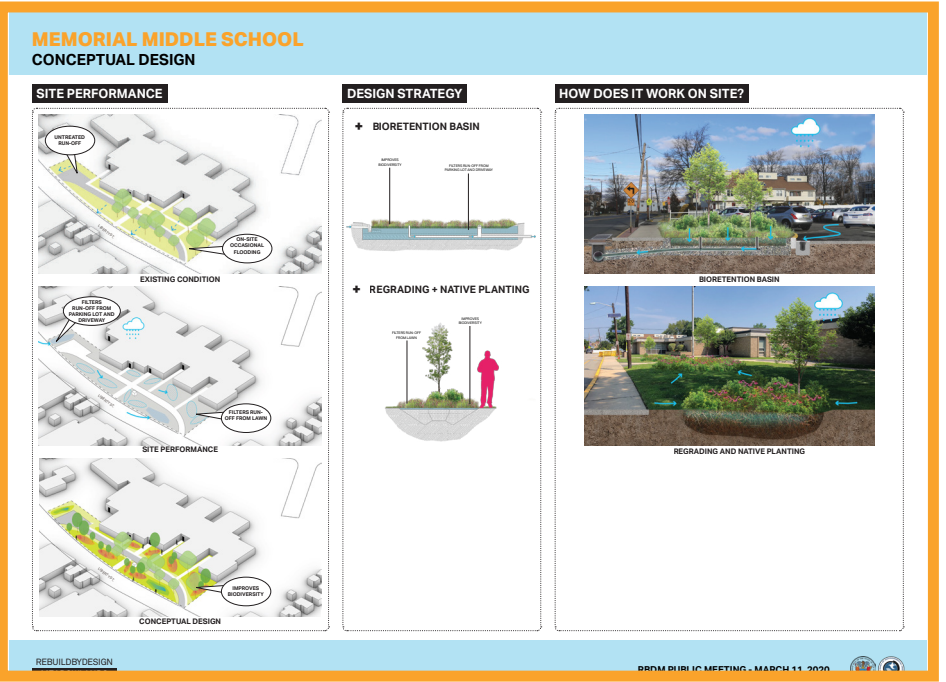
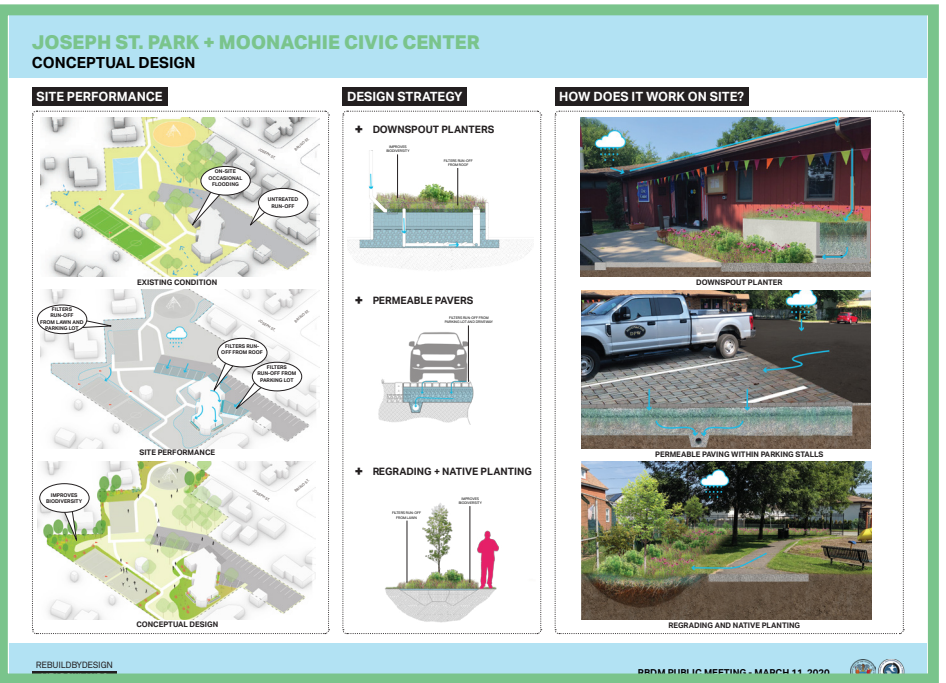
RIGHT-OF-WAY
GREEN
INFRASTRUCTURE



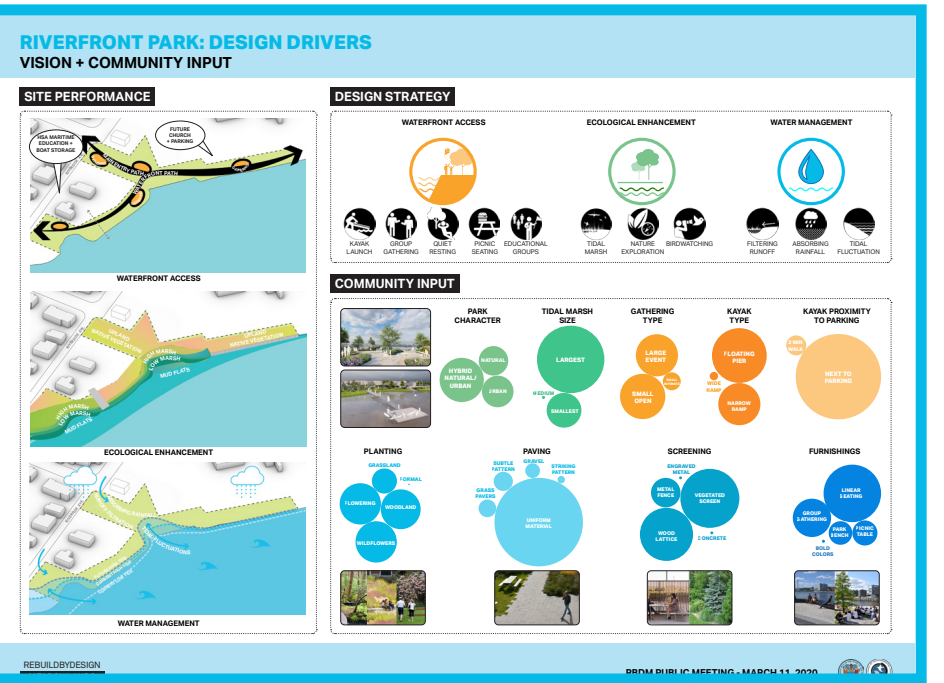
OVERALL
ECOLOGICAL
DESIGN STRATEGY



MUNICIPAL
SITES



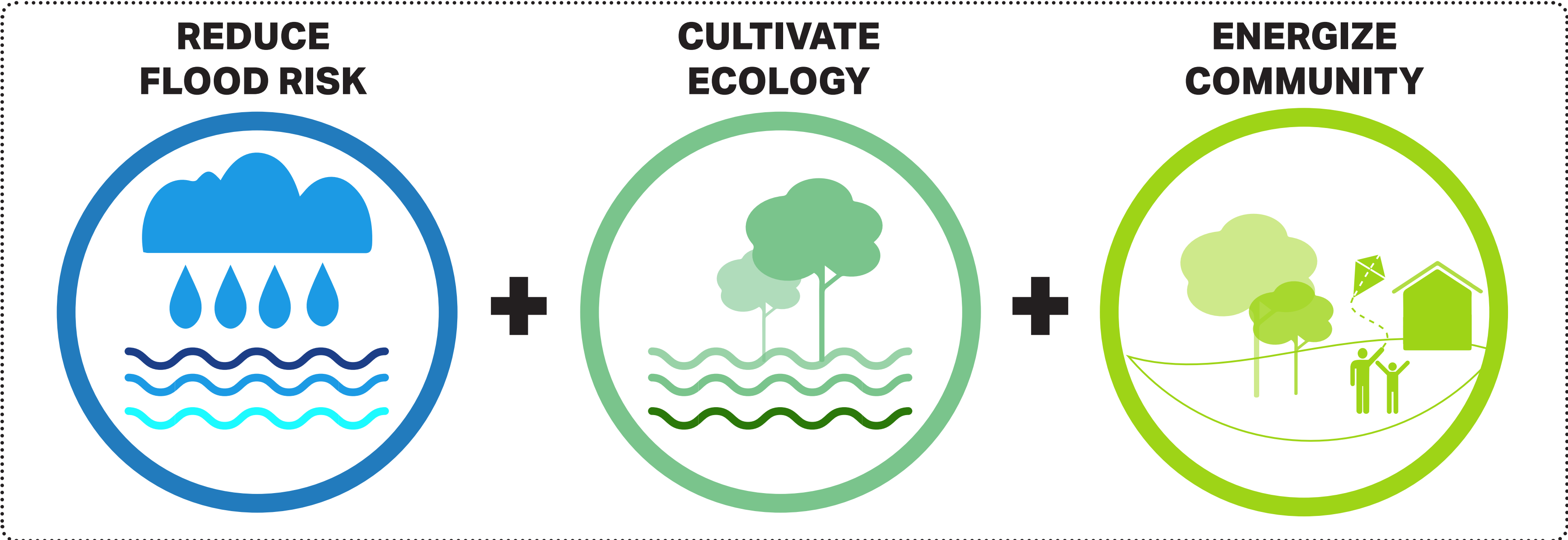
RIVERFRONT
PARK



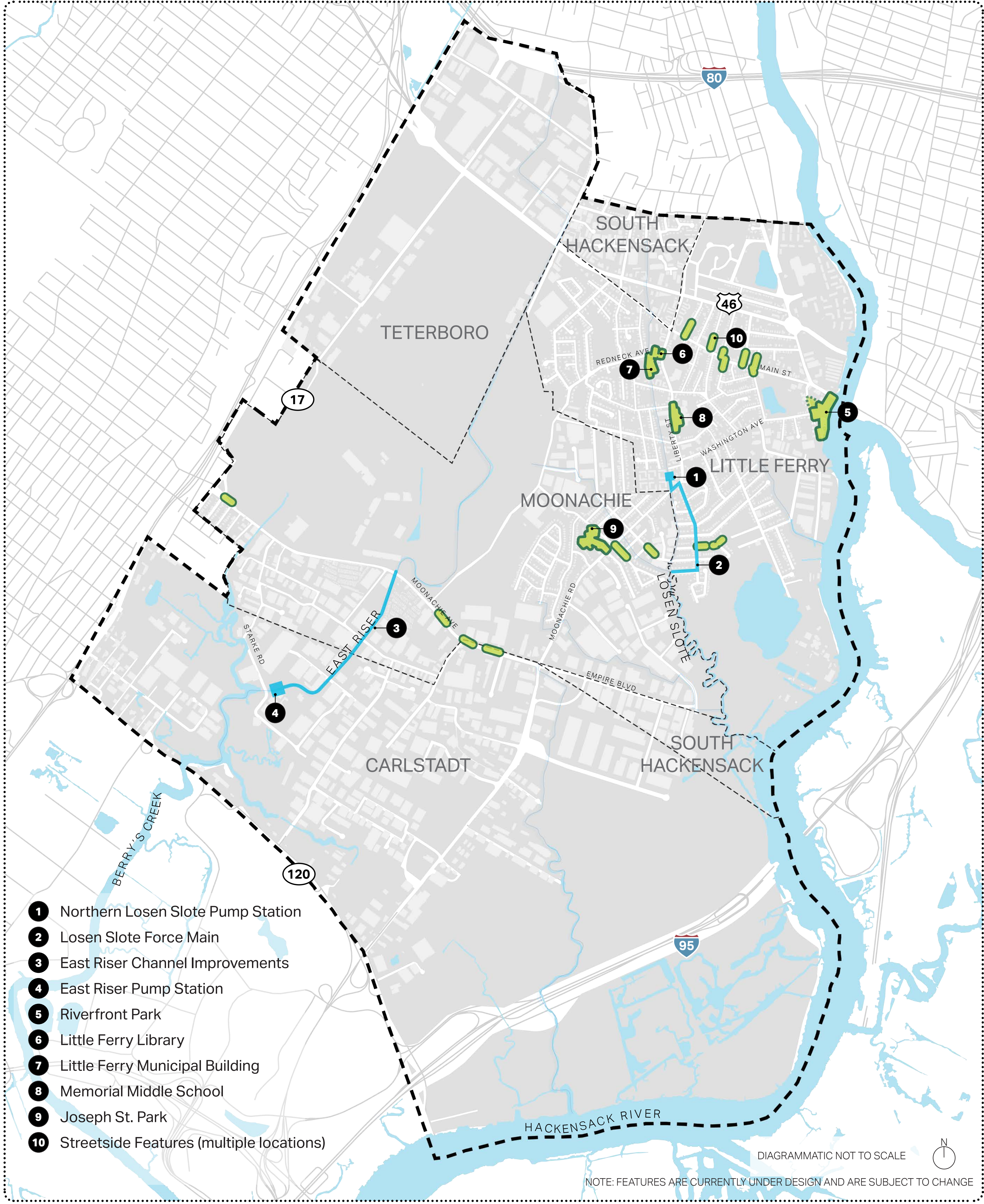
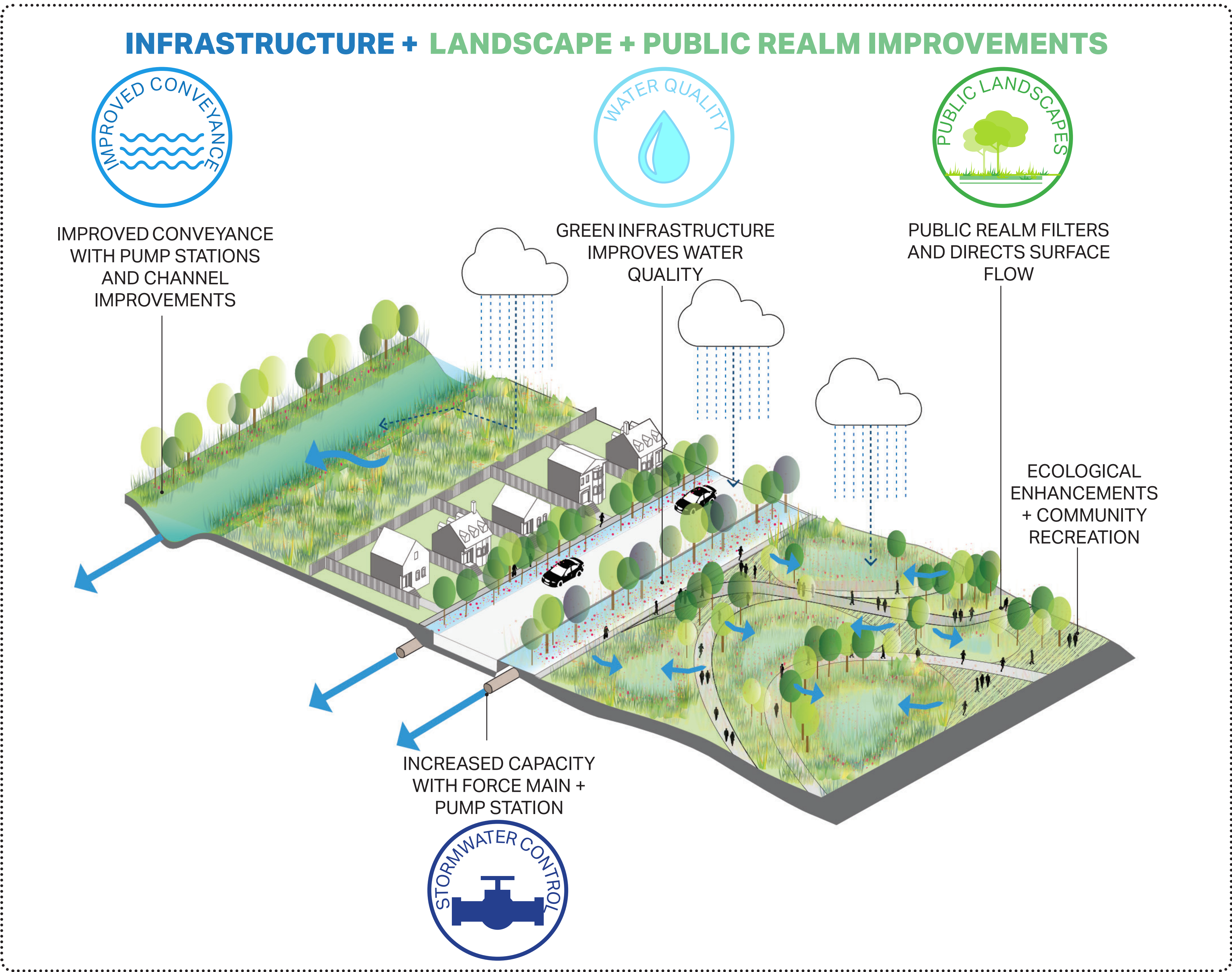
REBUILD BY DESIGN MEADOWLANDS: OVERALL PROJECT

DESIGN PURPOSE + FEATURES

FLOOD RISK REDUCTION + CO-BENEFITS



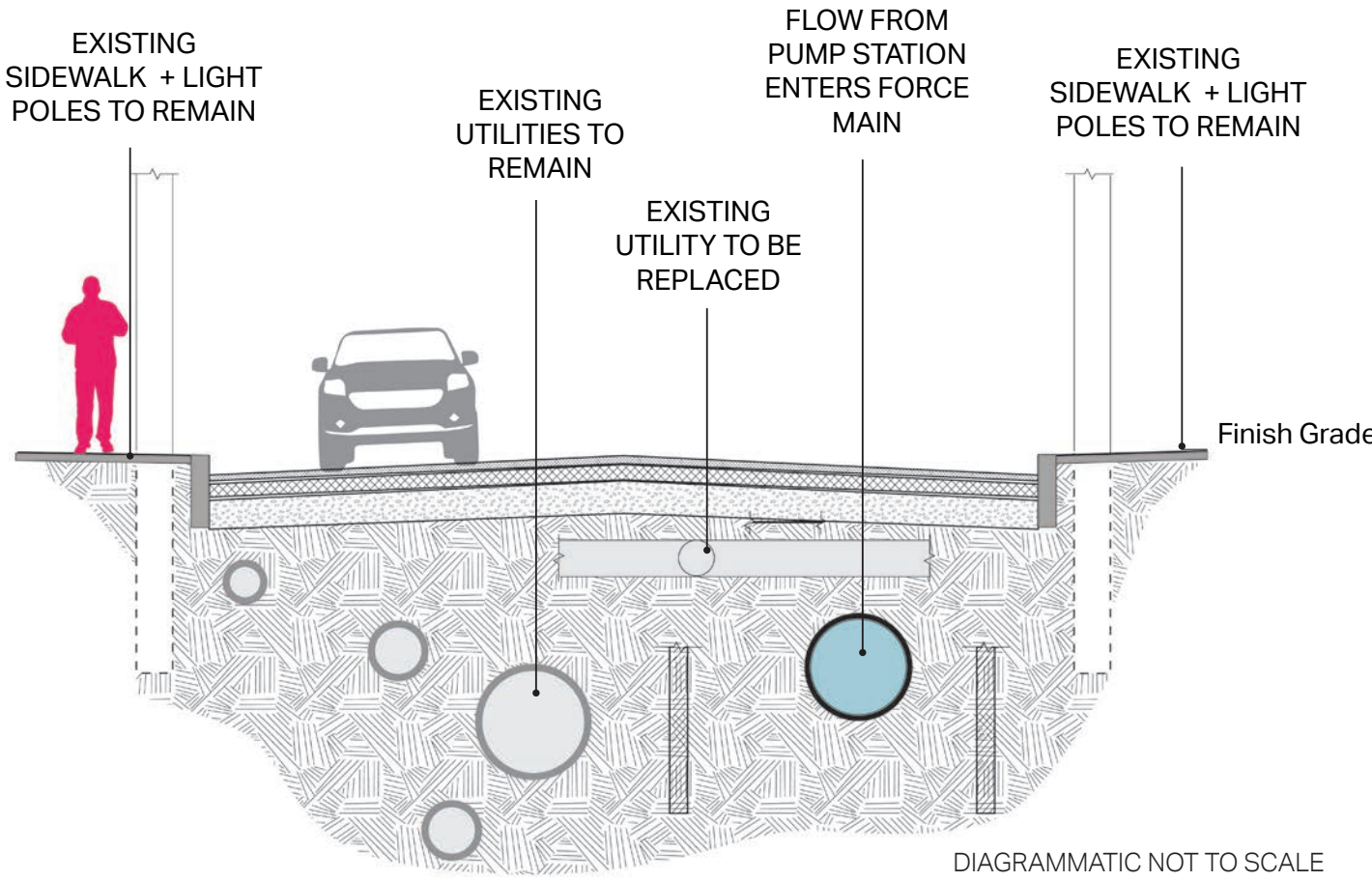
DESIGN APPROACH



LOSEN SLOTE

LOSEN SLOTE
FORCE MAIN

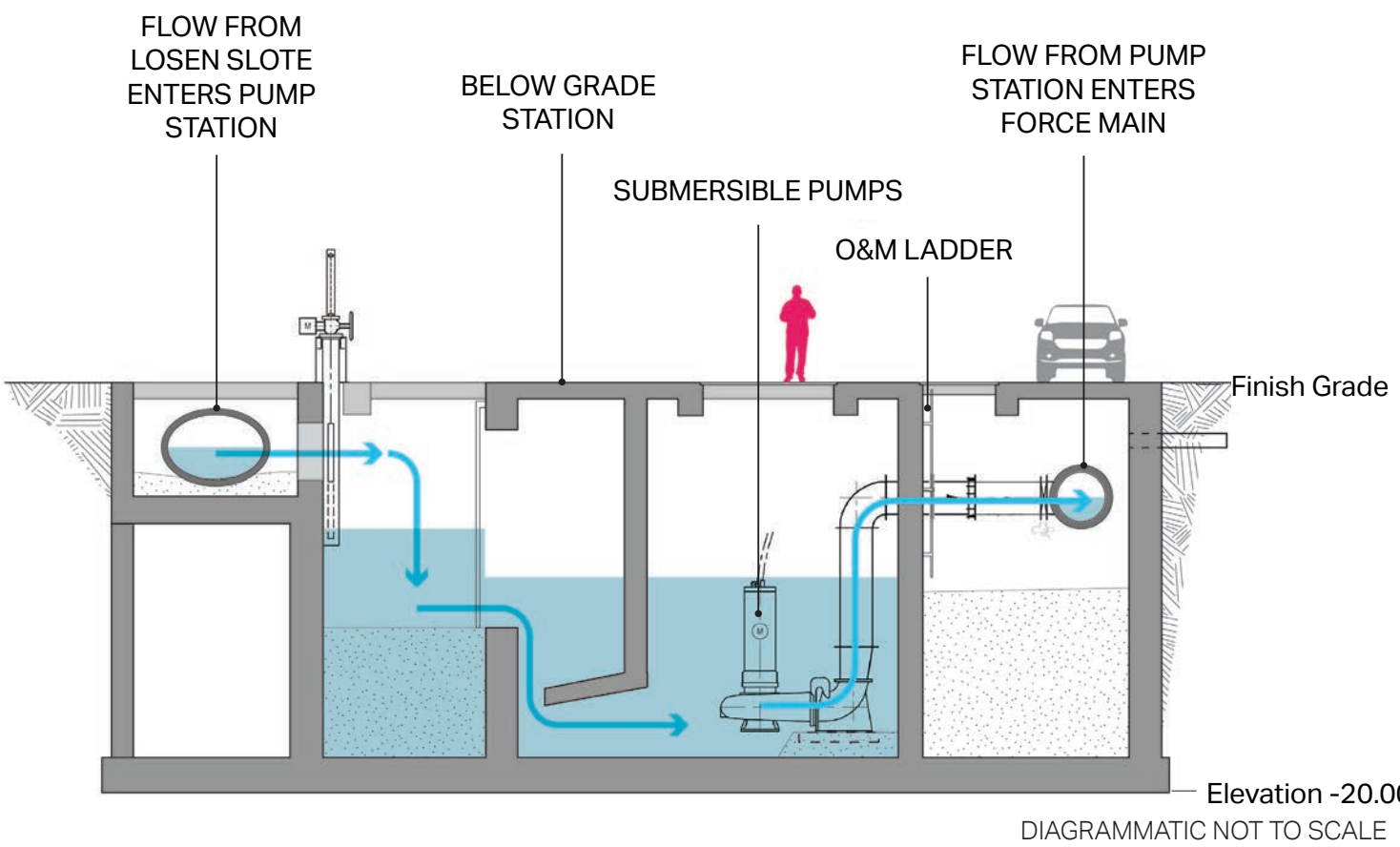
- The Force Main runs ~2,900 feet
- Bypasses a bottleneck in the stormwater flow within Losen Srote drainage area
- Discharges into open channel at Birch St.



LOSEN SLOTE FORCE MAIN

NORTHERN LOSEN SLOTE
PUMP STATION

- Draws stormwater out of Losen Srote and into a new force main
- Bypasses majority of existing Losen Srote below-grade conduit

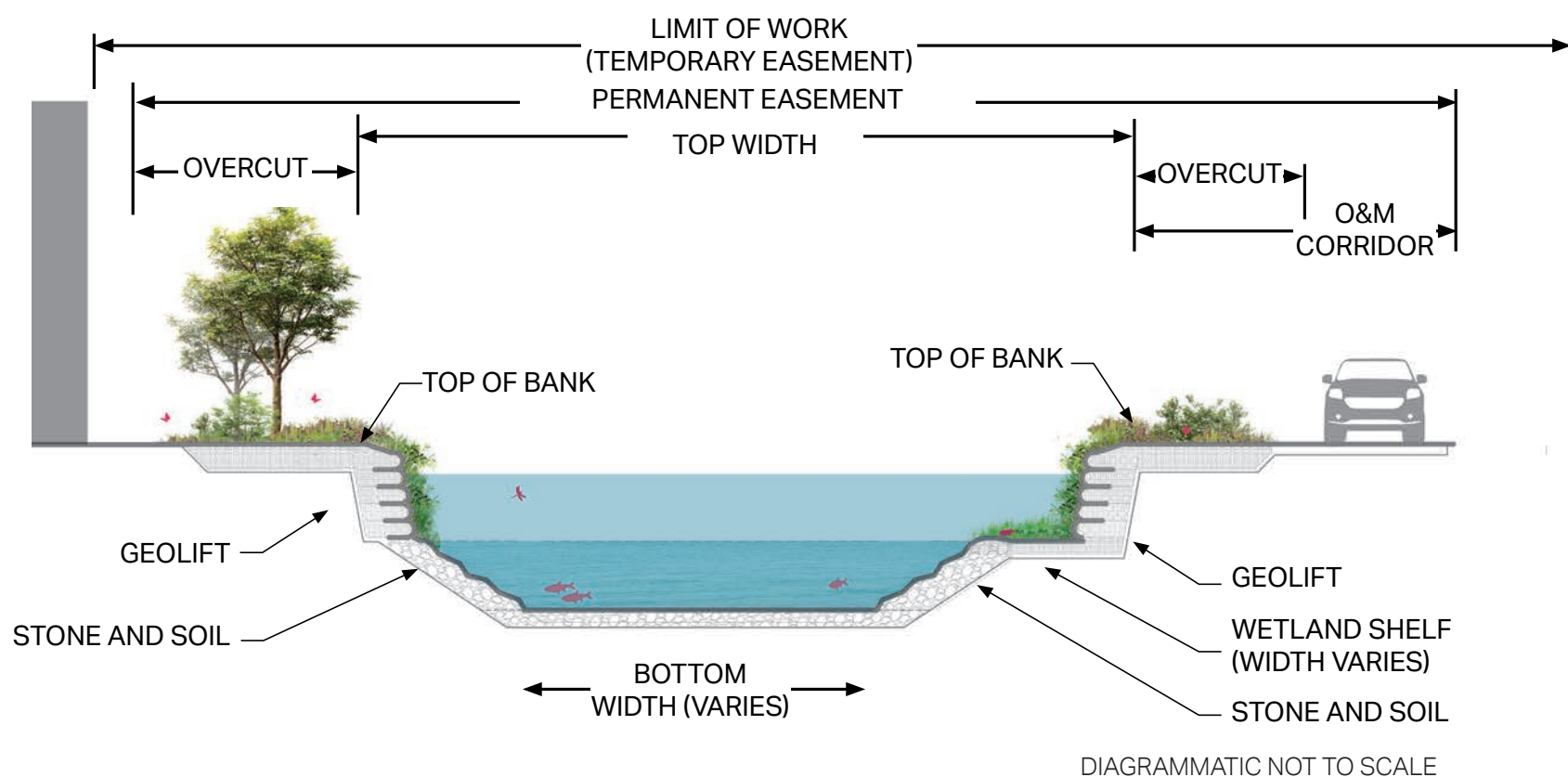


NORTHERN LOSEN SLOTE PUMP STATION

EAST RISER

EAST RISER
CHANNEL IMPROVEMENTS

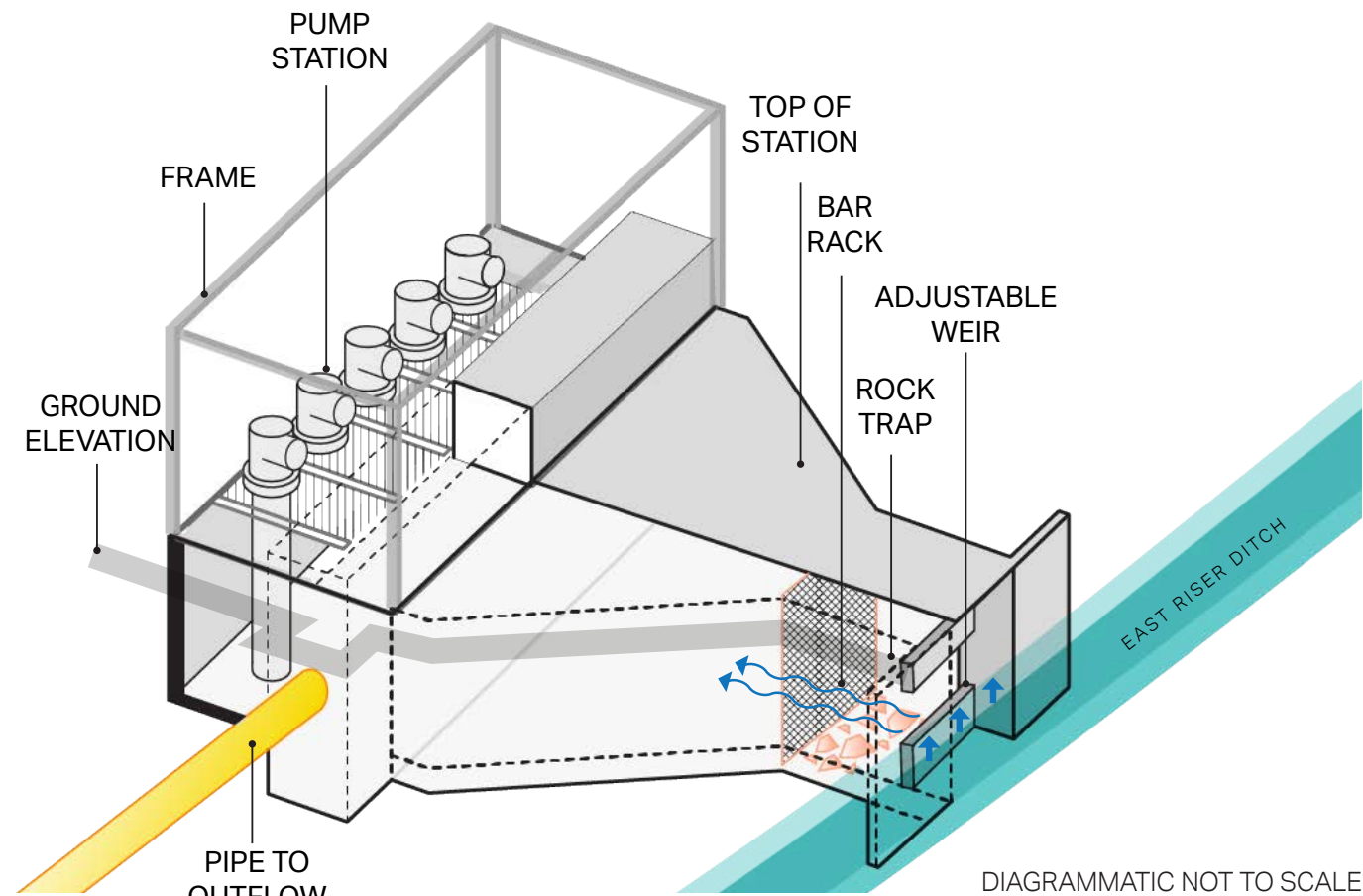
- Channel design improves water conveyance and reduces flood risk
- Dredging, widening and embankment stabilization
- Bridge culvert and railroad bridge replacements
- O&M corridor
- Native planting



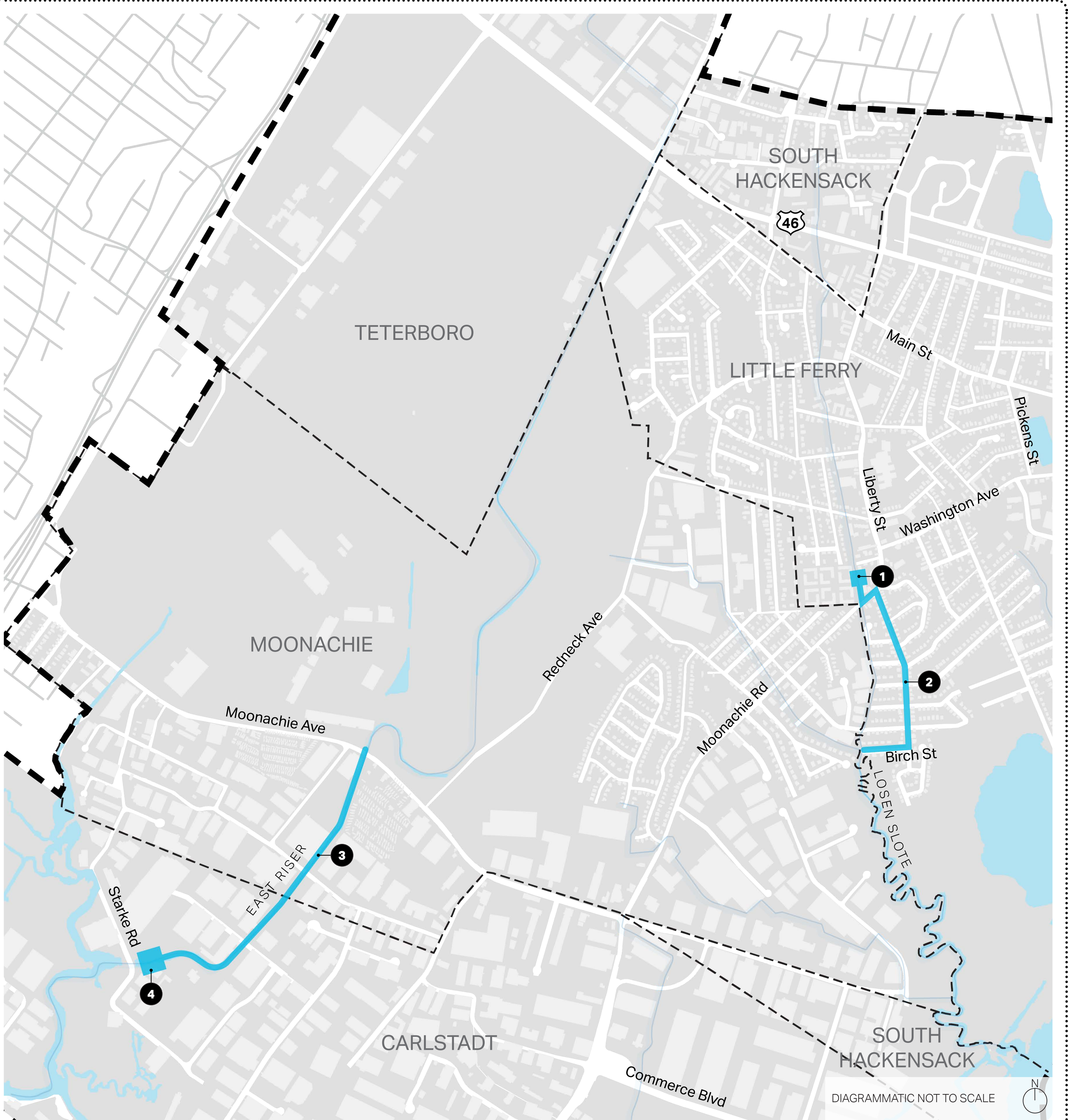
EAST RISER CHANNEL IMPROVEMENTS

EAST RISER
PUMP STATION

- Submersible pumps
- Activates and pumps water beyond tide gates when water levels in East Riser Ditch reach 2' EL.



EAST RISER PUMP STATION



- 1 Northern Losen Srote Pump Station
- 2 Losen Srote Force Main
- 3 East Riser Channel Improvements
- 4 East Riser Pump Station

RIGHT-OF-WAY GREEN INFRASTRUCTURE-TYPE IMPROVEMENTS

CONCEPTUAL DESIGN

C

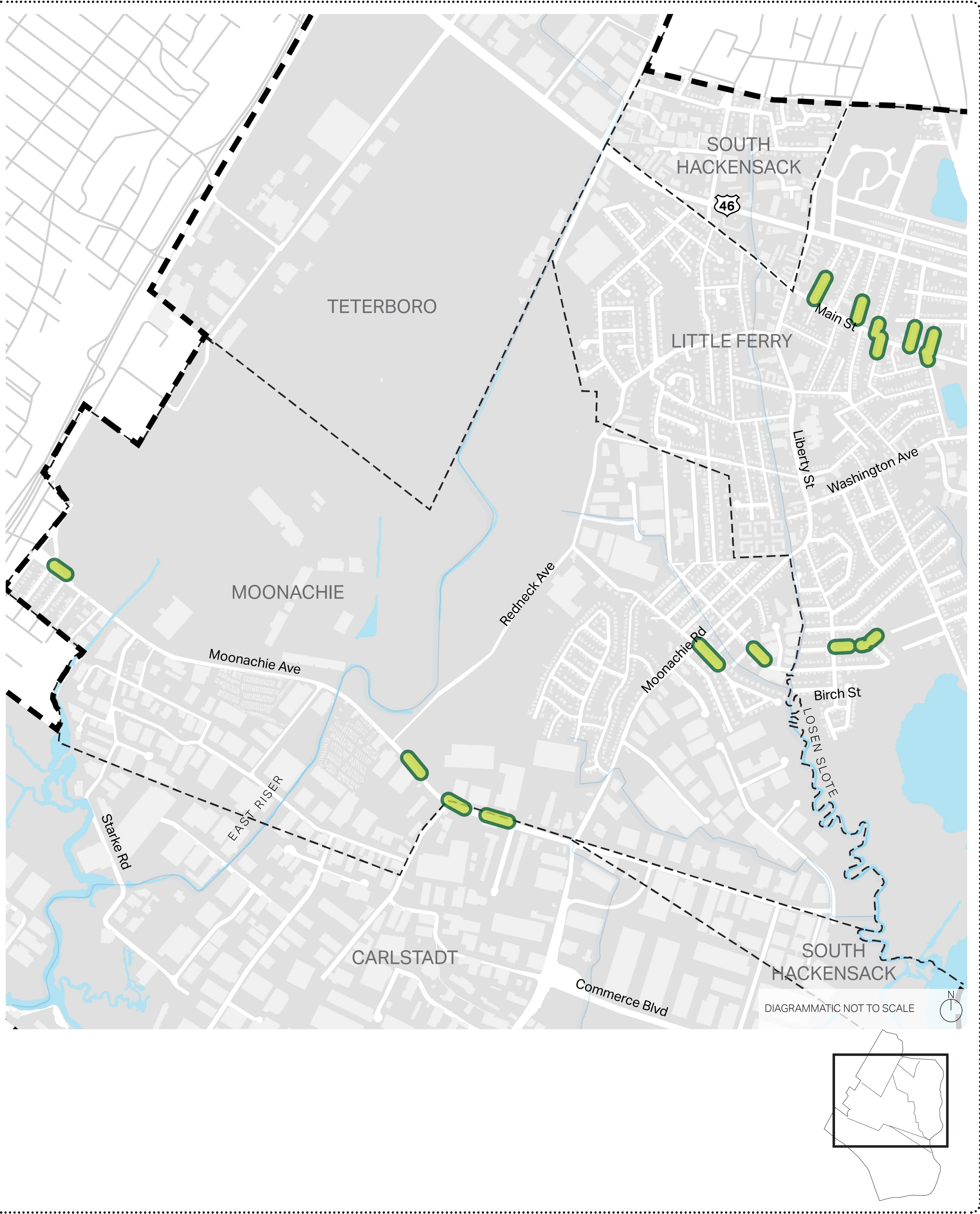
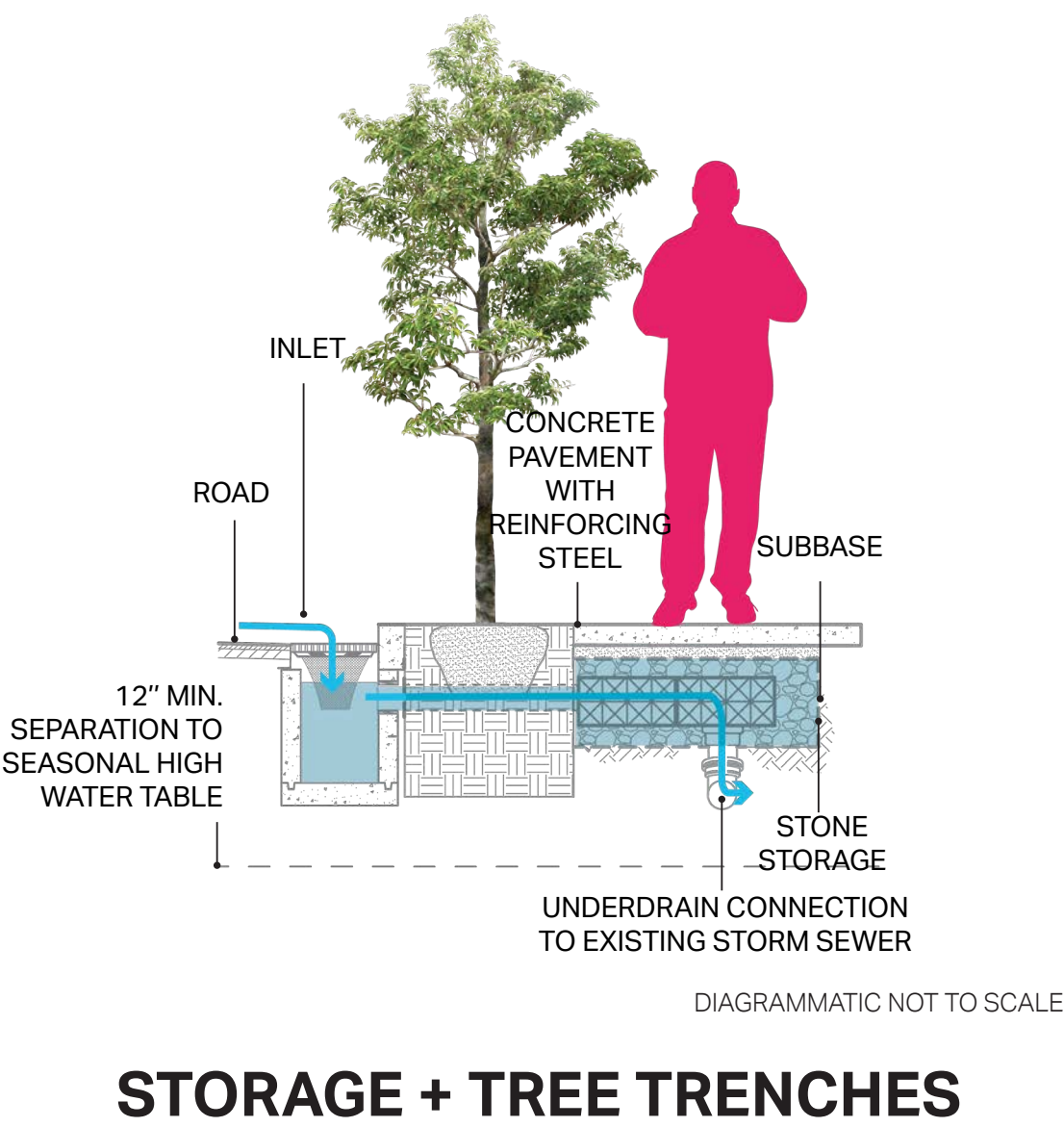
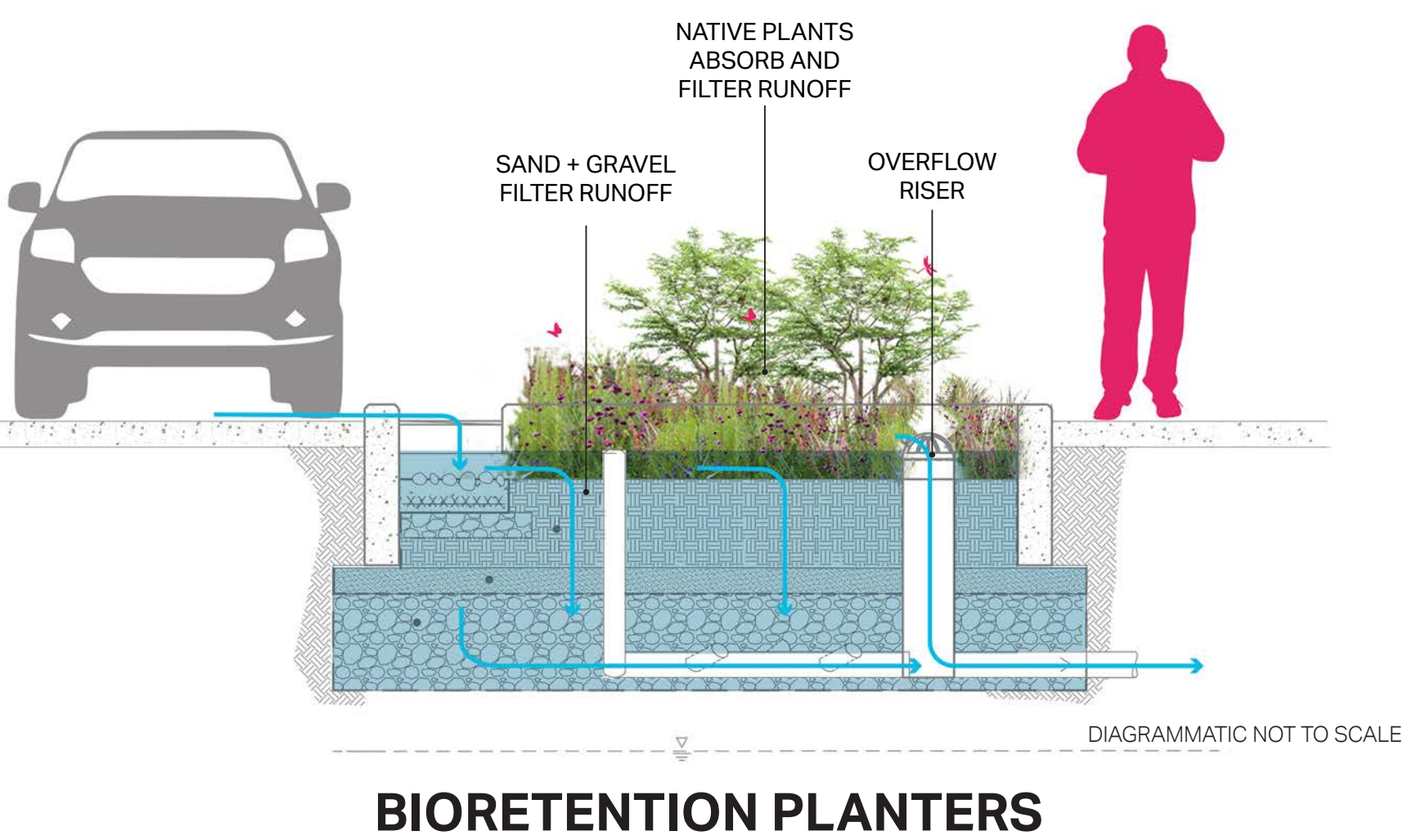
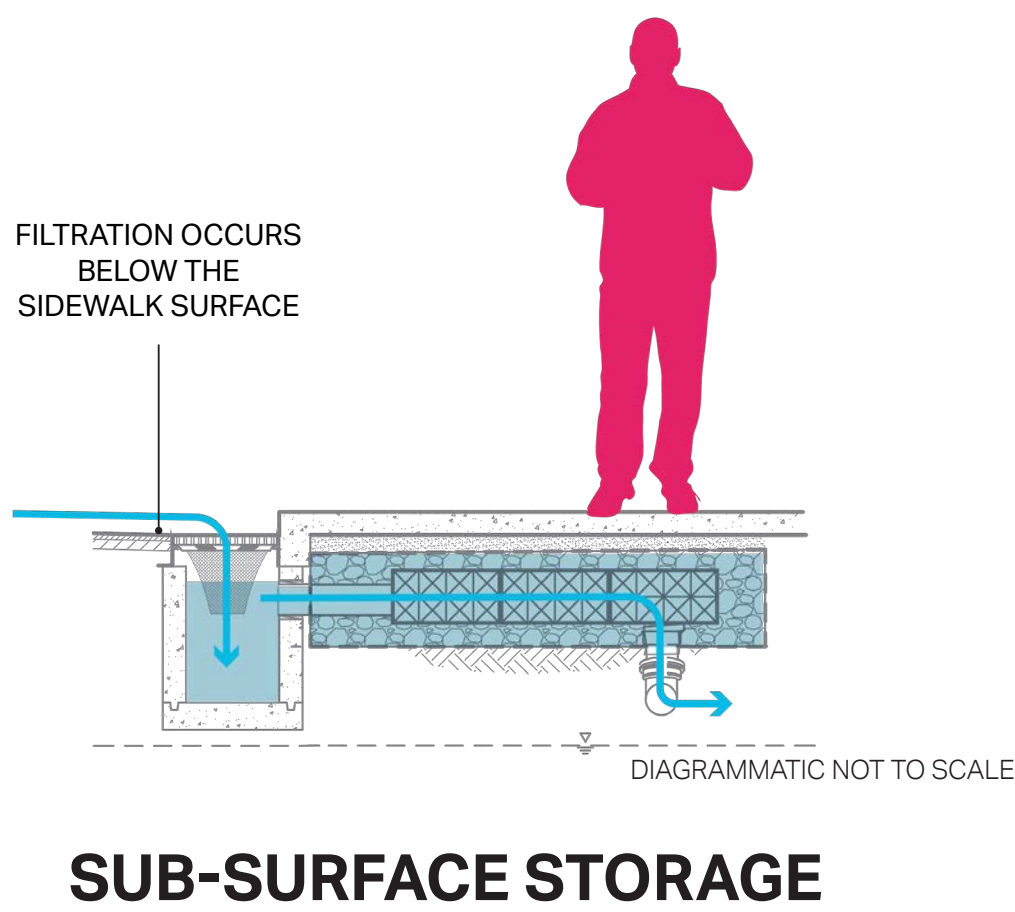
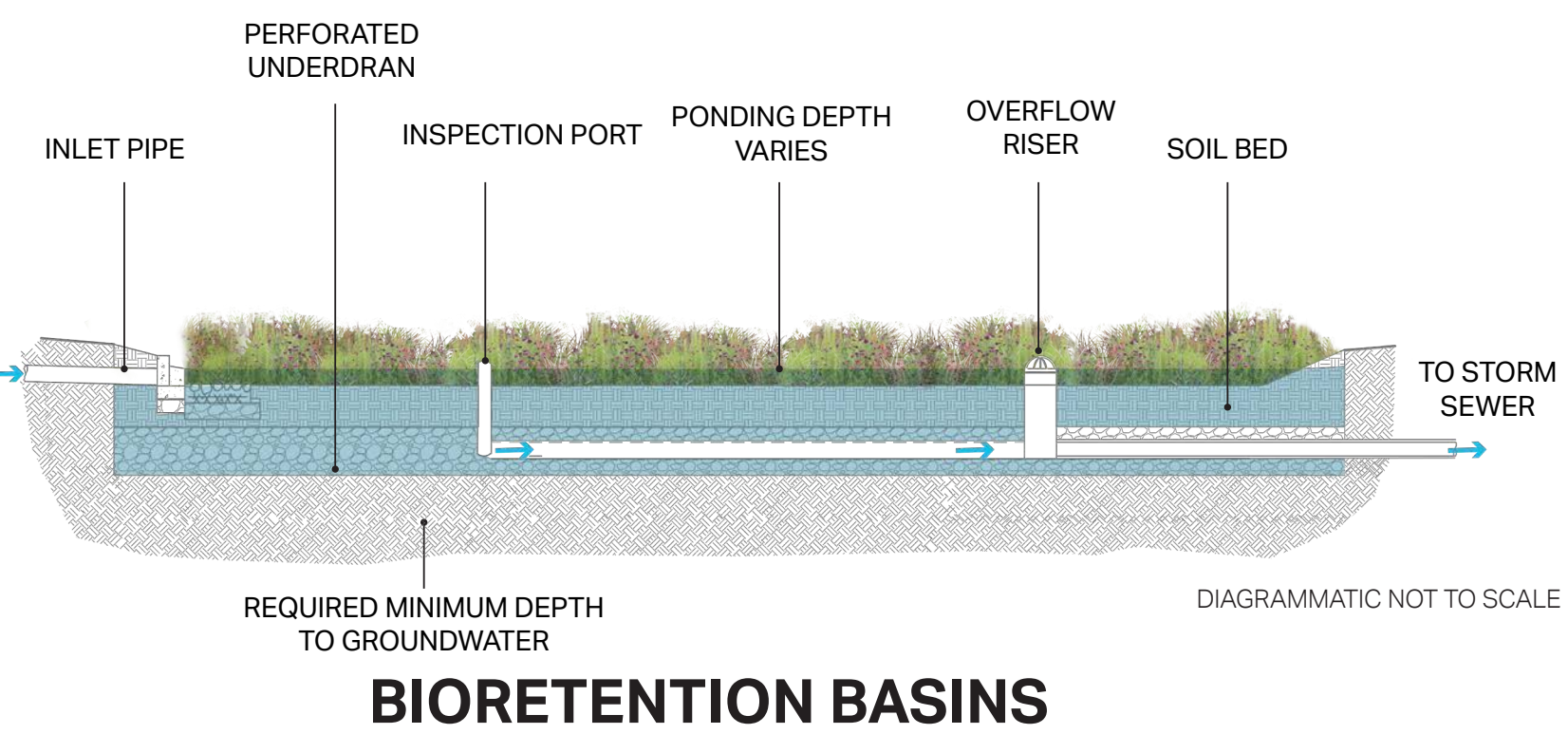
GREEN INFRASTRUCTURE-TYPE IMPROVEMENTS

SYSTEM PERFORMANCE

- Numerous system locations throughout project area
- Filtering roadway runoff
- Designed to capture stormwater and then slowly release into existing grey infrastructure, reducing peak flow in the storm sewer mains
- Treating and diverting runoff from entering the sewer system at the peak of the storm
- Located within public right-of-way
- Native soils have poor infiltration capacity and high groundwater limits application in some areas
- Treats smaller, more frequent storms
- Some types include vegetation or trees, while others are below the surface.

4 PRIMARY TYPES UNDER CONSIDERATION*

*Alternative designs being considered where shallow groundwater is present. Final designs are not yet confirmed.

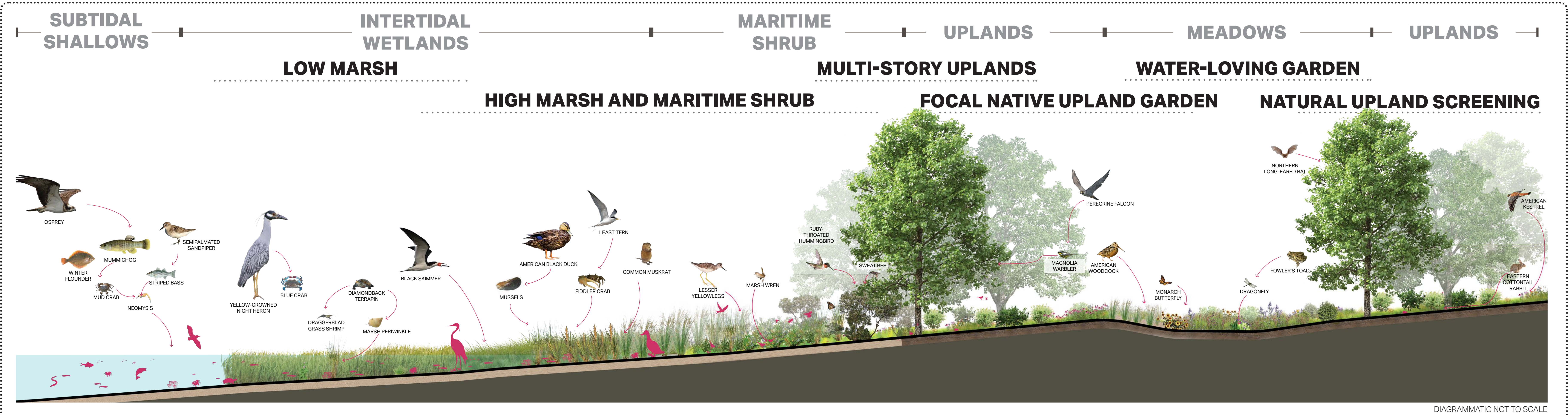


REBUILD BY DESIGN MEADOWLANDS: ECOLOGICAL DESIGN

CONCEPTUAL PLANTING DESIGN

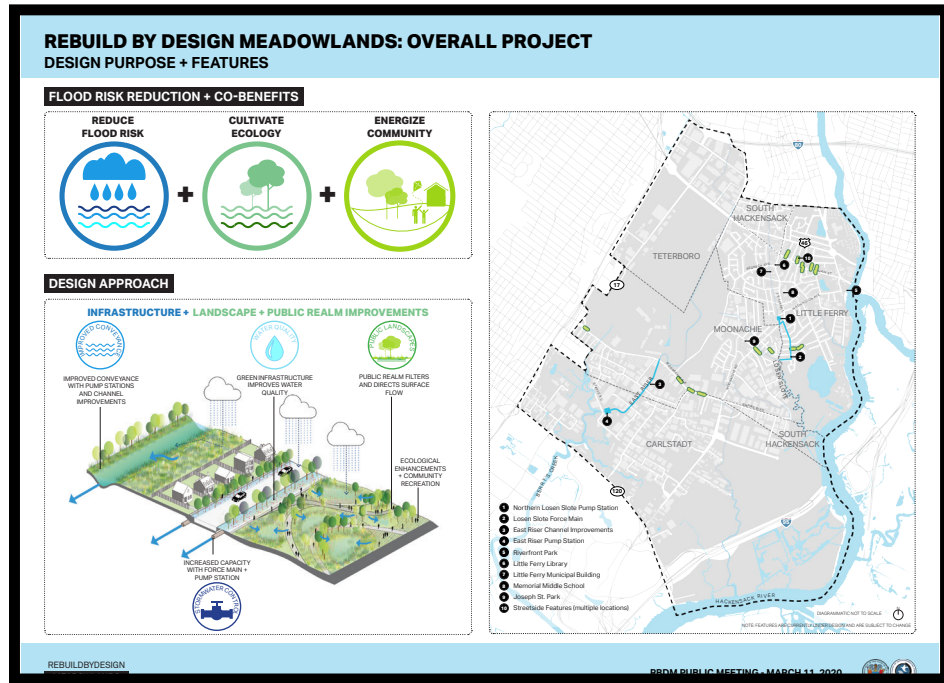
D

MEADOWLANDS TYPICAL ECOLOGICAL HABITATS

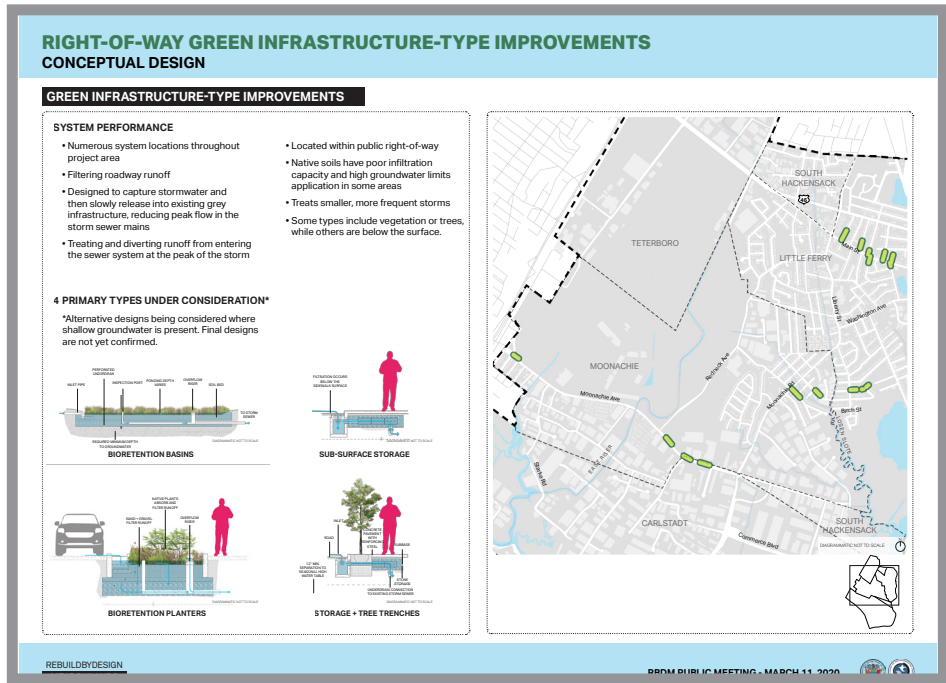


DIAGRAMMATIC NOT TO SCALE

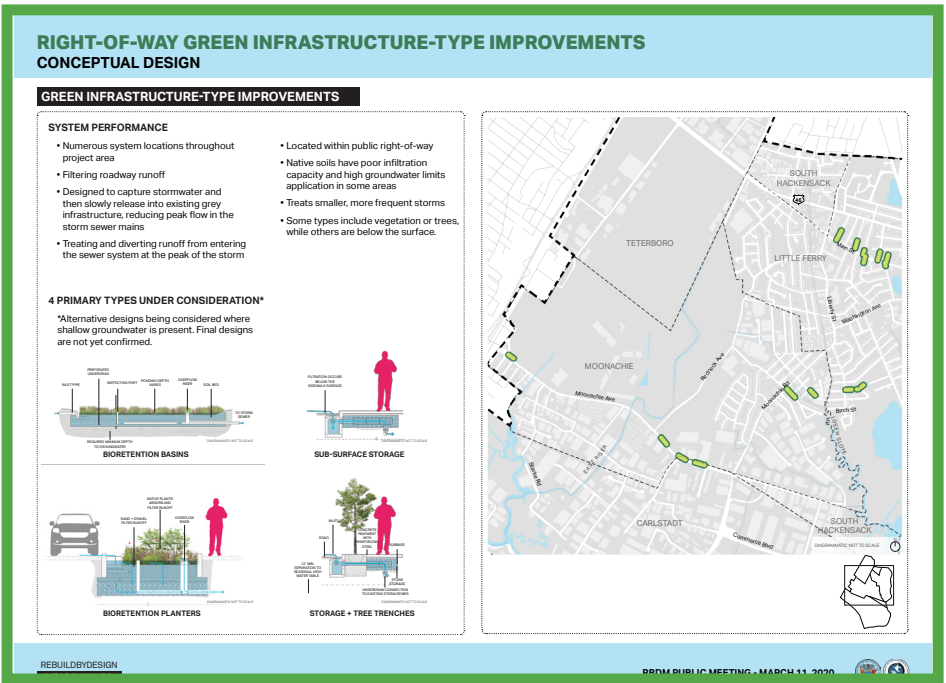
OVERALL
PROJECT INFO



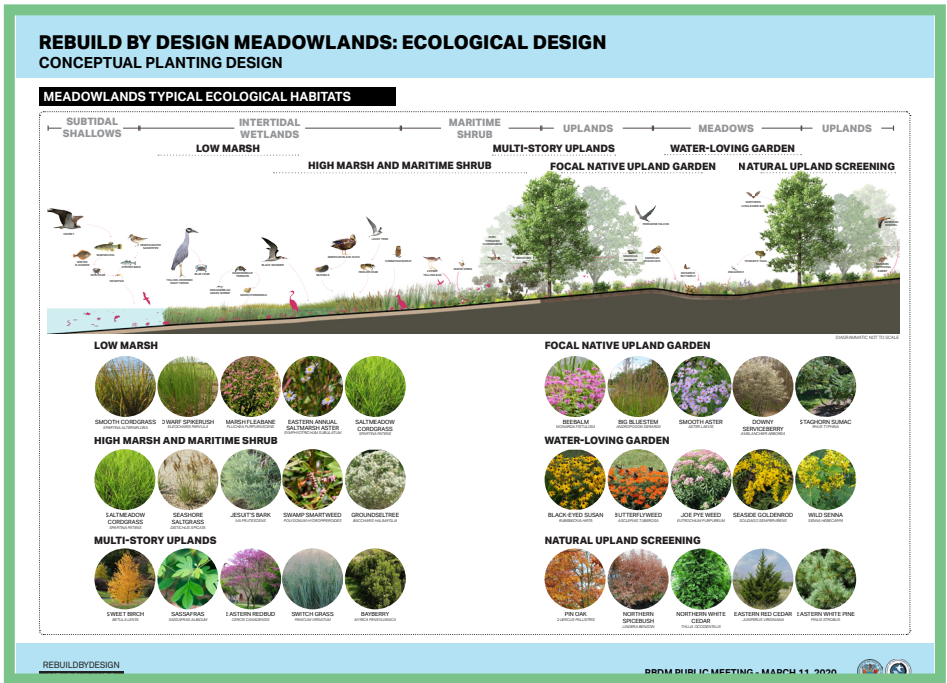
GREY
INFRASTRUCTURE



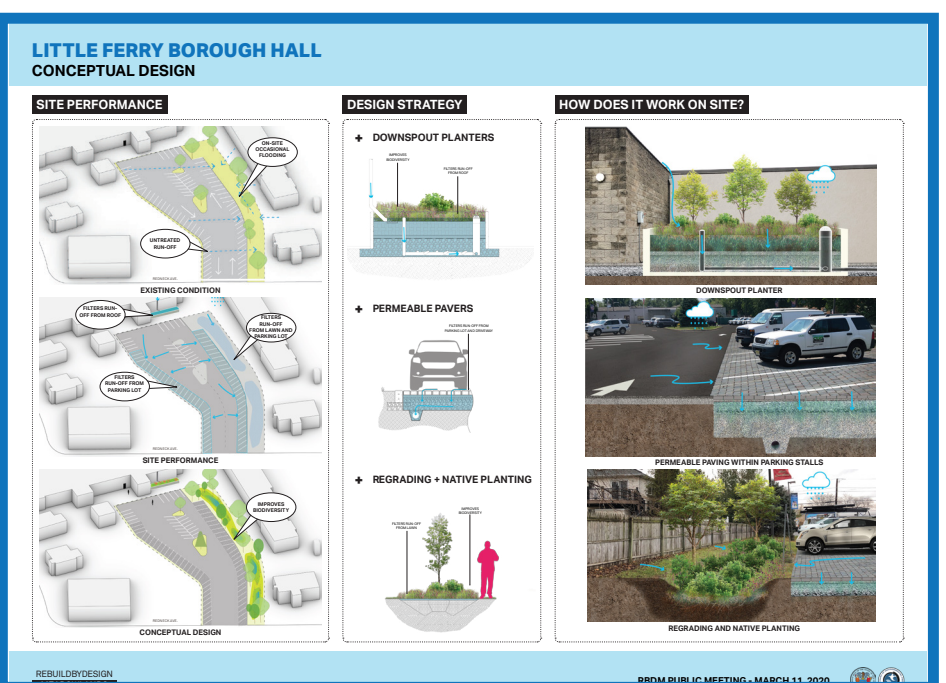
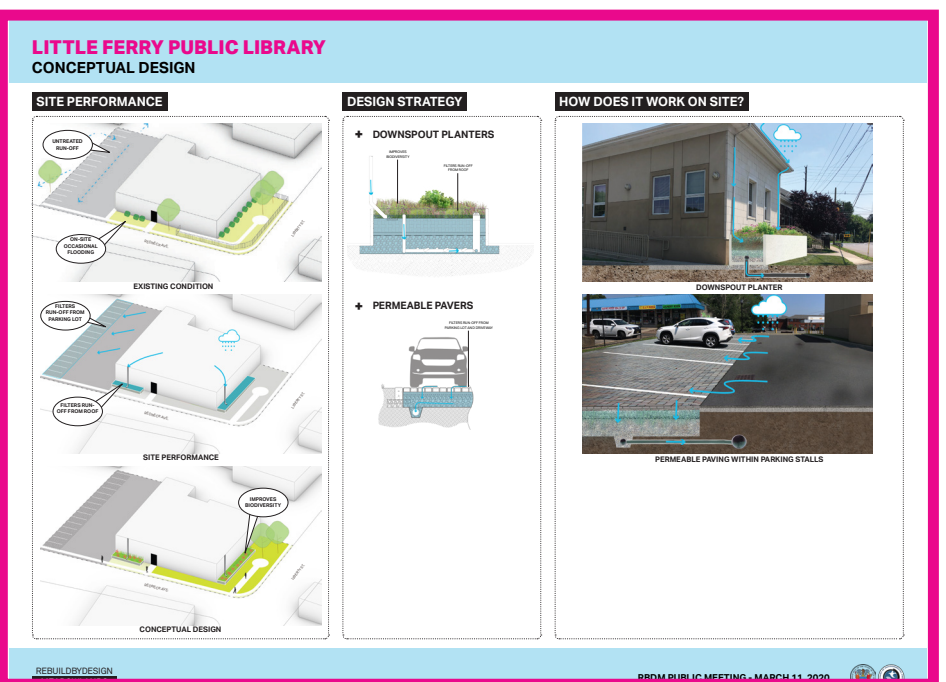
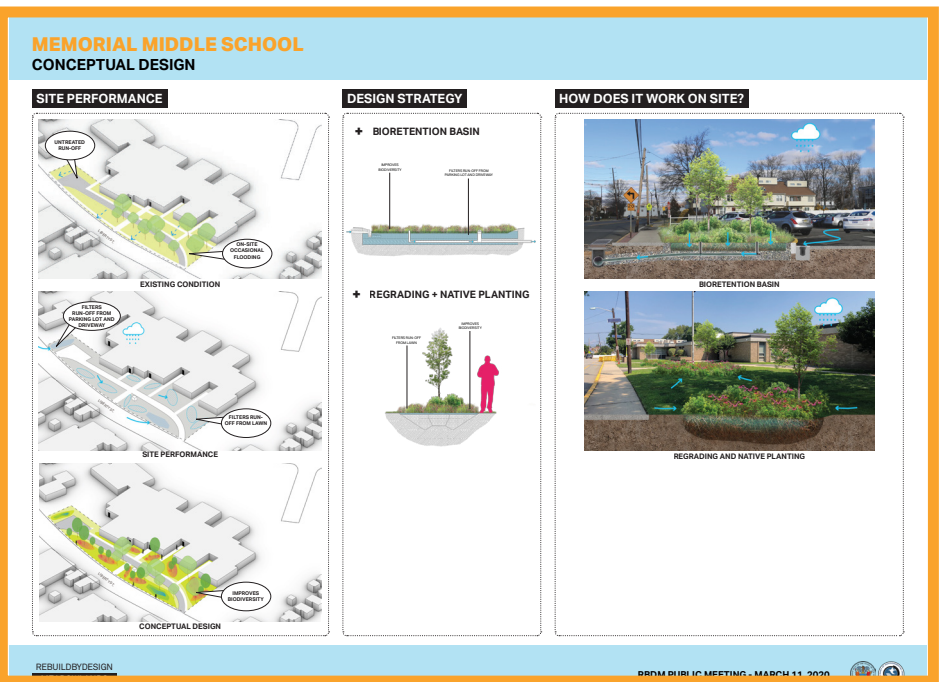
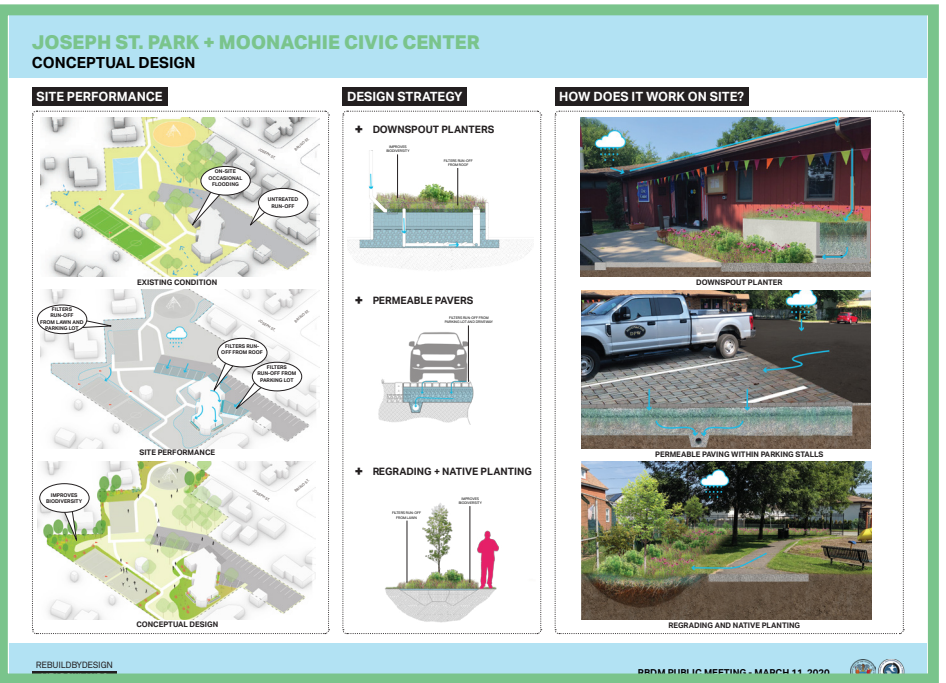
RIGHT-OF-WAY
GREEN
INFRASTRUCTURE



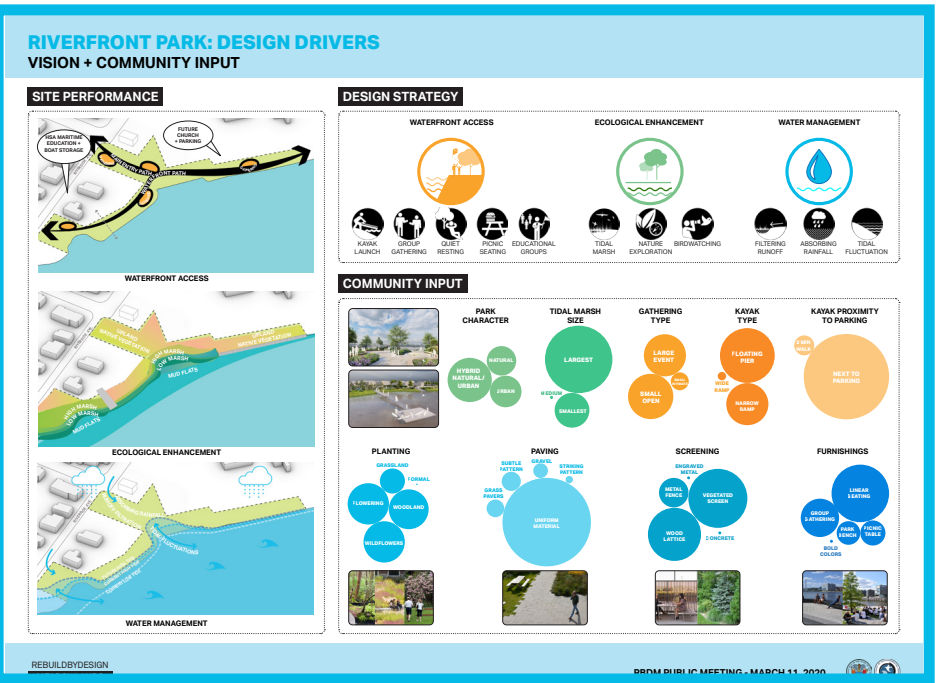
OVERALL
ECOLOGICAL
DESIGN STRATEGY



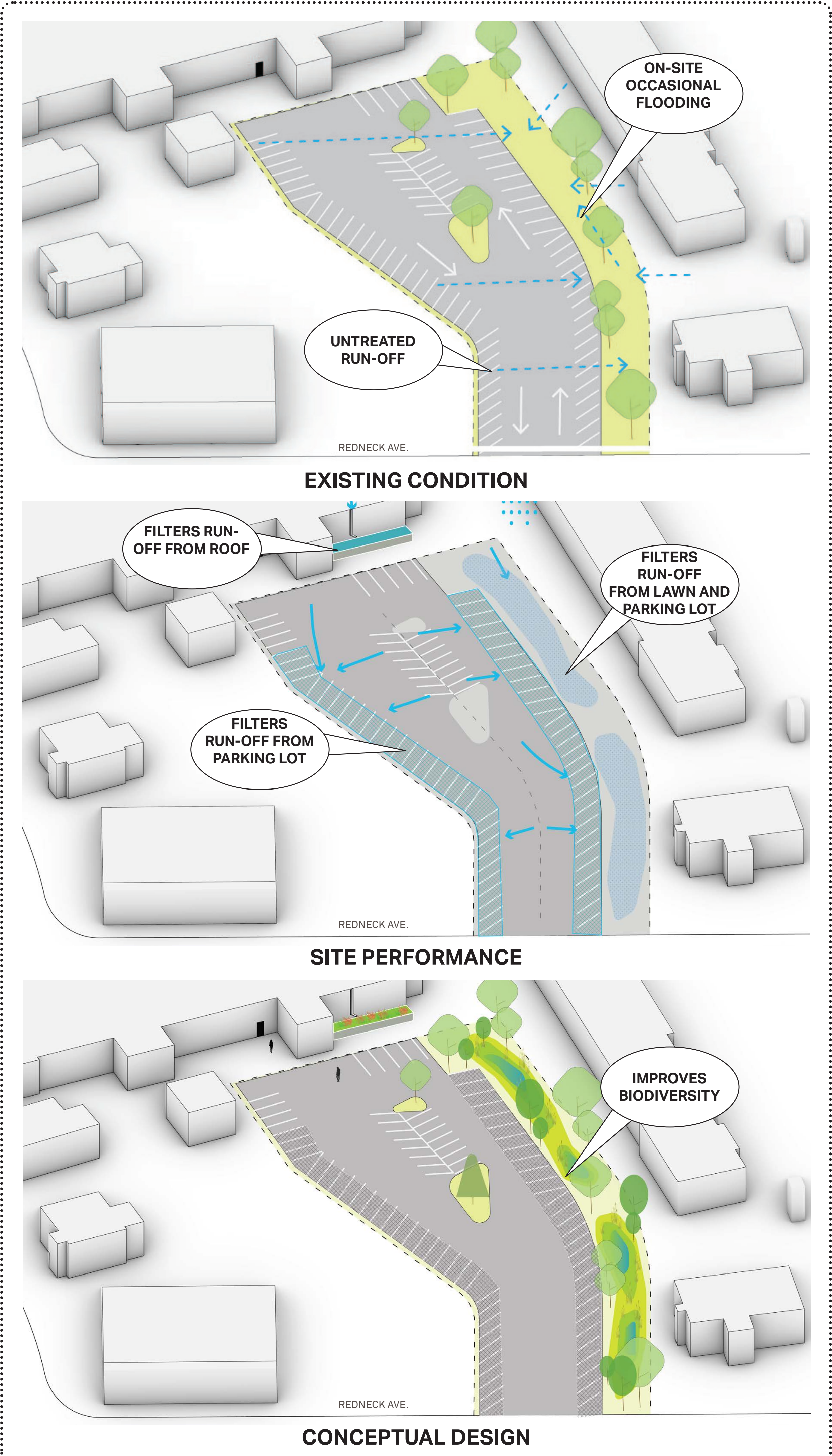
MUNICIPAL
SITES



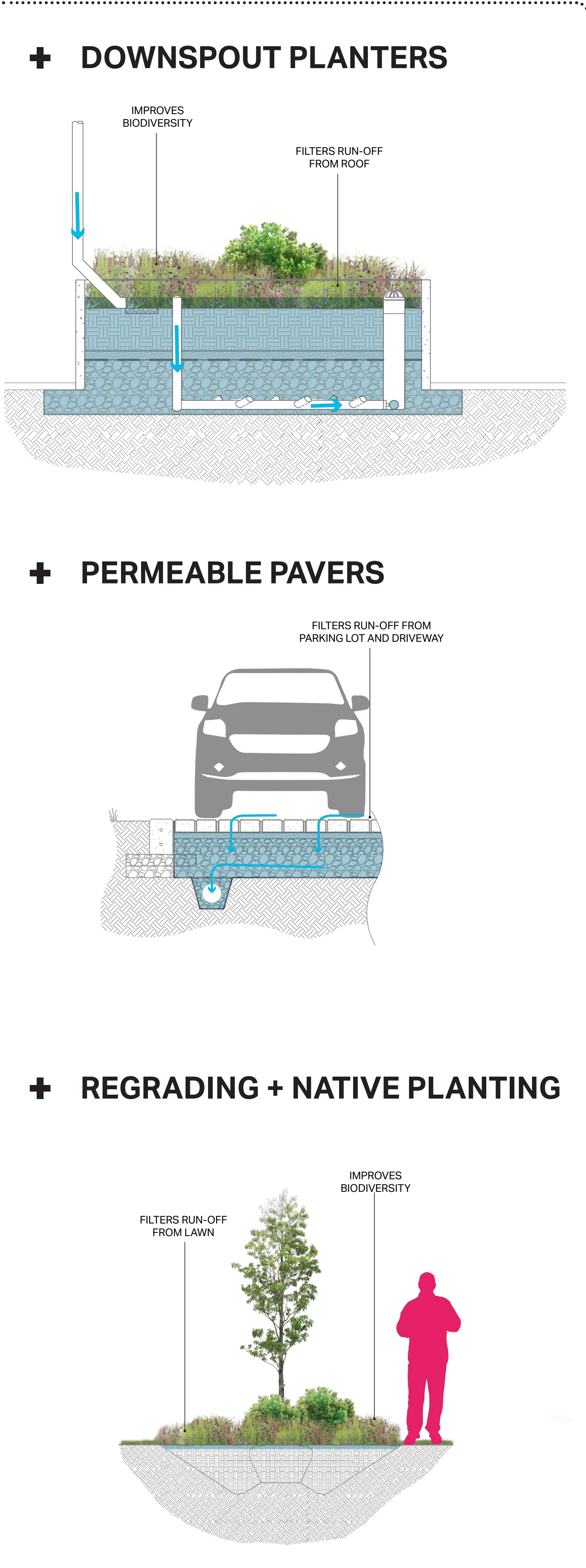
RIVERFRONT
PARK



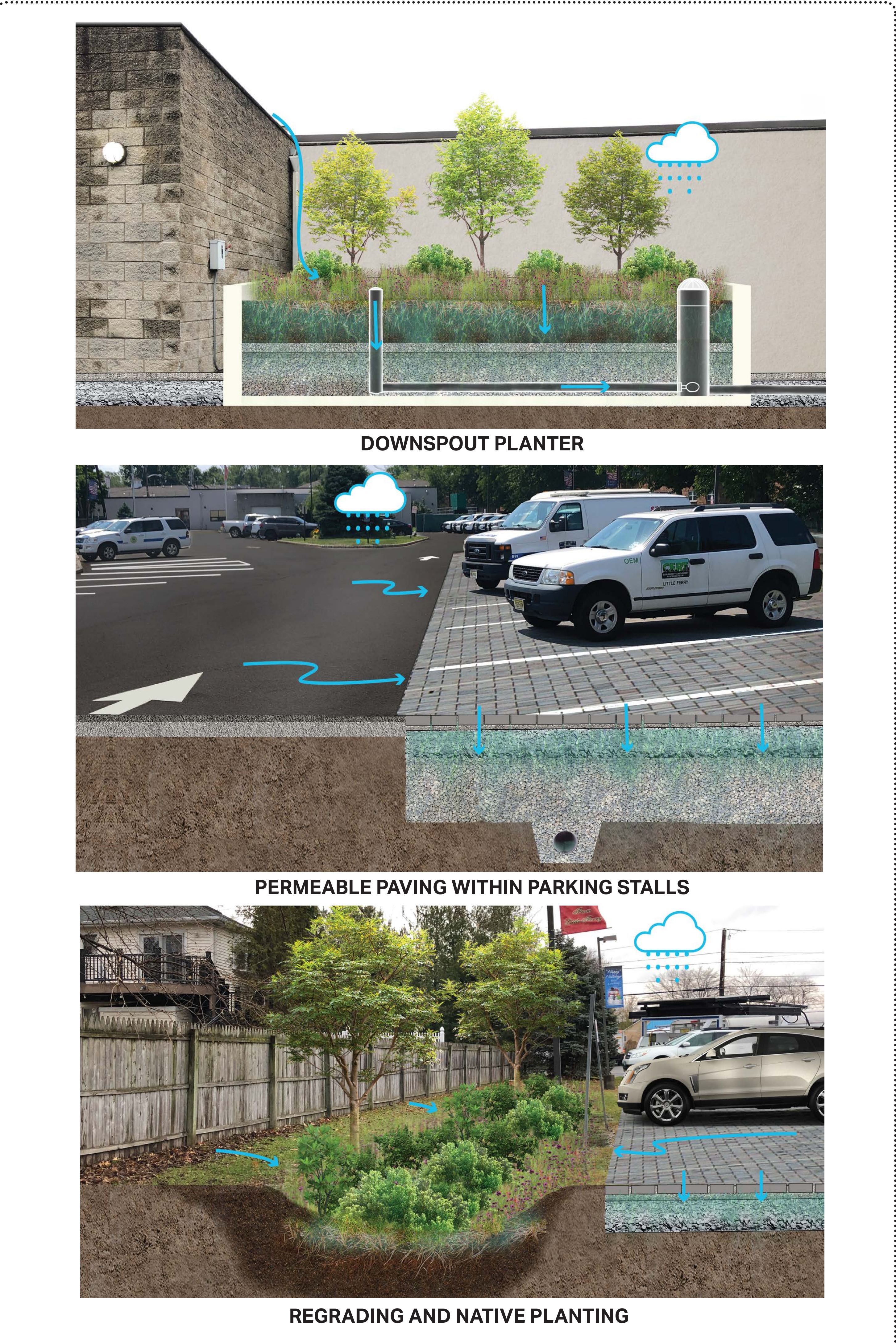
SITE PERFORMANCE



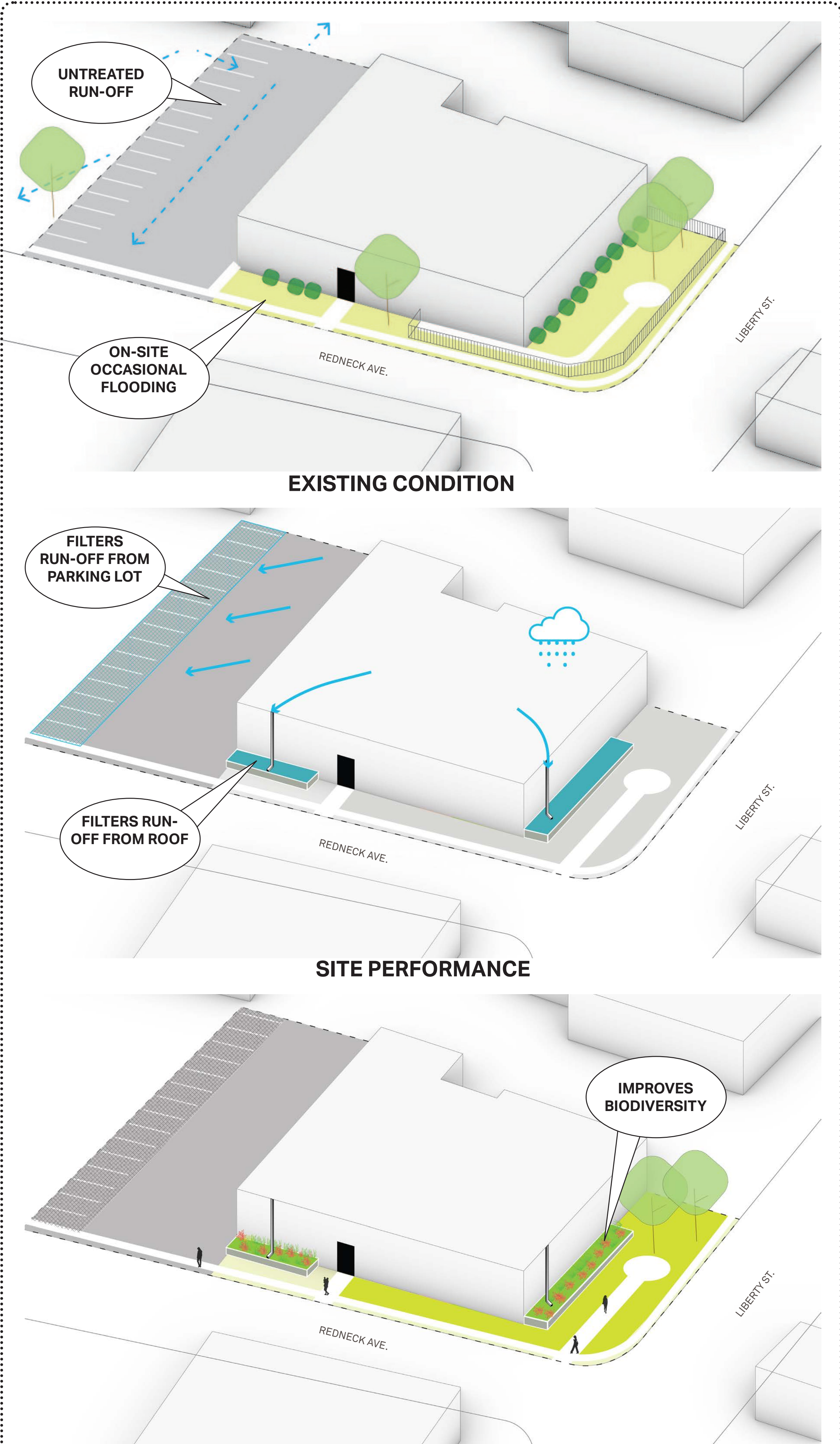
DESIGN STRATEGY



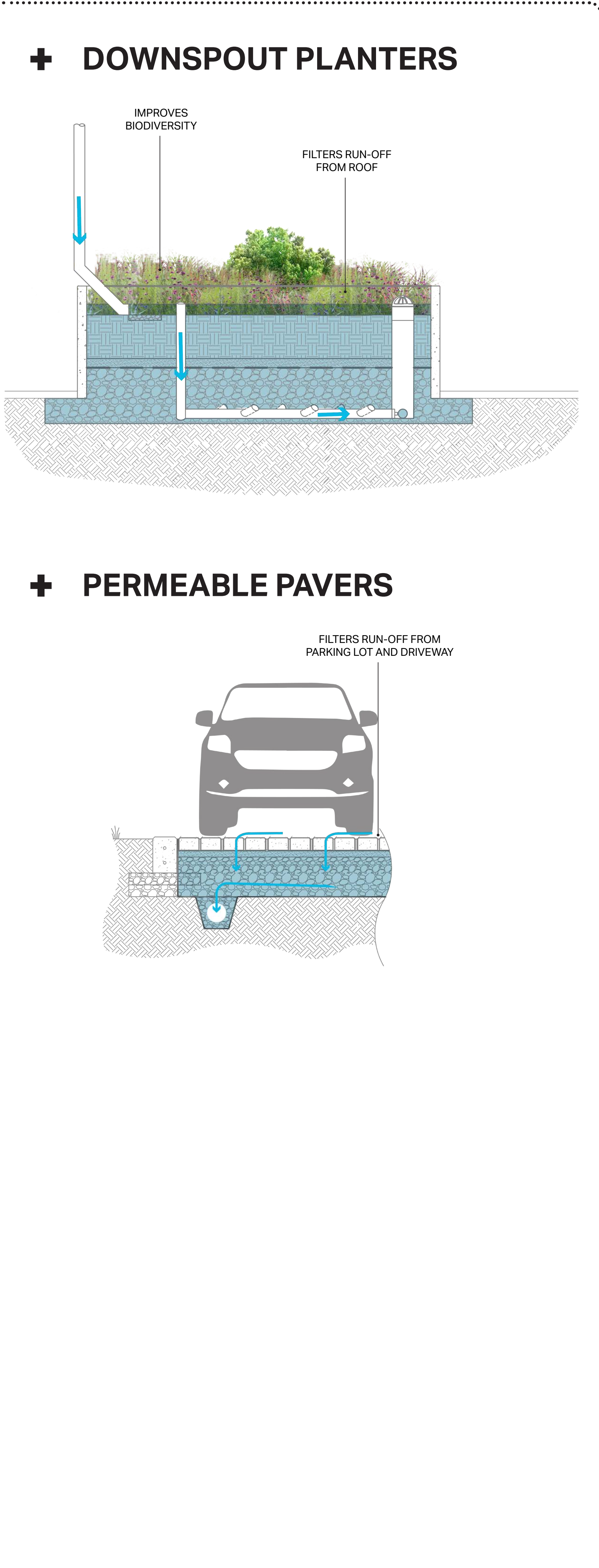
HOW DOES IT WORK ON SITE?



SITE PERFORMANCE



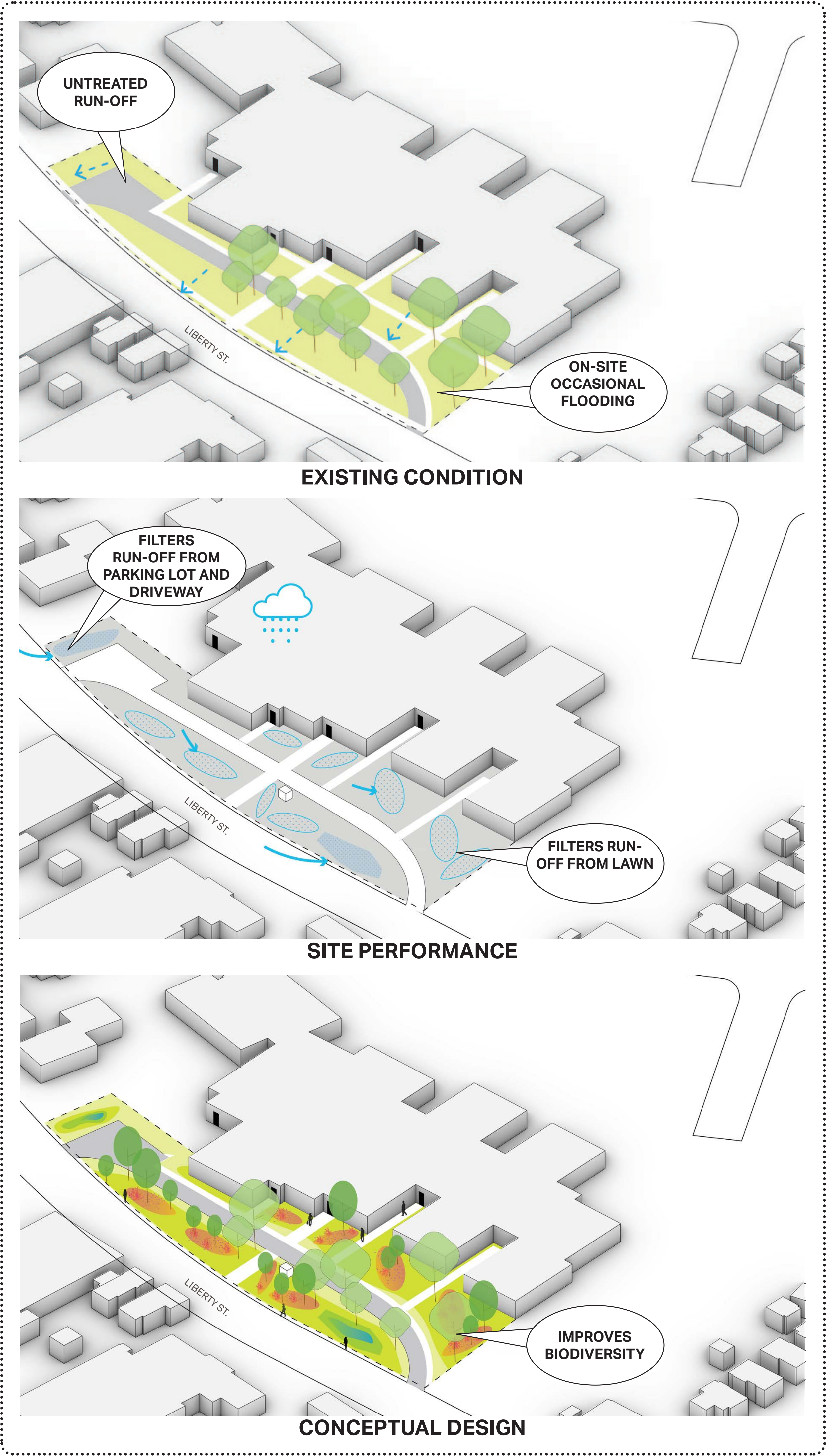
DESIGN STRATEGY



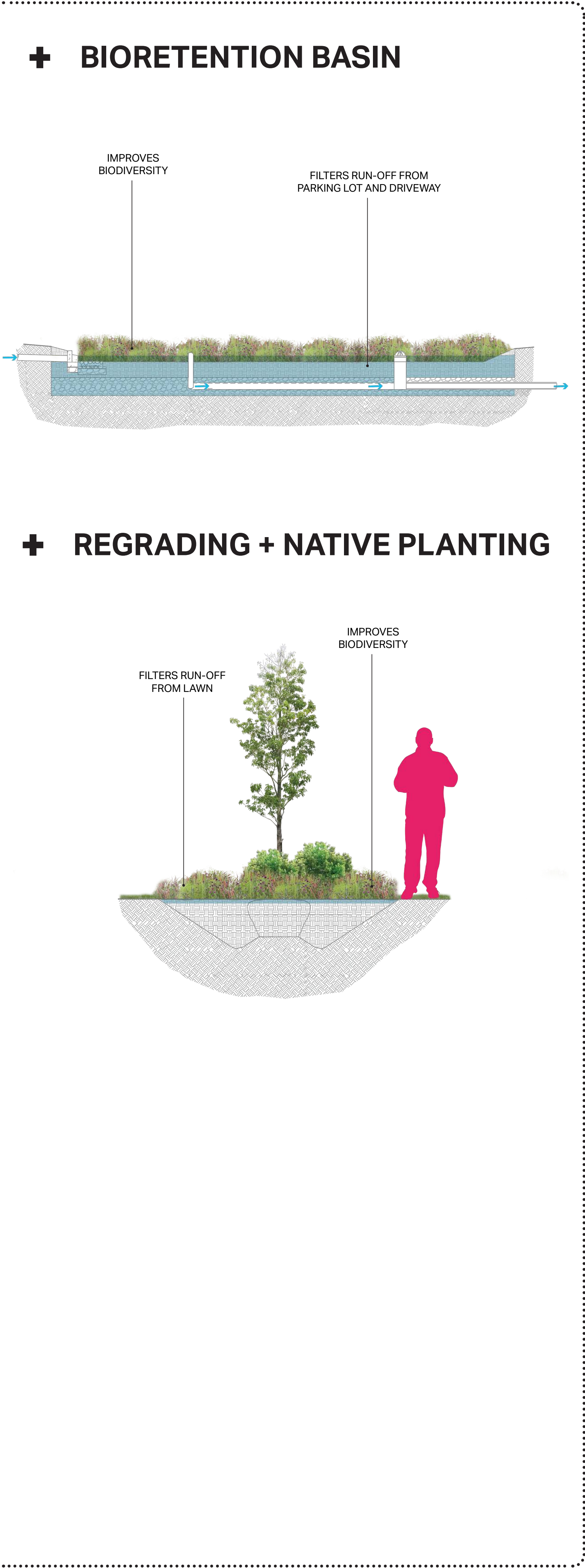
HOW DOES IT WORK ON SITE?



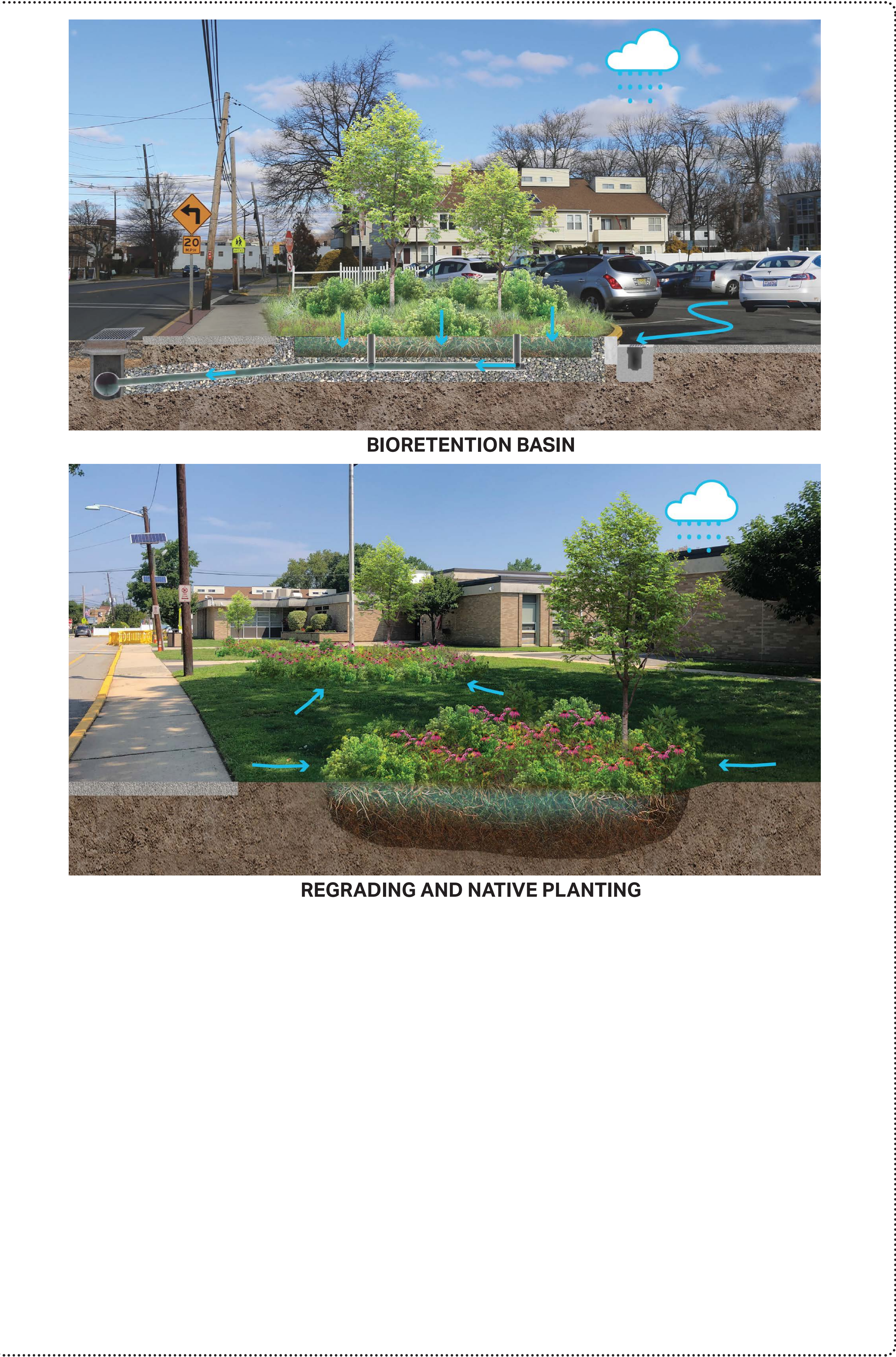
SITE PERFORMANCE



DESIGN STRATEGY



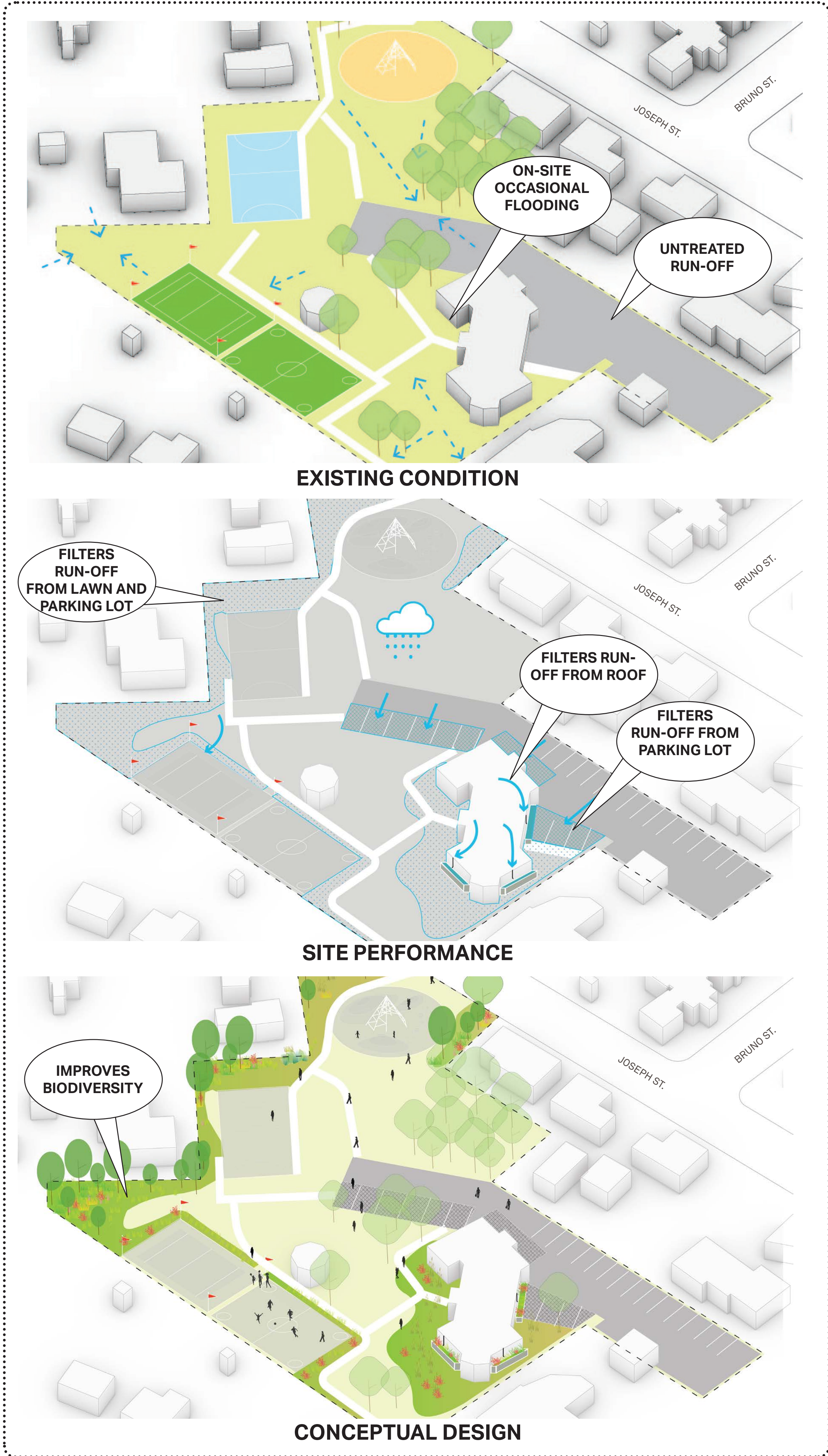
HOW DOES IT WORK ON SITE?



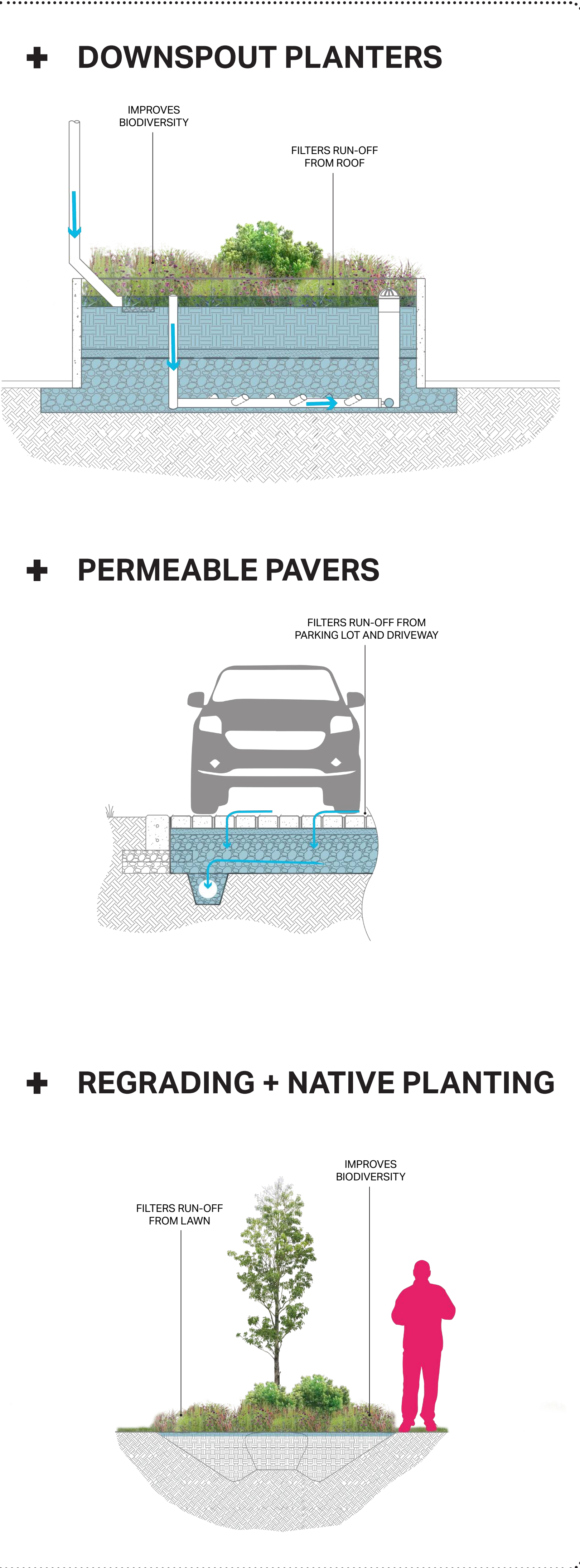
JOSEPH ST. PARK + MOONACHIE CIVIC CENTER

CONCEPTUAL DESIGN

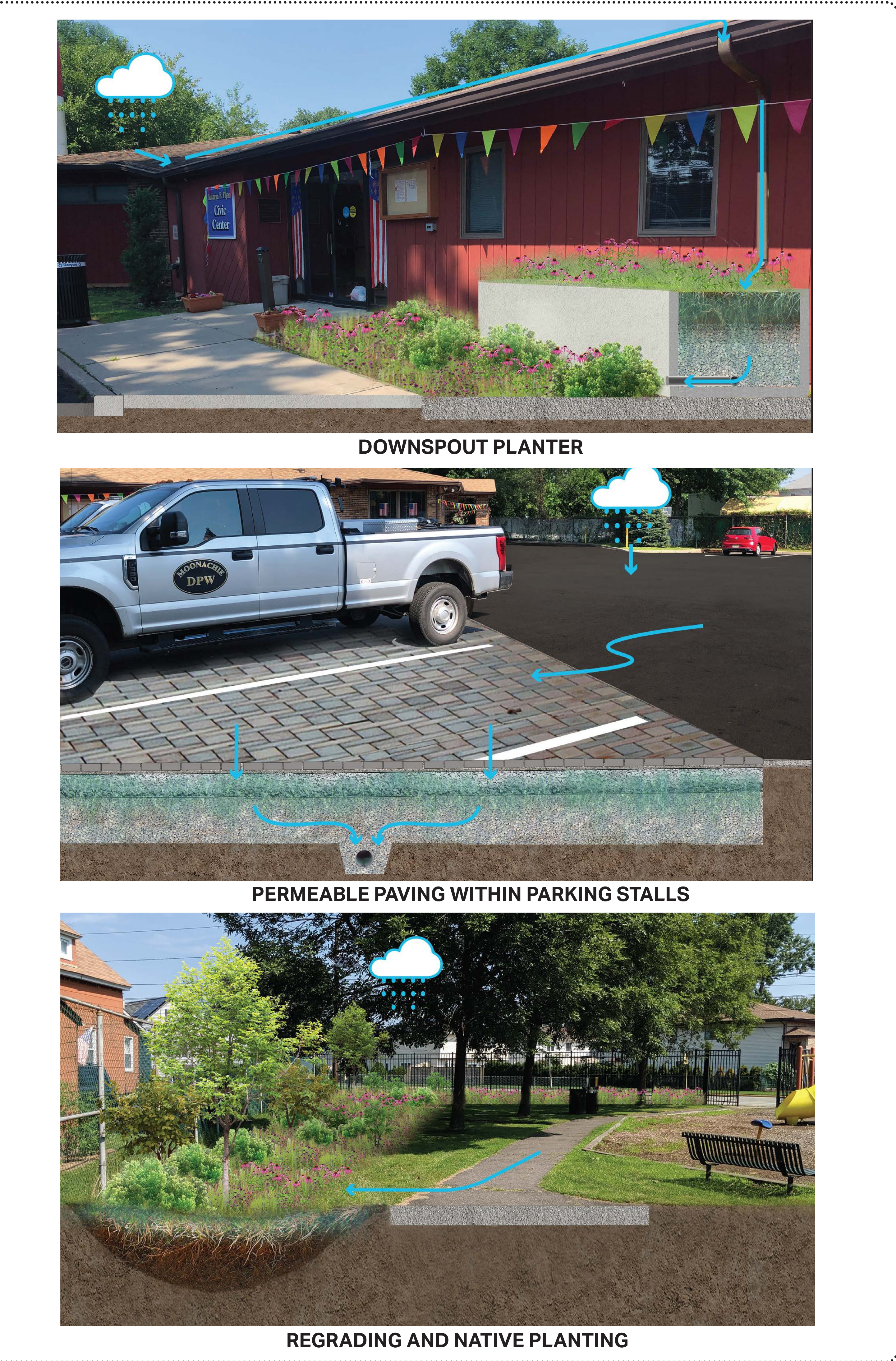
SITE PERFORMANCE



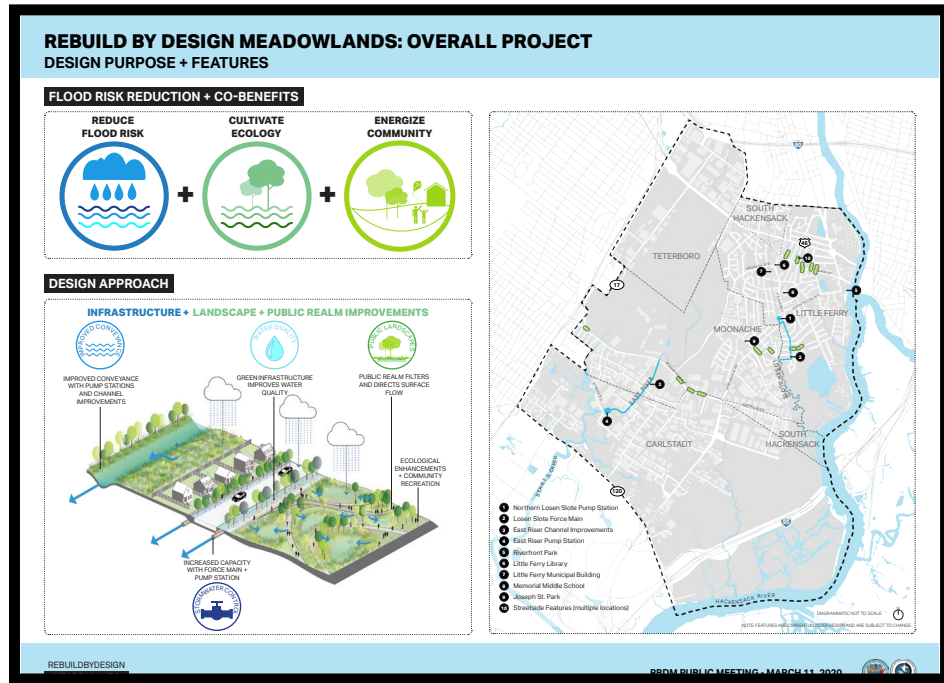
DESIGN STRATEGY



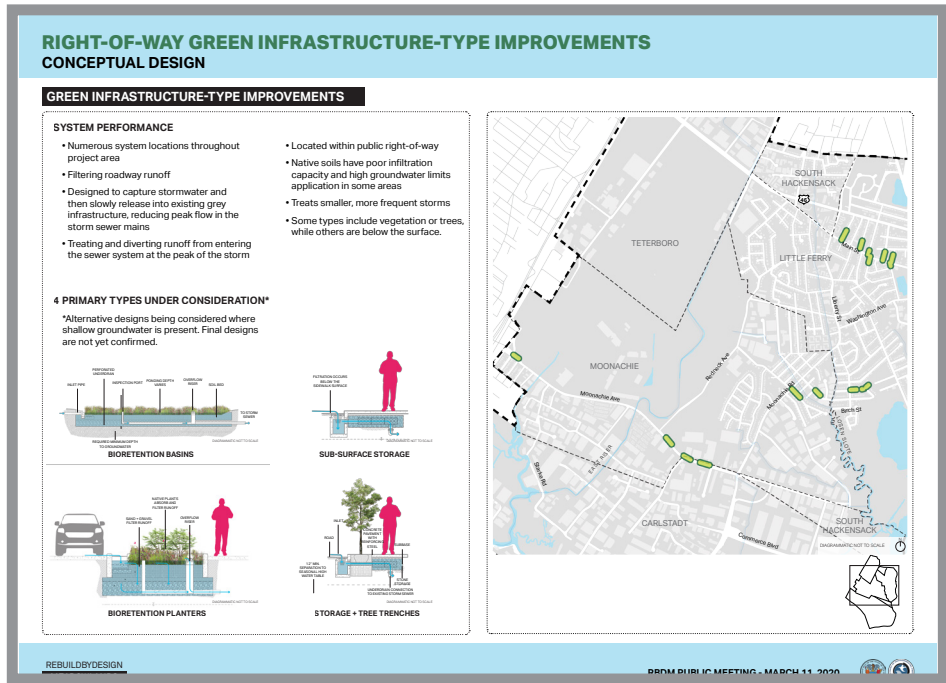
HOW DOES IT WORK ON SITE?



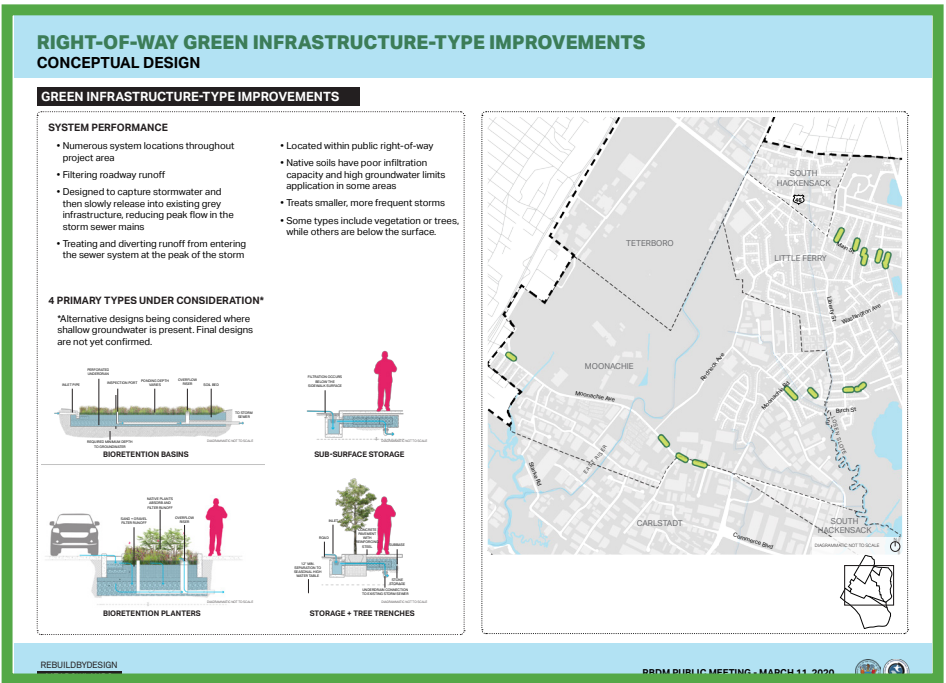
OVERALL
PROJECT INFO



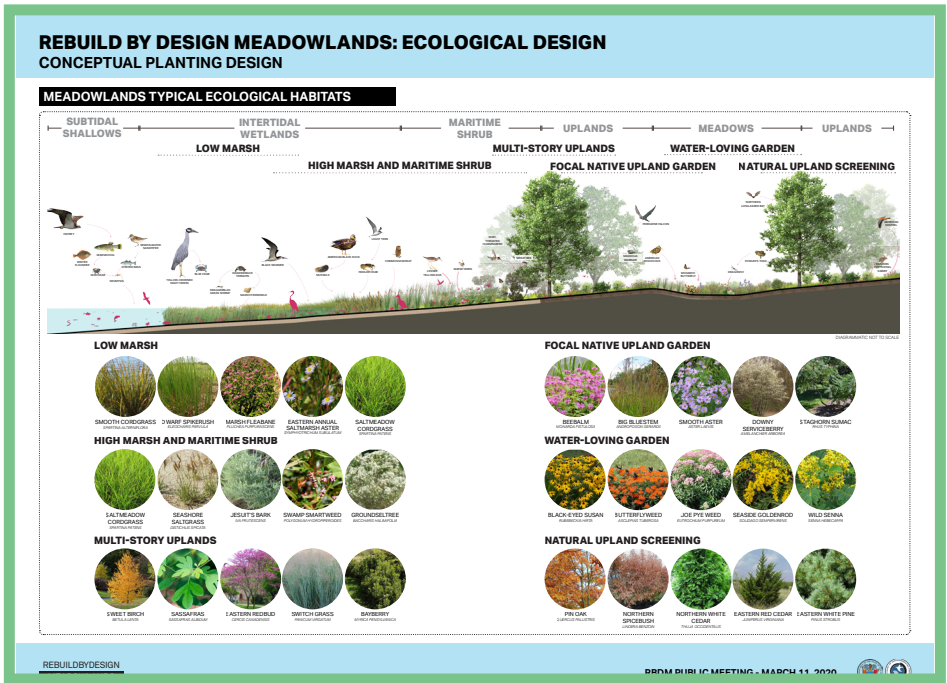
GREY
INFRASTRUCTURE



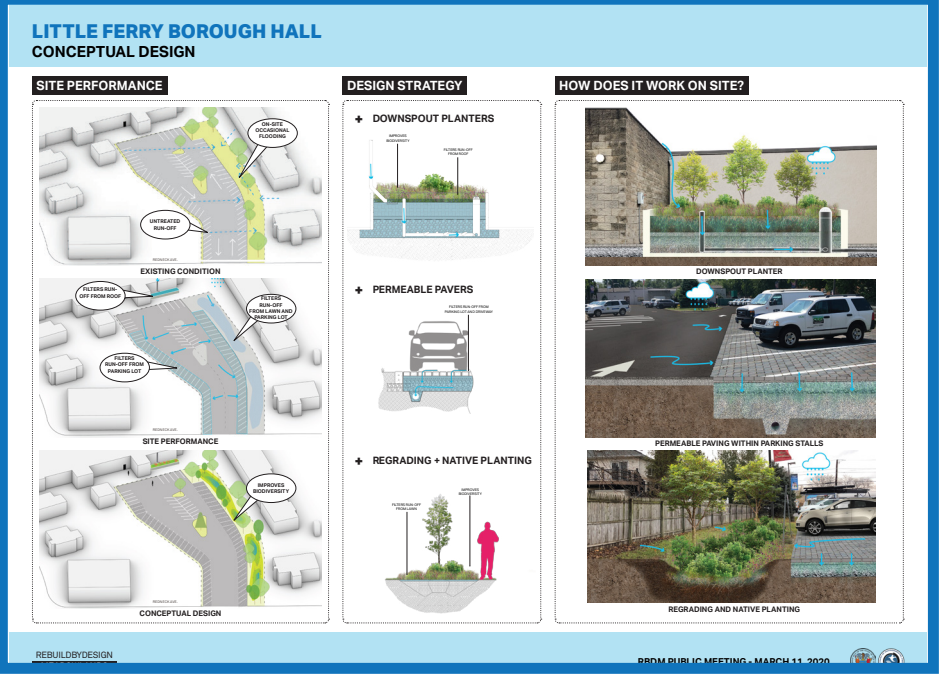
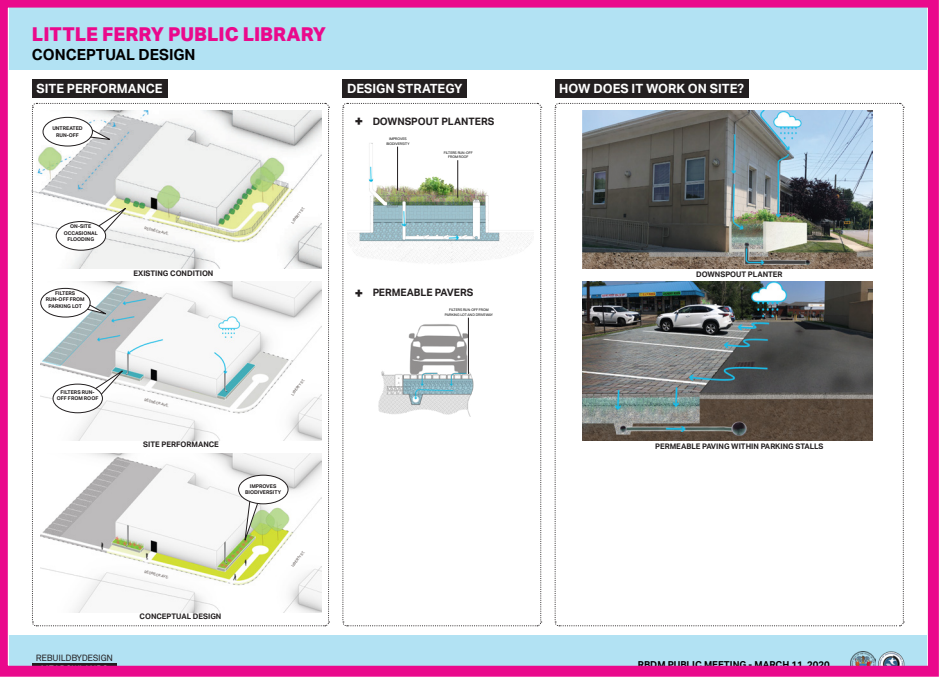
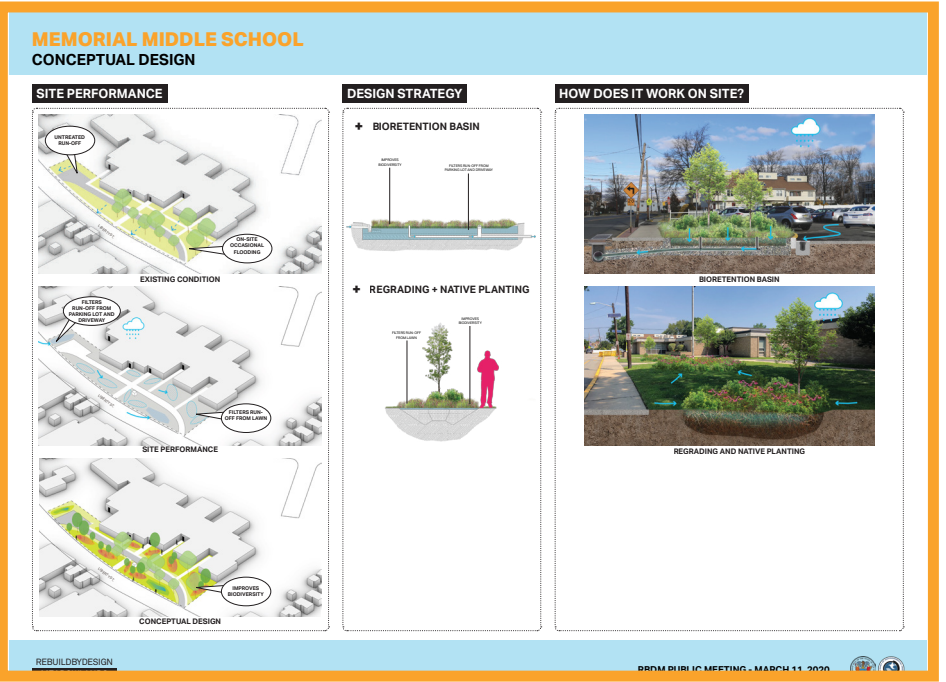
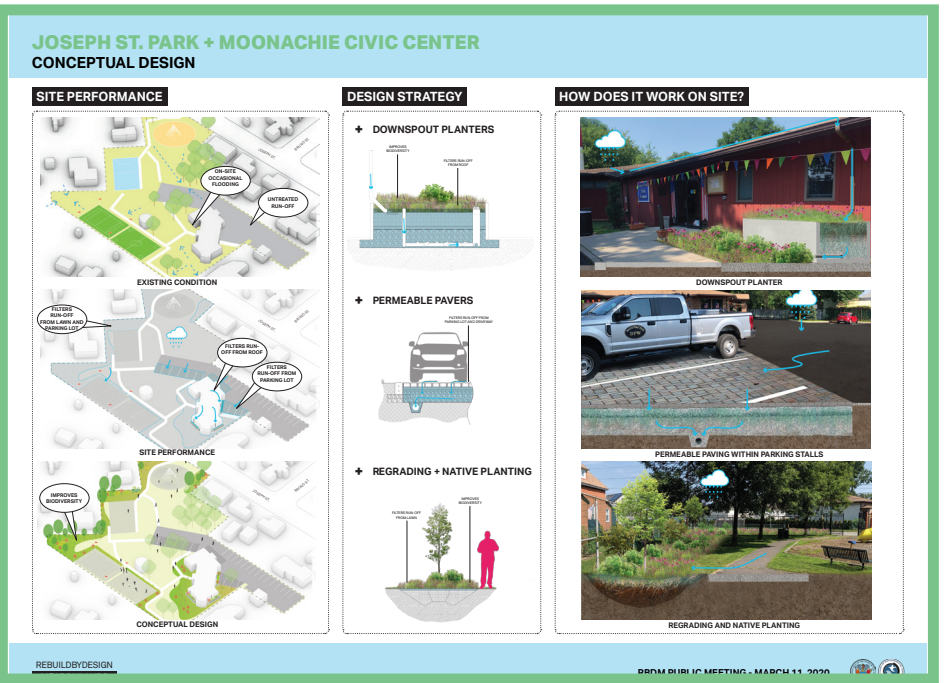
RIGHT-OF-WAY
GREEN
INFRASTRUCTURE



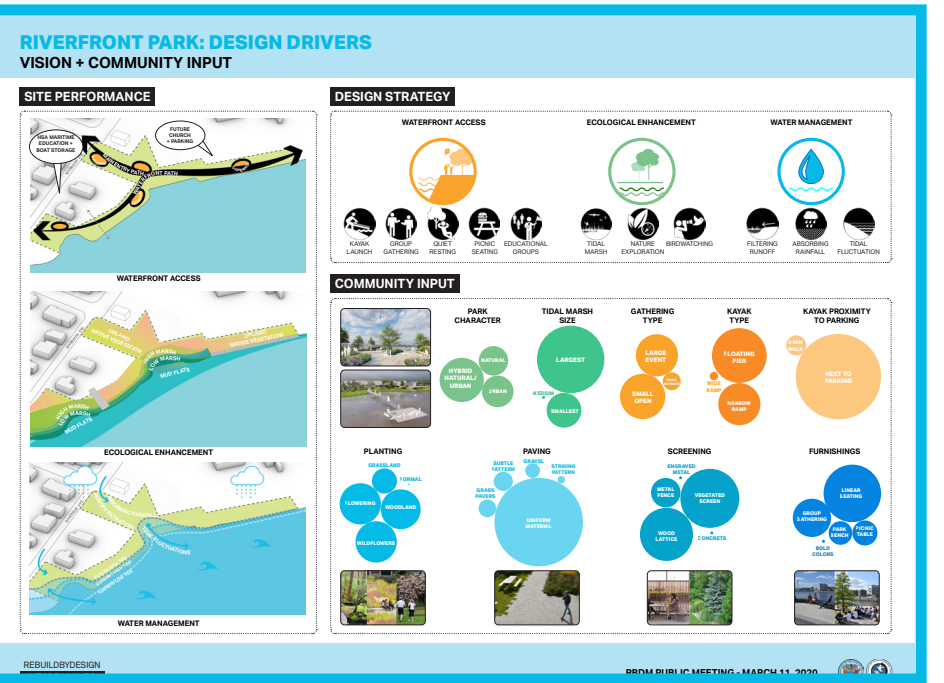
OVERALL
ECOLOGICAL
DESIGN STRATEGY



MUNICIPAL
SITES



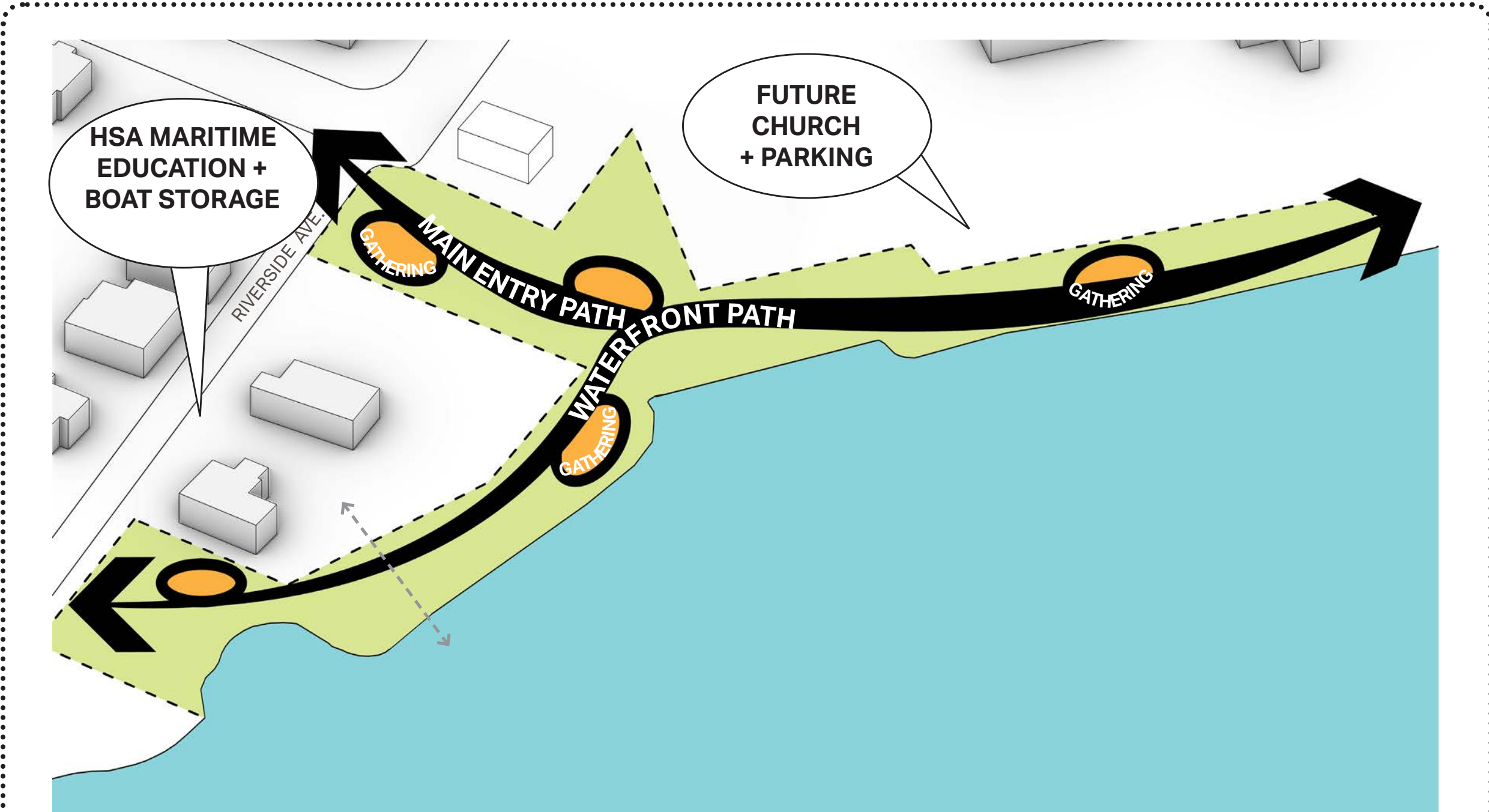
RIVERFRONT
PARK



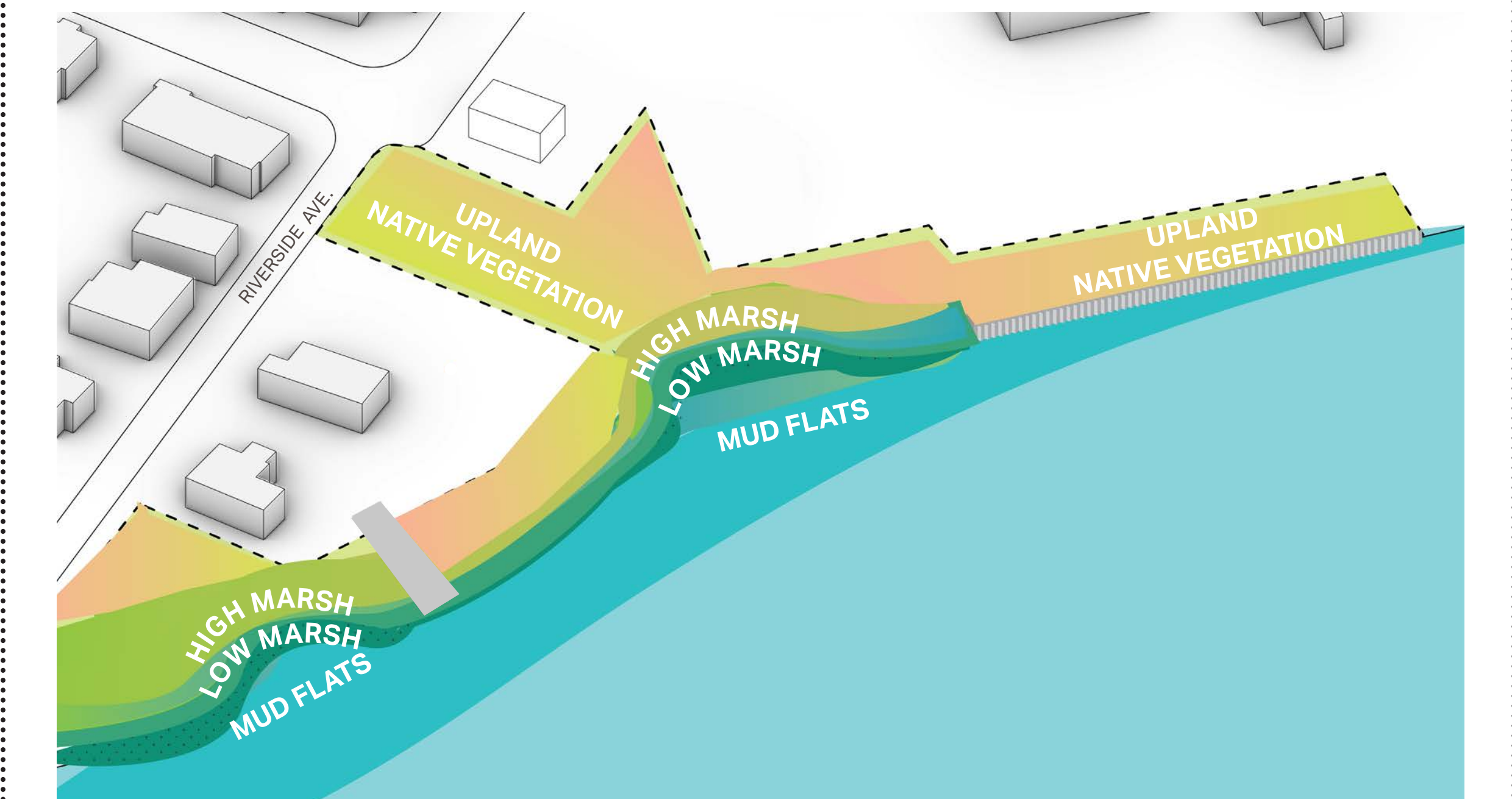
RIVERFRONT PARK: DESIGN DRIVERS

VISION + COMMUNITY INPUT

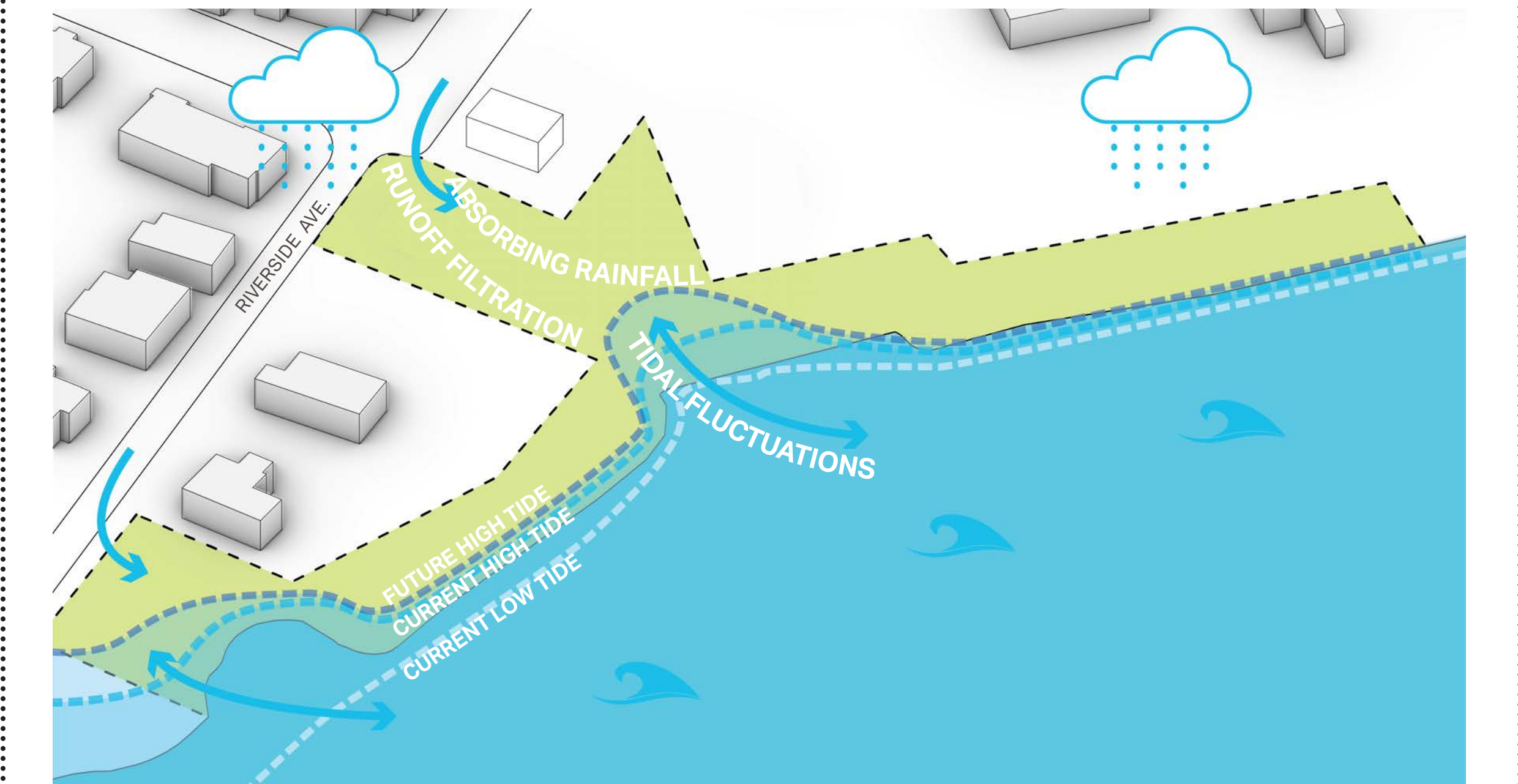
SITE PERFORMANCE



WATERFRONT ACCESS

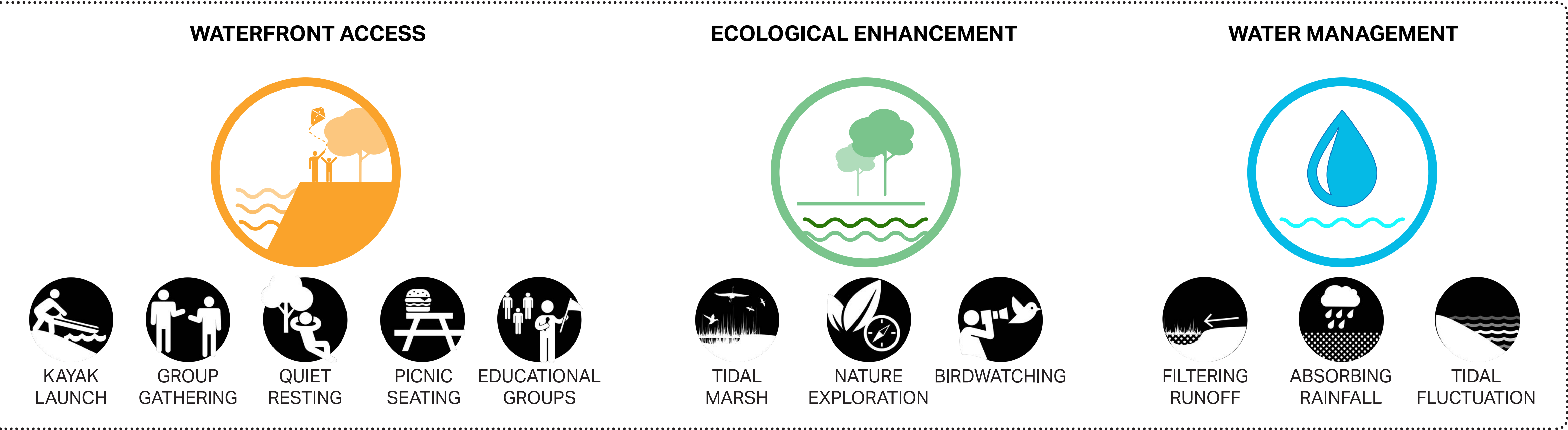


ECOLOGICAL ENHANCEMENT

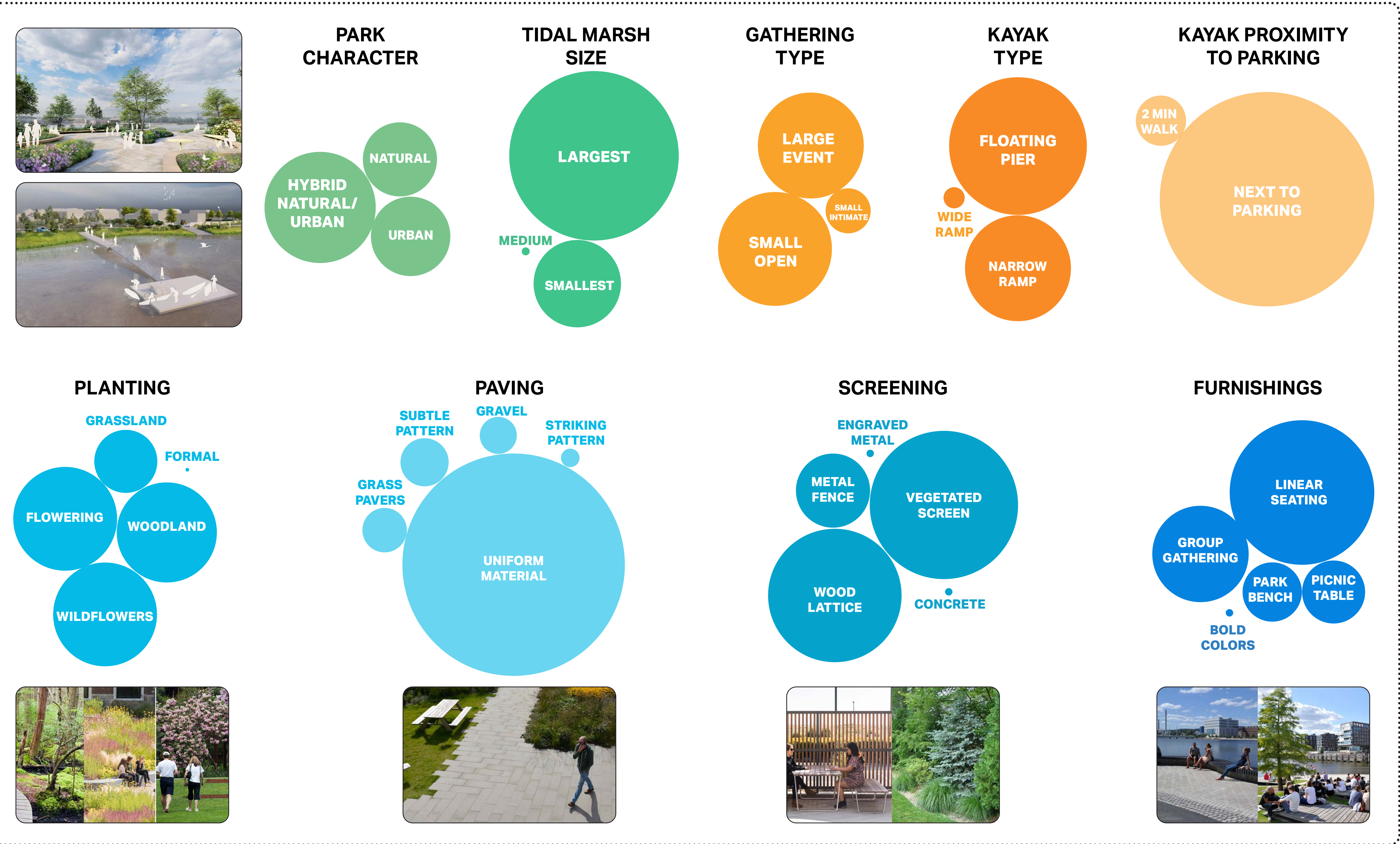


WATER MANAGEMENT

DESIGN STRATEGY



COMMUNITY INPUT



RIVERFRONT PARK
CONCEPTUAL DESIGN



FLEXIBLE SMALL GATHERING
IN LUSH PLANTING



FLEXIBLE GROUP GATHERING



TIDAL MARSH ENHANCEMENT
WITH FLOATING KAYAK LAUNCH

NEXT STEPS

CHRIS BENOSKY, AECOM

NEXT STEPS



- **Detailed Design Development + Permitting**
- **On-going Engagement**
- **Citizen Advisory Group Meeting (Spring)**
- **Community Meeting (Summer)**



CRITICAL PROJECT INFORMATION



Website

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Question & Answer

