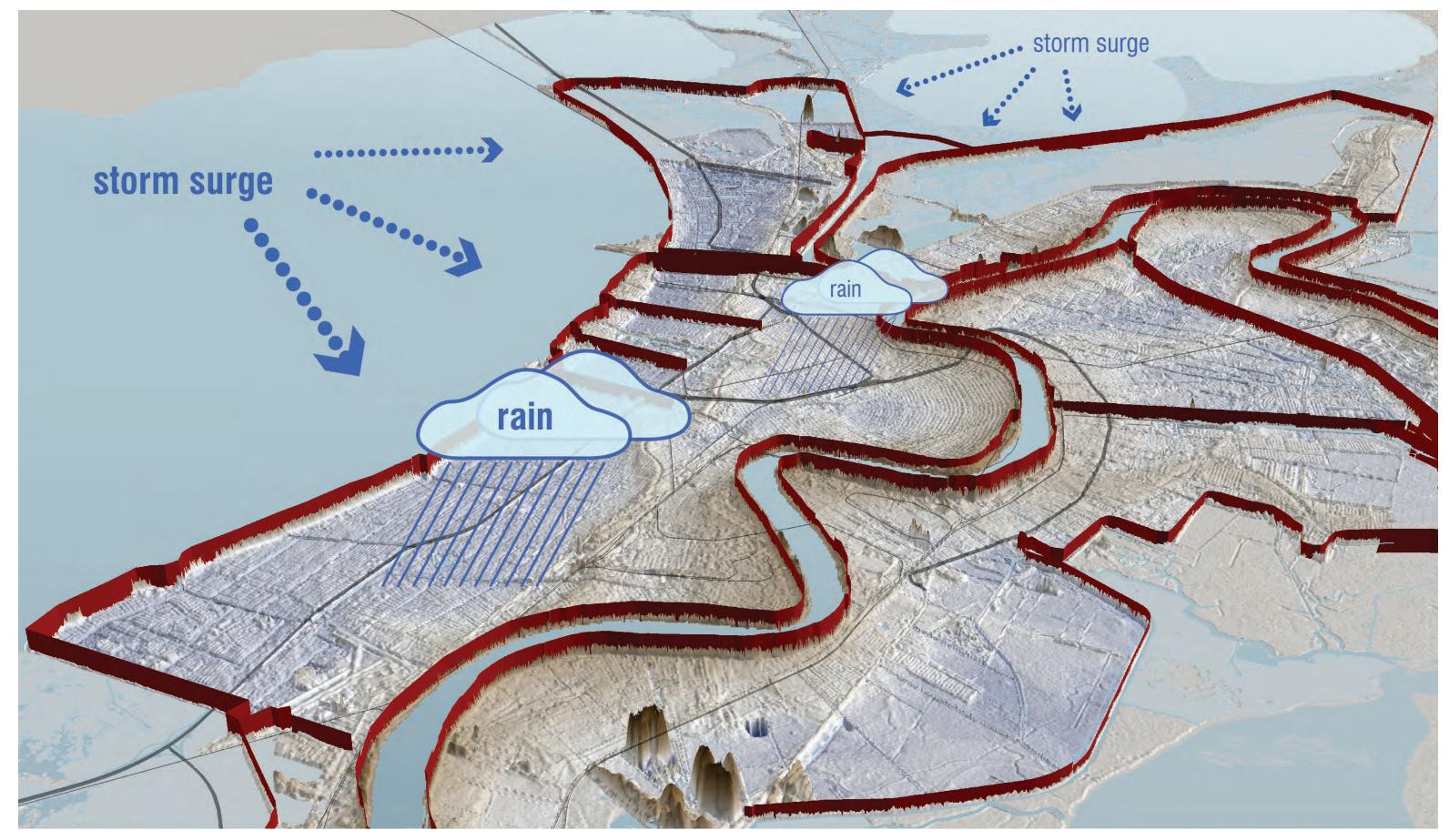


29 MARCH 2017 ITRC ANNUAL MEETING DAVID WAGGONNER PRINCIPAL

Living With Water Ground - Infrastructure - Habitation

> WAGGONNER &BALL

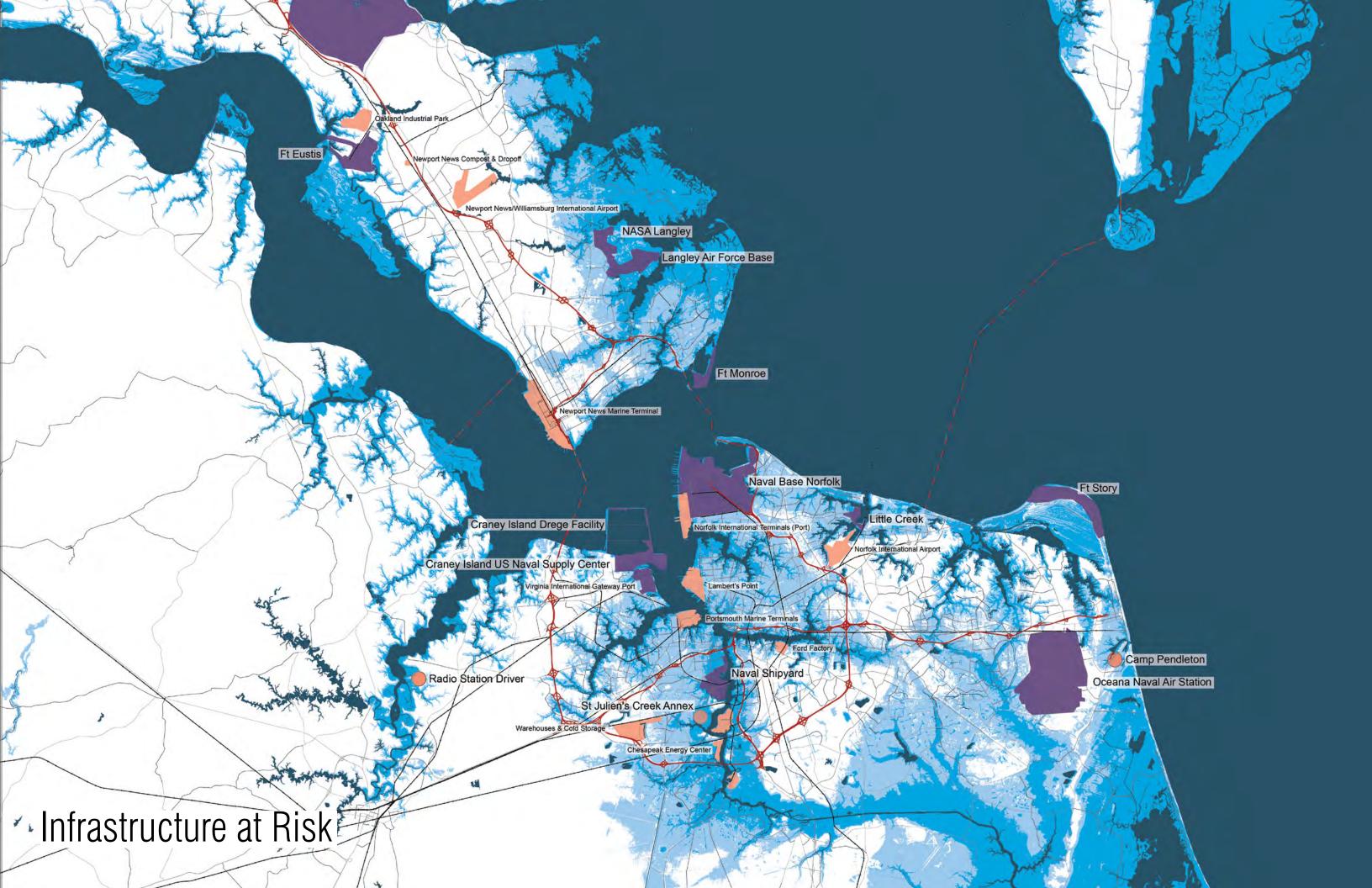
NEW ORLEANS LINES OF DEFENSE



NEW ORLEANS FLOODED CITY, 2005







NDRC NORFOLK FORCES OF WATER

STORM SÜRGE





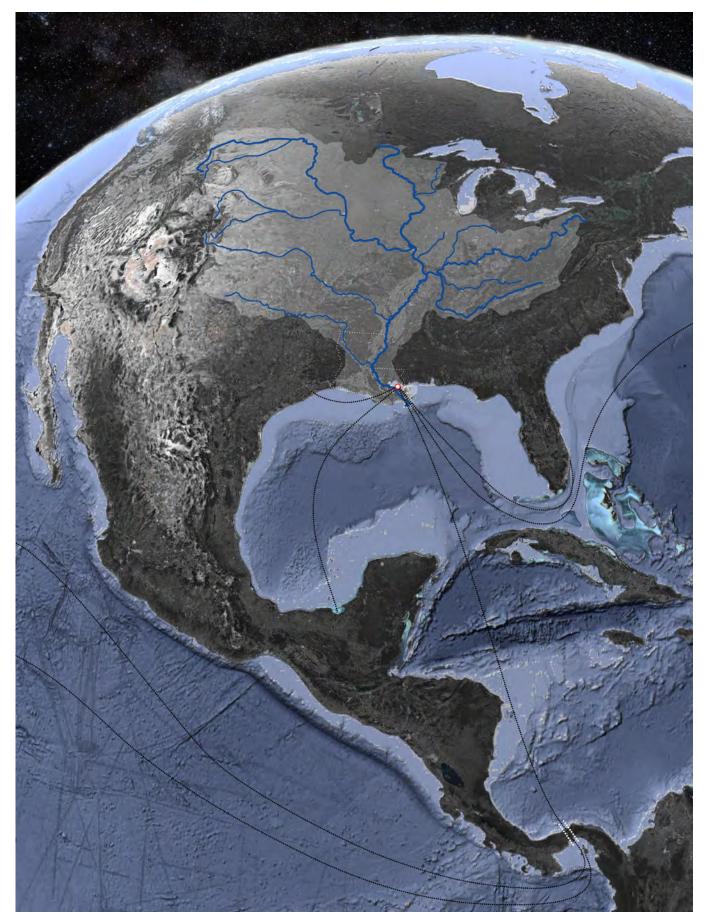
INCREASED

PRECIPITATION

SURFACE RUNOFF



NEW ORLEANS DUTCH DIALOGUES



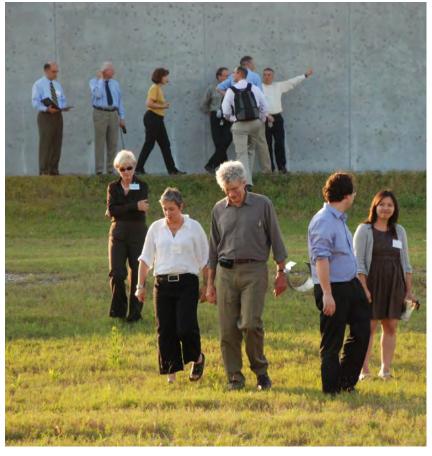
Diatah Dialog Sules New ORLEANS Common Challenges in Urbanized Deltas

Waggonner and Ball Royal Netherlands Embassy American Planning Association



DUTCH DIALOGUES











GREATER NEW ORLEANS URBAN WATER PLAN **DOCUMENTS**

Greater New Orleans Urban Water Plan

Vision

Waggonner & Ball Architects September 2013 Greater New Orleans Urban Water Plan

Urban Design

Waggonner & Ball Architects

September 2013

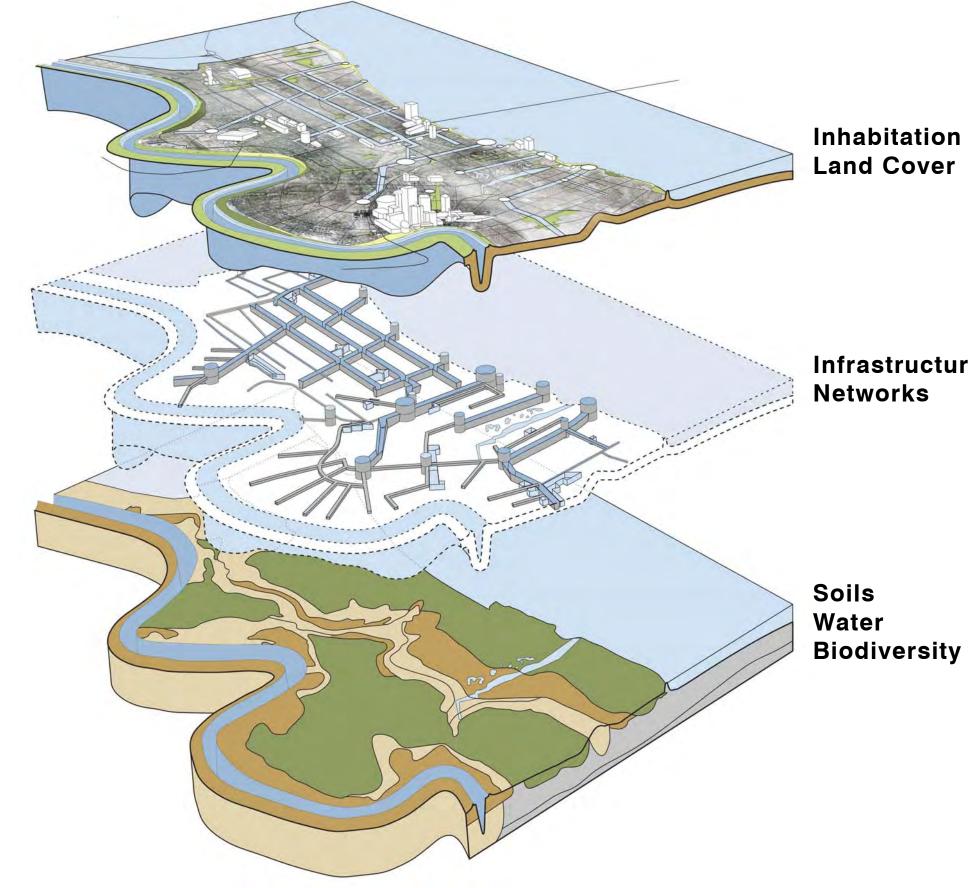
LIVINGWITHWATER.COM

Greater New Orleans Urban Water Plan

Implementation

Waggonner & Ball Architects

GREATER NEW ORLEANS URBAN WATER PLAN PLANNING APPROACH



Infrastructure

GROUND



NEW ORLEANS SOIL TYPES



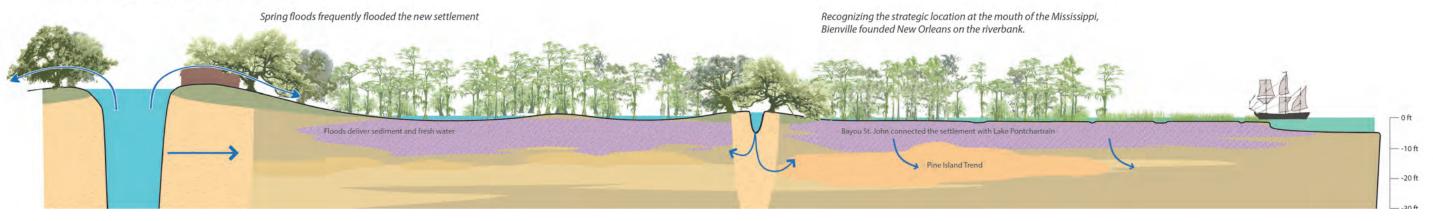
NEW ORLEANS



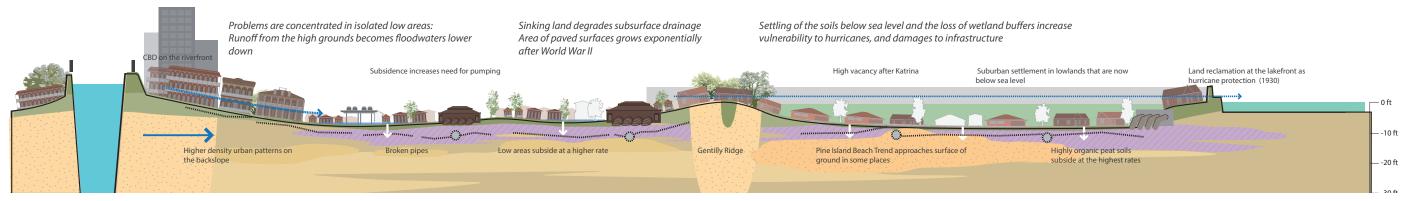


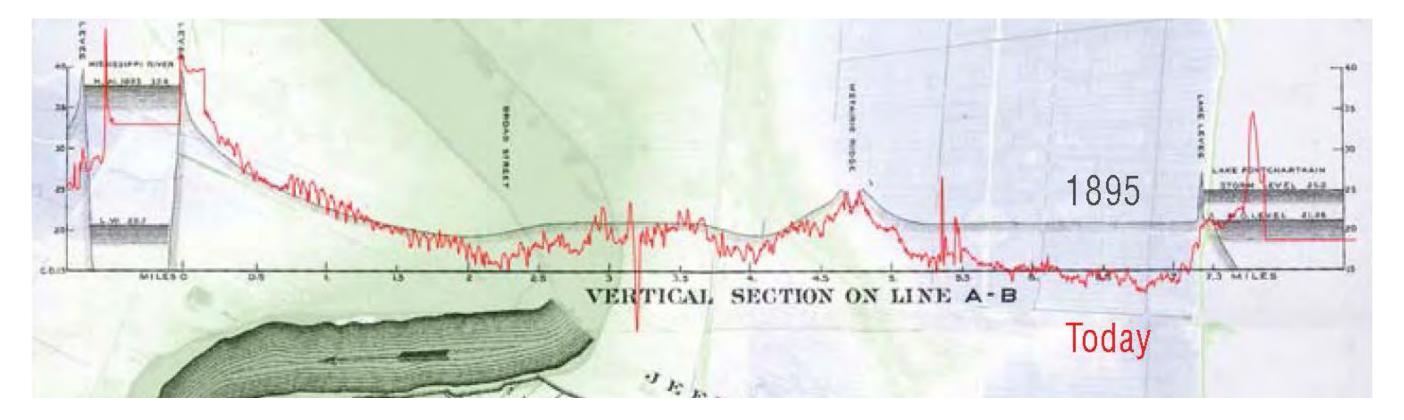
NEW ORLEANS AVOIDABLE COST: SUBSIDENCE

Circa 1718 Founding on the Riverbank

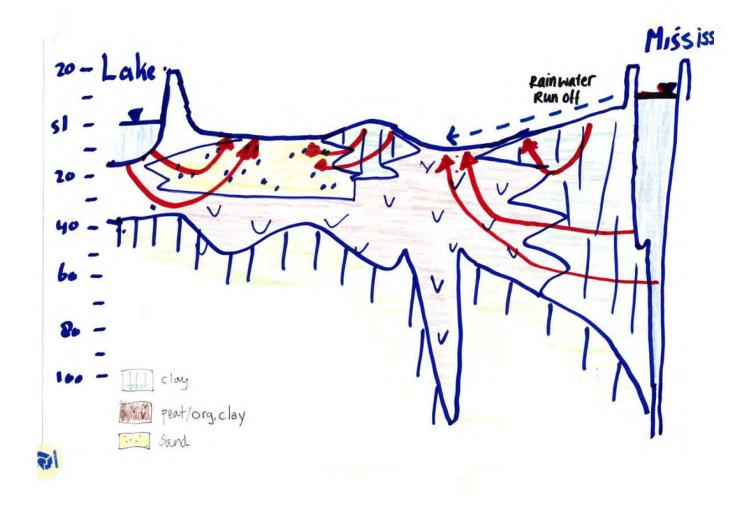


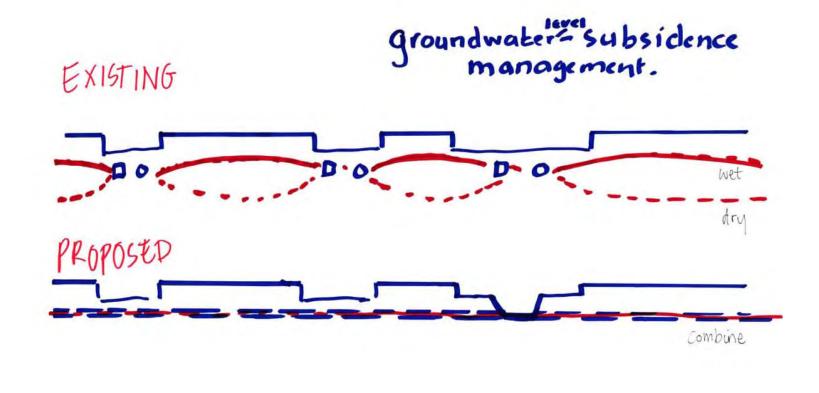
Circa 2000 City Between River and Lake





DUTCH DIALOGUES GROUNDWATER MANAGEMENT





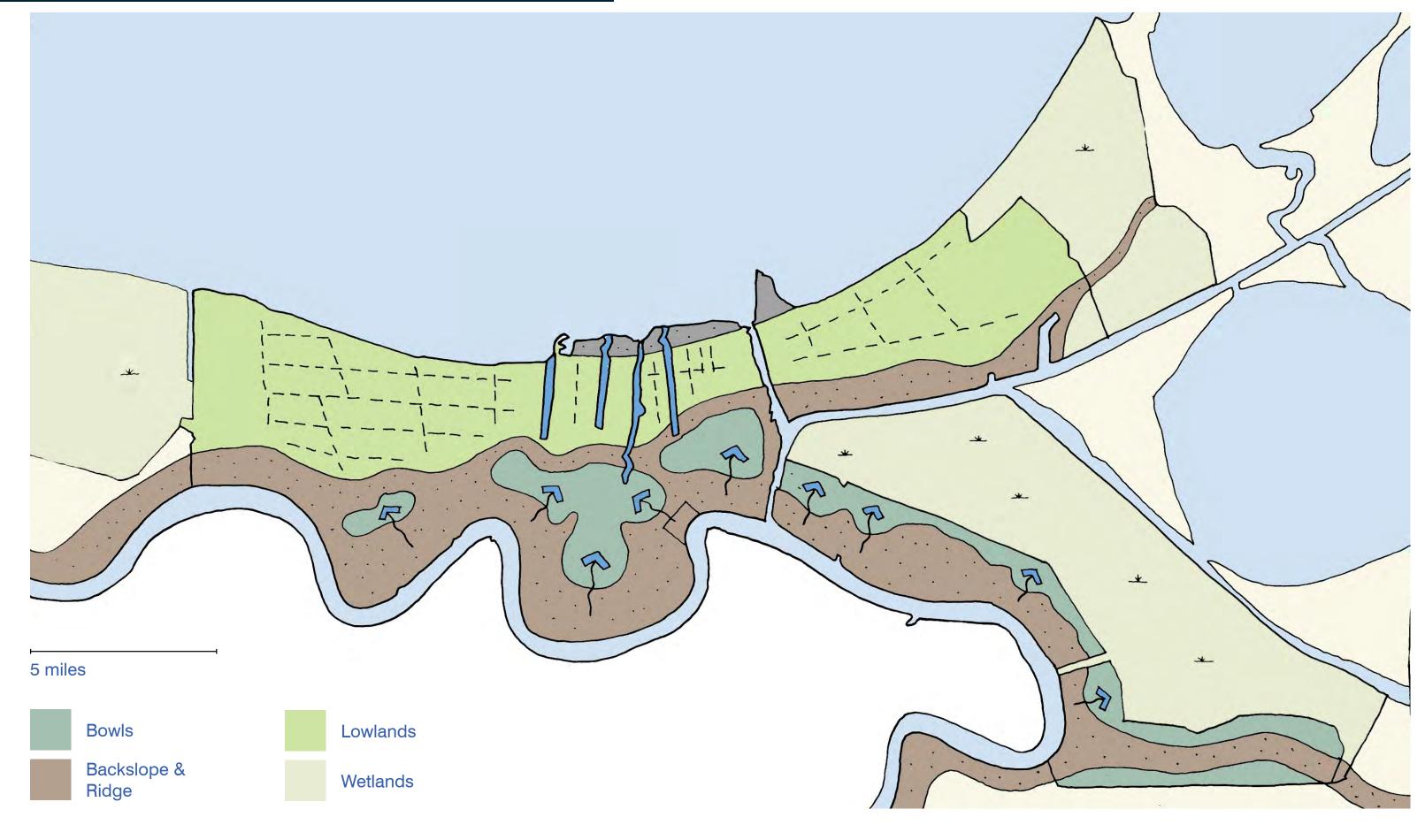
PRAINAGE SYSTEM : EXISTING AND POTENTIAL

image: Deltares

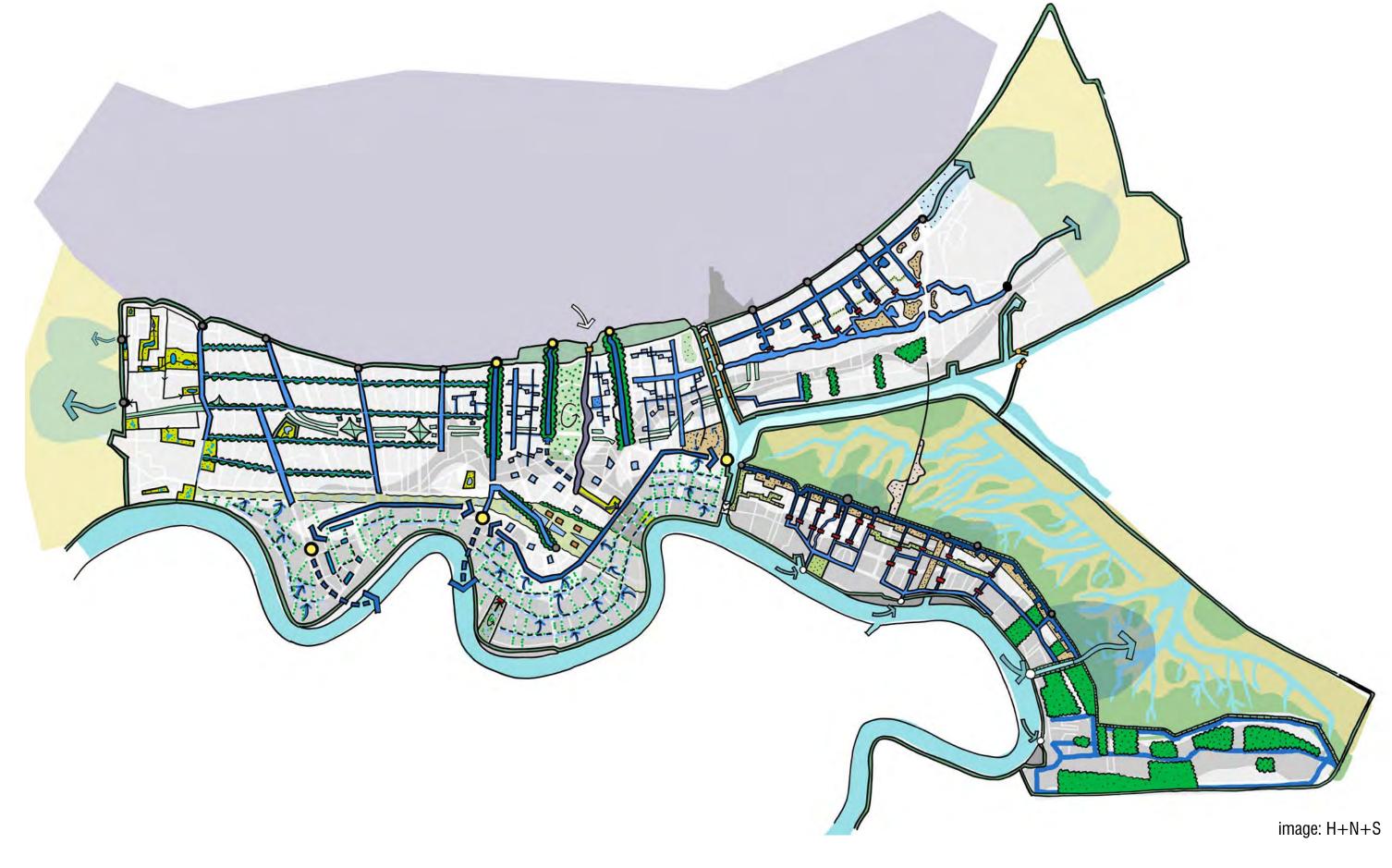
NEW ORLEANS SUBSIDENCE



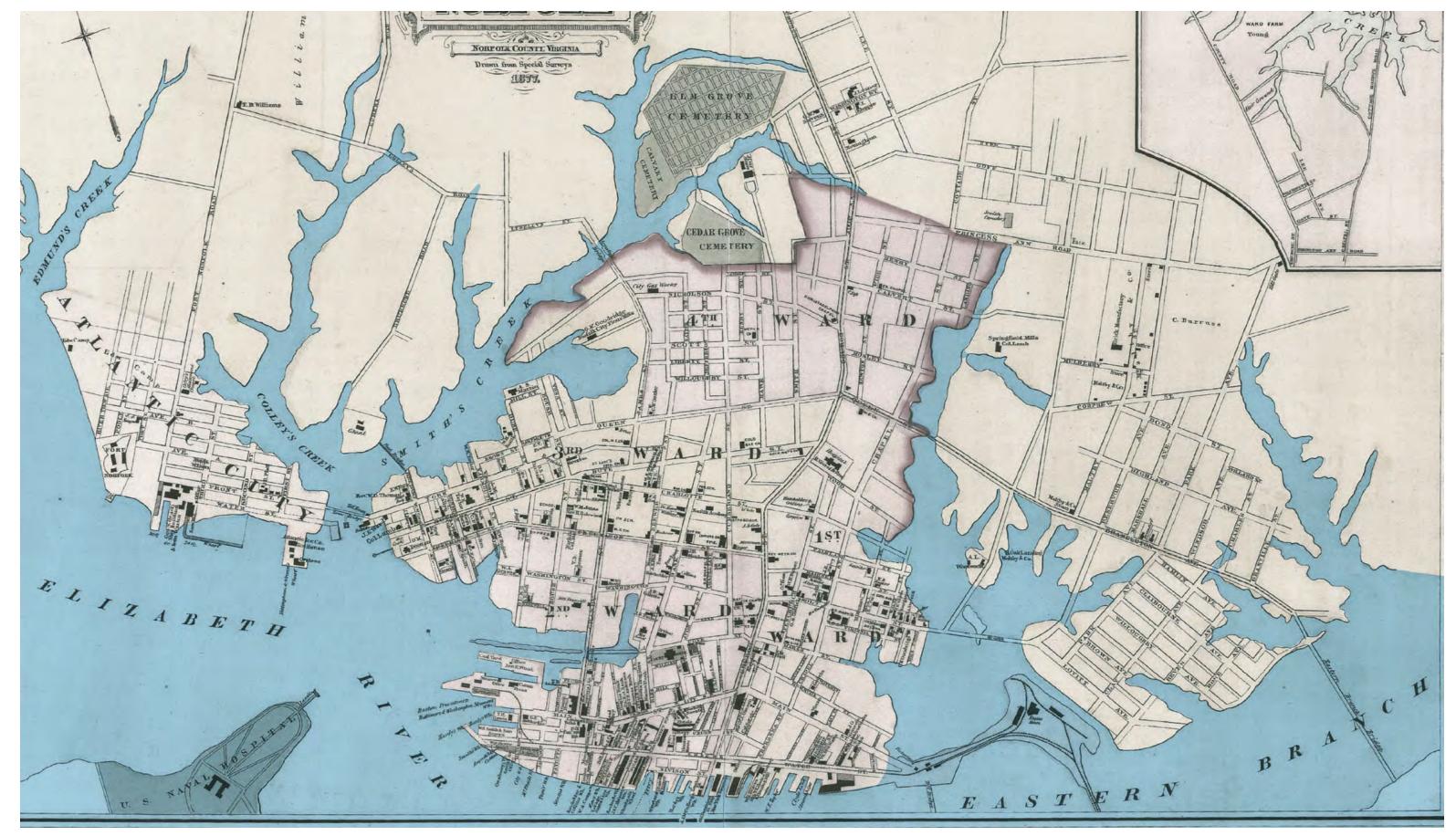
GREATER NEW ORLEANS URBAN WATER PLAN LANDSCAPE TYPES



GREATER NEW ORLEANS URBAN WATER PLAN



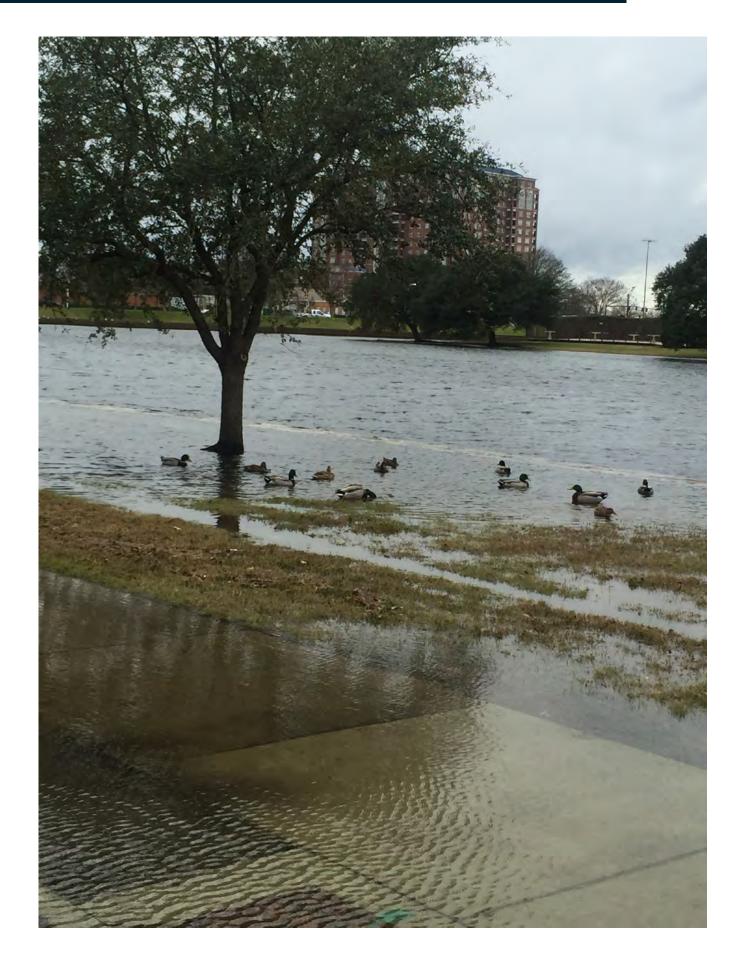
NDRC: VIRGINIA NORFOLK 1877

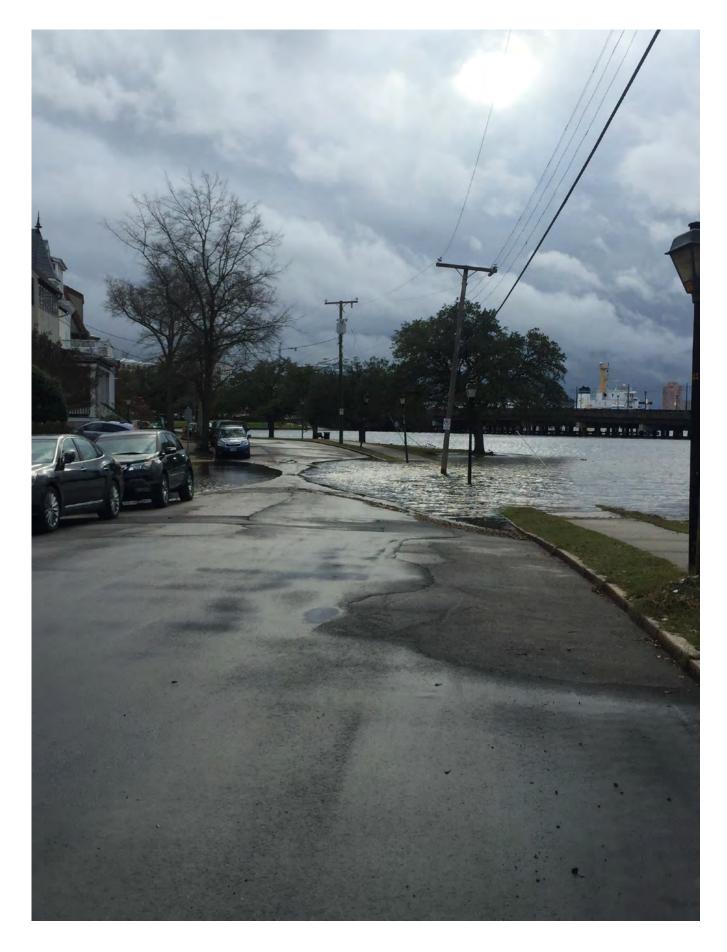


NDRC: VIRGINIA



DUTCH DIALOGUES VIRGINIA NORFOLK TIDAL FLOODING





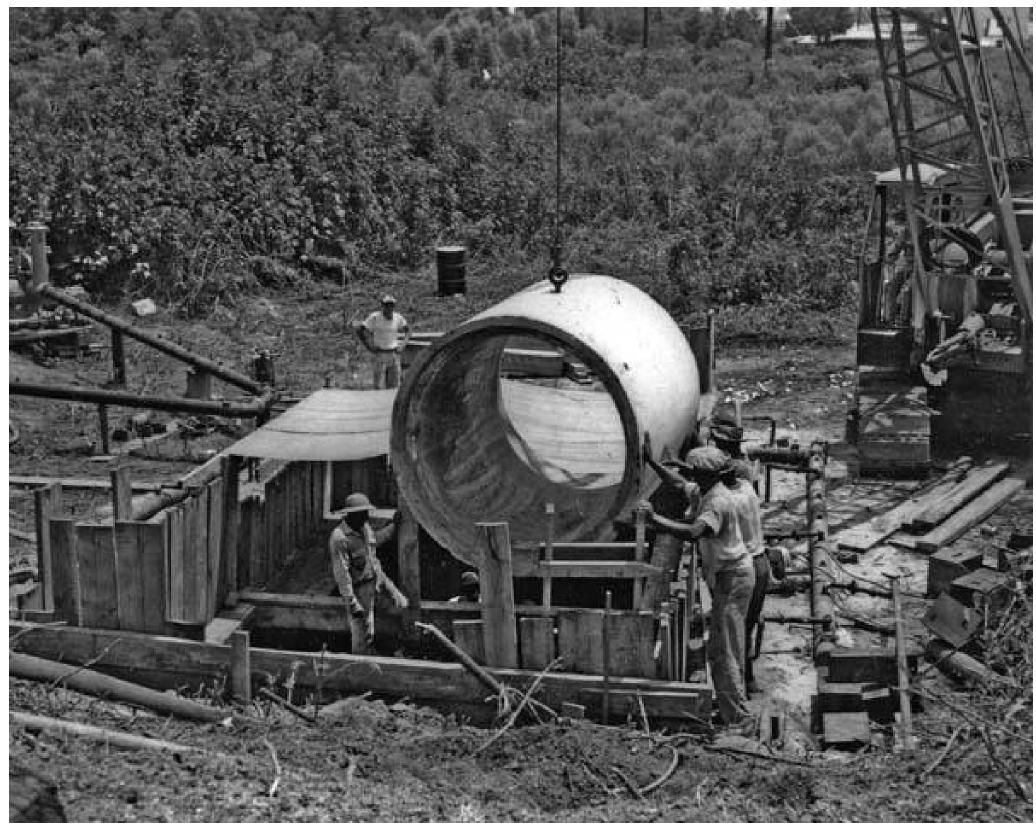
HOUSTON, 2015 FLOODING

source: Associated Press, David J. Phillips

INFRASTRUCTURE

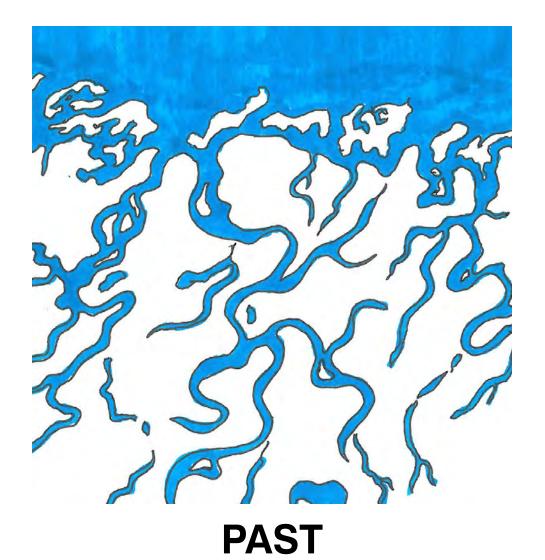


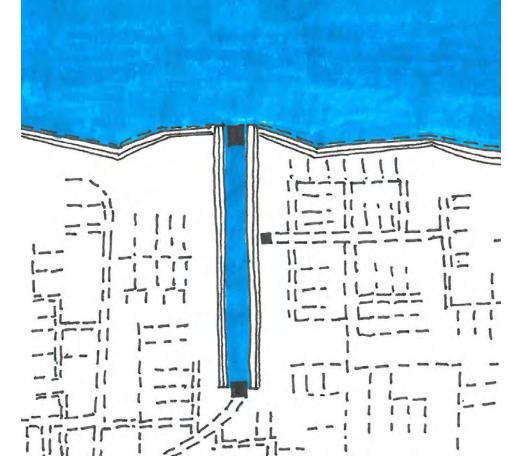
NEW ORLEANS DRAINING THE SWAMP



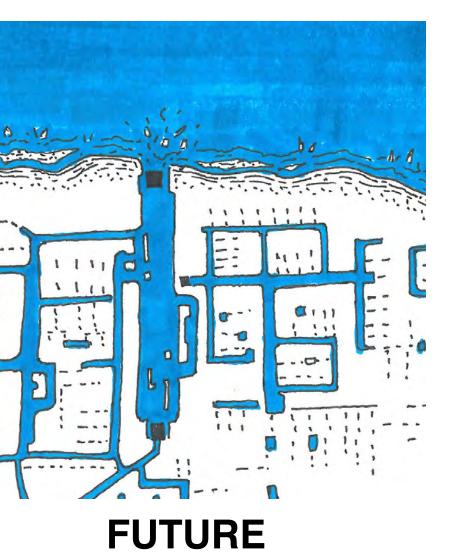
source: New Orleans Public Library

NDRC NEW ORLEANS DELTA ADAPTATION

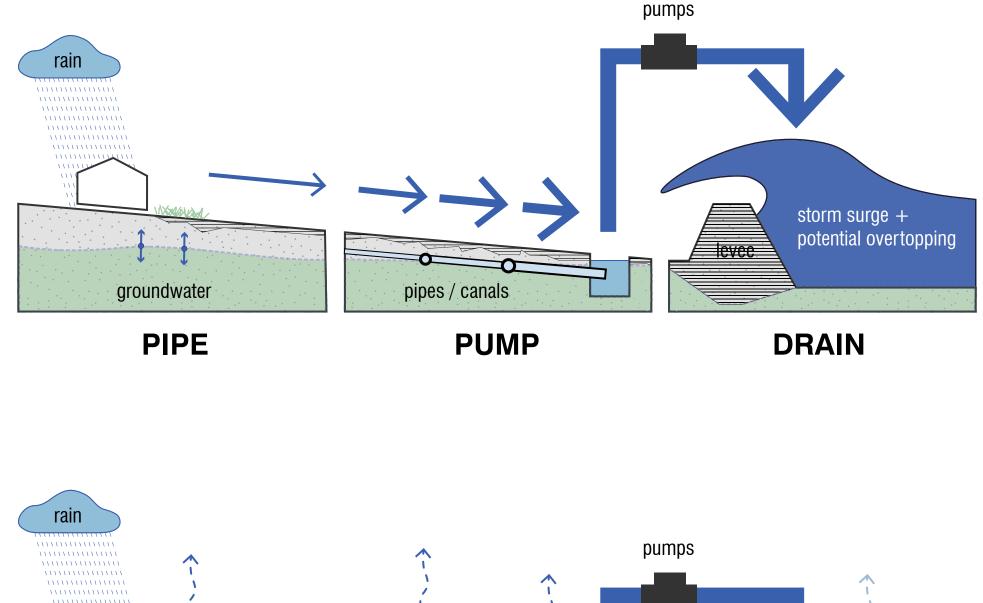


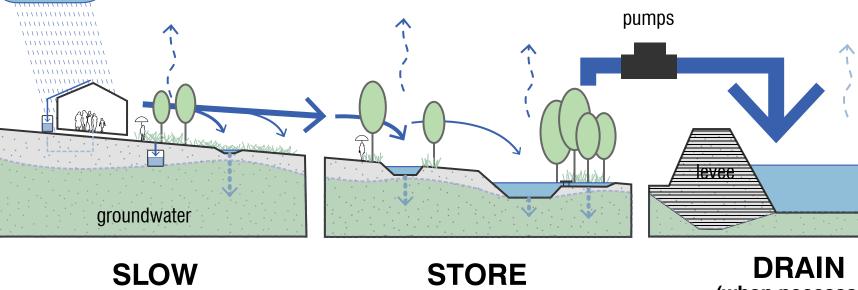


CURRENT

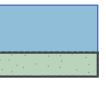


GREATER NEW ORLEANS URBAN WATER PLAN **PARADIGM SHIFT**

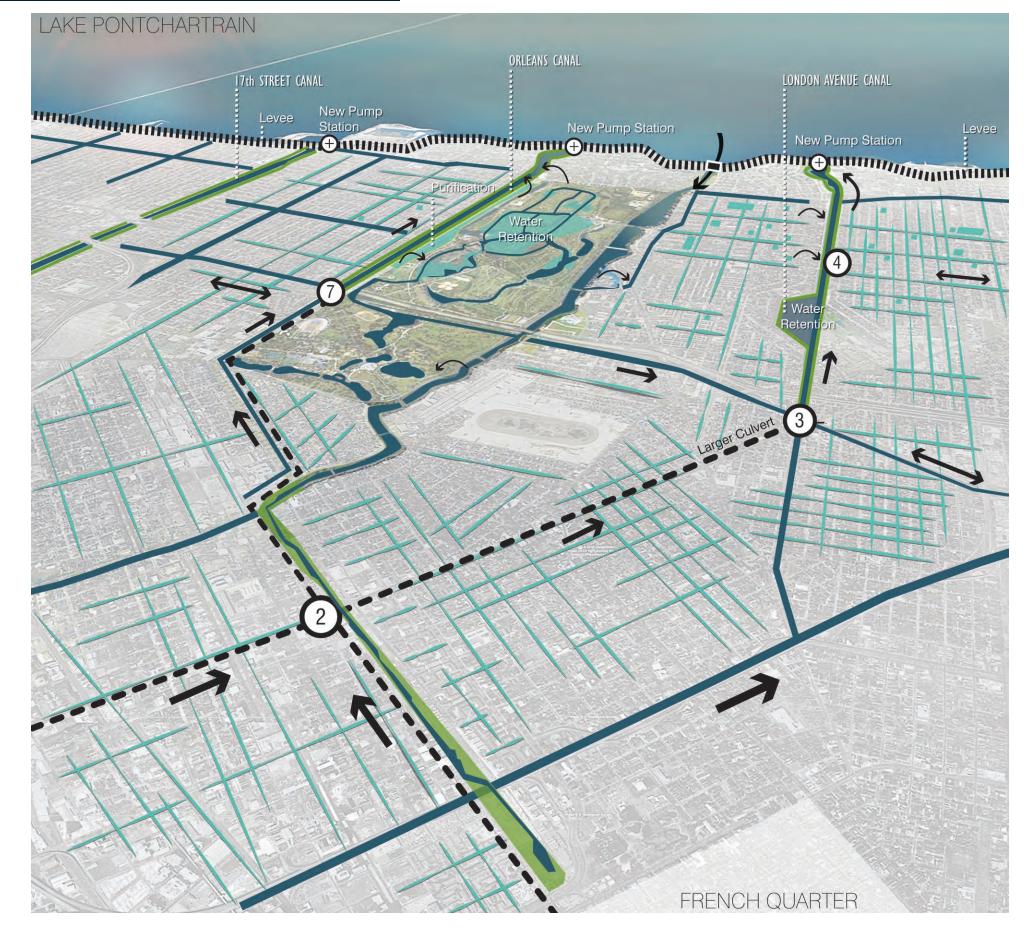




(when necessary)



GREATER NEW ORLEANS URBAN WATER PLAN LOWLAND CANAL NETWORK



NEW ORLEANS LAFITTE CORRIDOR

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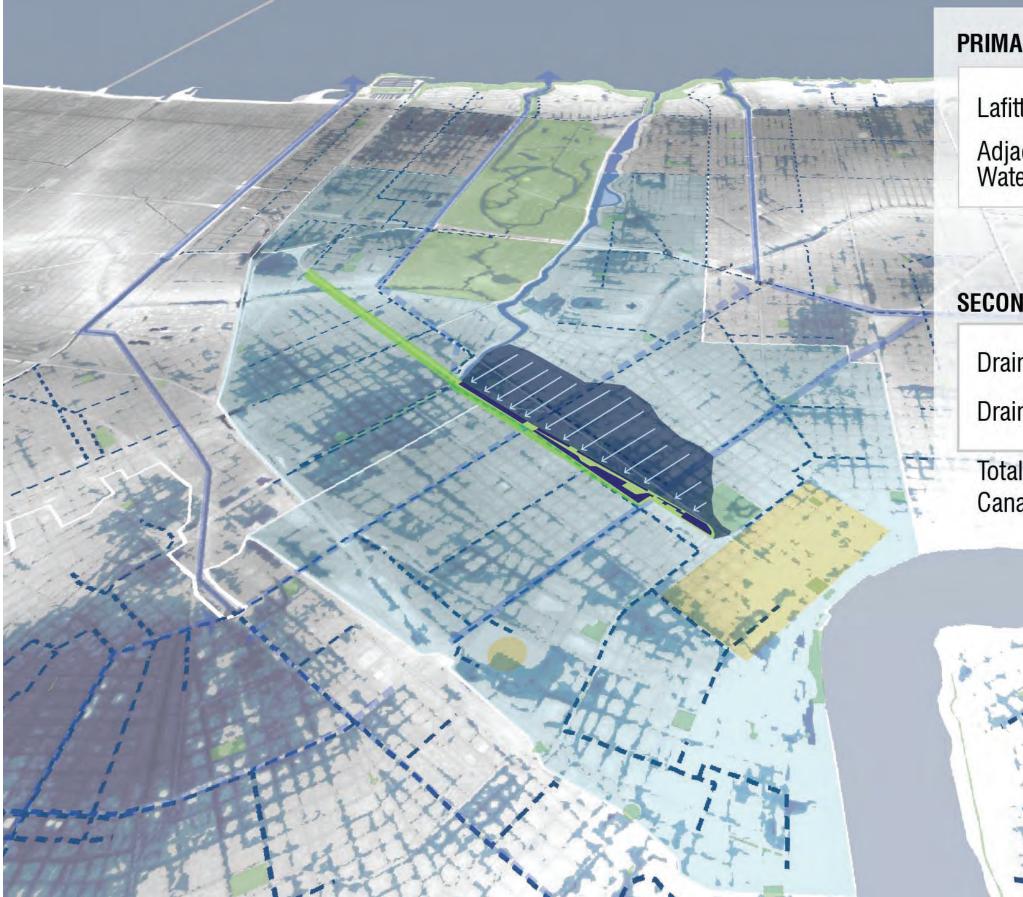
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GREATER NEW ORLEANS URBAN WATER PLAN LAFITTE BLUEWAY - DRAINAGE IMPACT



Lafitte Greenway Retention Adjacent Catchment Area Water Assignment

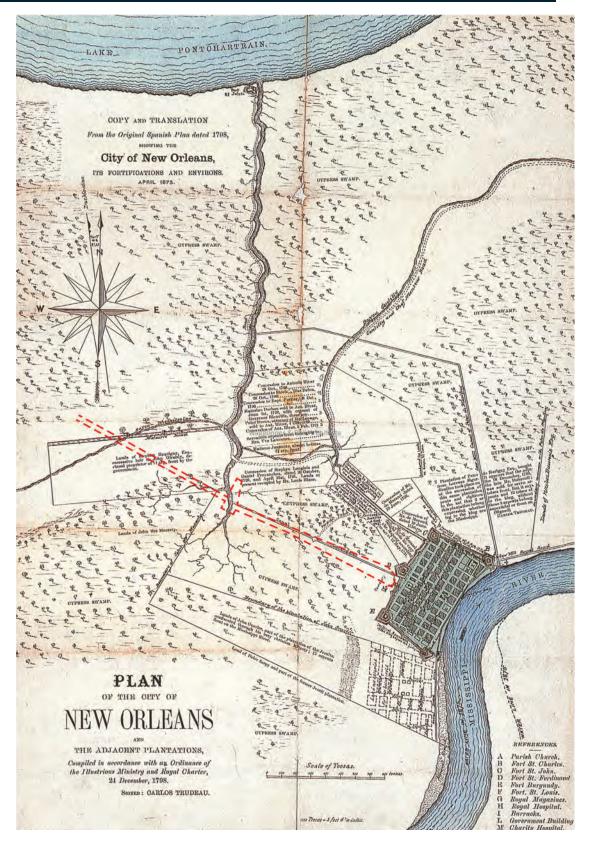
Drainage Service Area 3

Drainage Service Areas 2+7

Total Orleans and London Avenue Canal Service Areas



LAFITTE GREENWAY SUSTAINABLE WATER DESIGN HISTORIC CONNECTIONS





GREATER NEW ORLEANS URBAN WATER PLAN LAFITTE BLUEWAY

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image: Bosch Slabbers

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GREATER NEW ORLEANS URBAN WATER PLAN LAFITTE BLUEWAY - WET

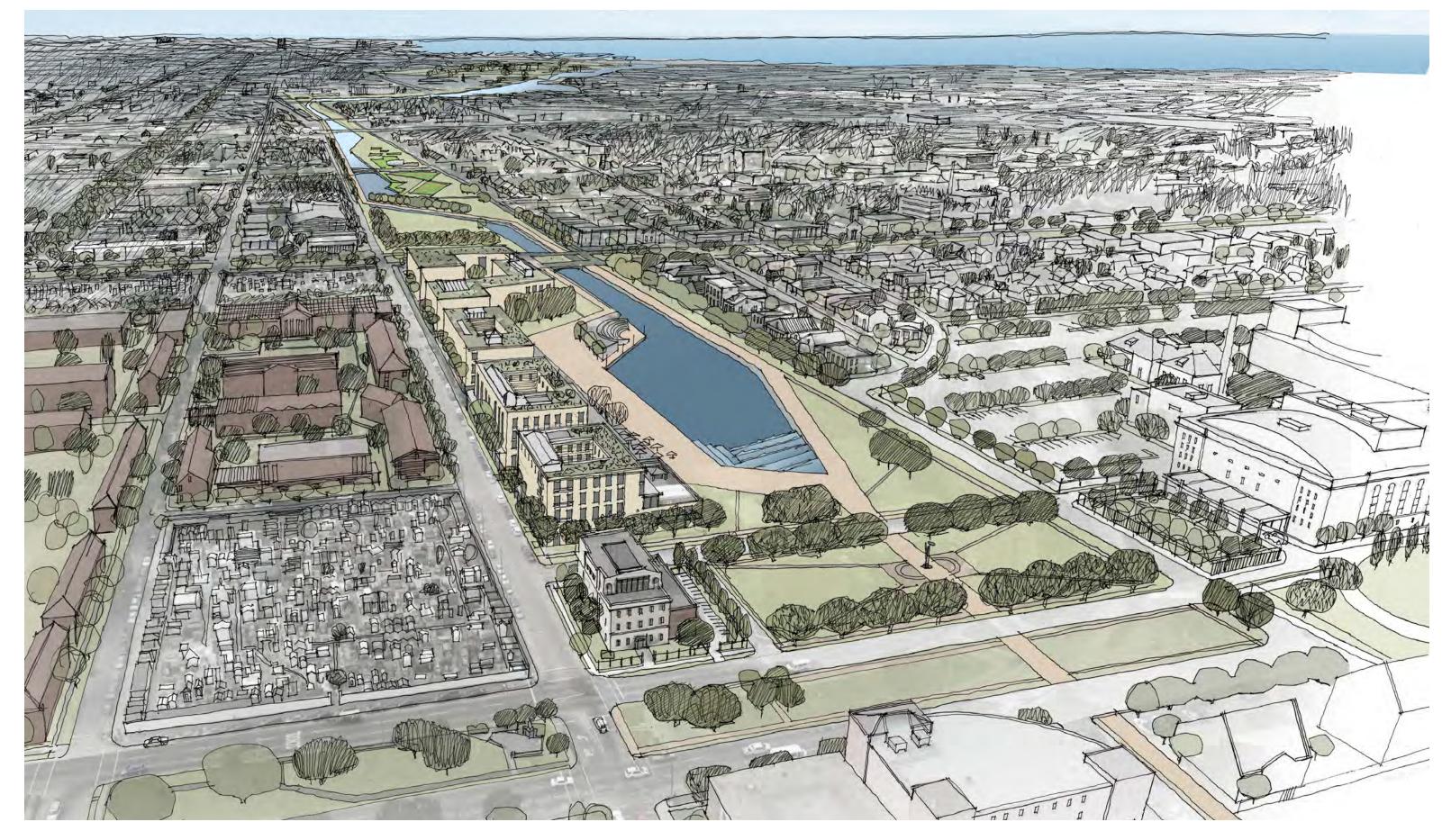
E

image: Bosch Slabbers

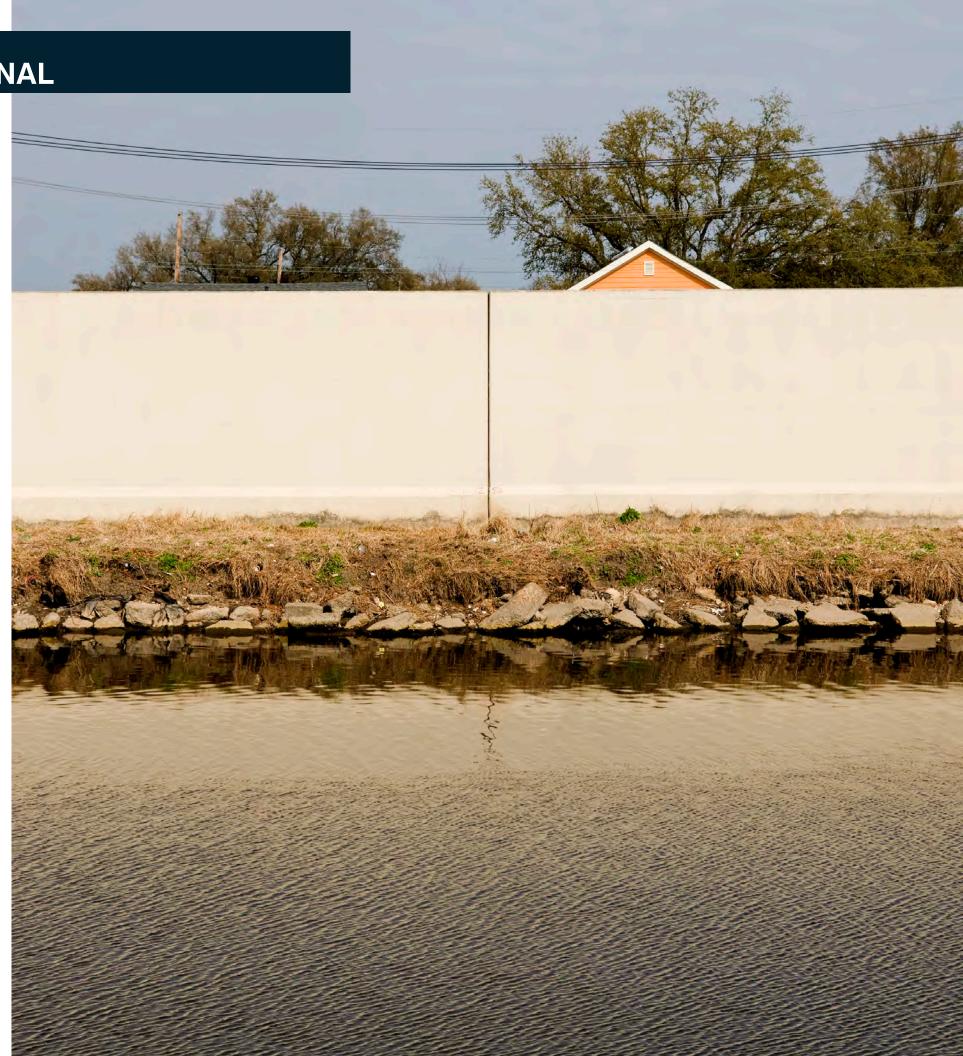
n

DOTATION PAR

GREATER NEW ORLEANS URBAN WATER PLAN LAFITTE BLUEWAY FROM BASIN



NEW ORLEANS LONDON AVENUE CANAL



GERMANY BERLIN WALL



GERMANY BERLIN WALL



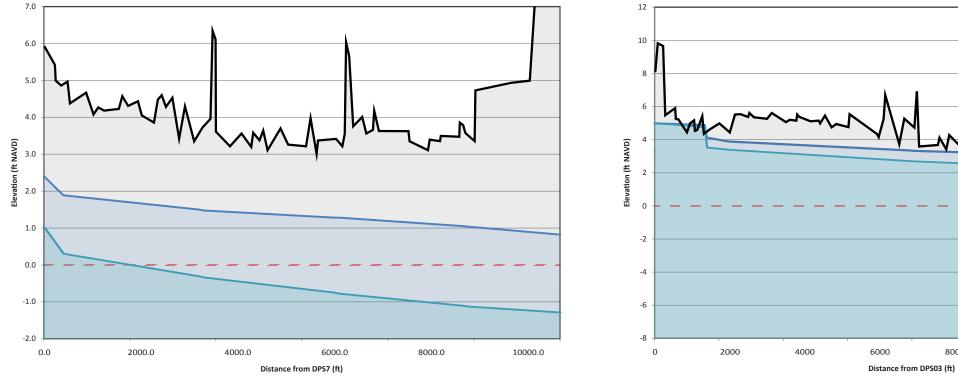
NEW ORLEANS LONDON AVENUE CANAL

Marken and and and



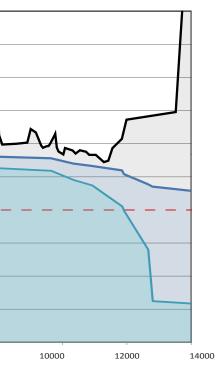
GREATER NEW ORLEANS URBAN WATER PLAN OUTFALL CANALS





Orleans Canal

London Avenue Canal



8000



GREATER NEW ORLEANS URBAN WATER PLAN HOEY'S BASIN / MONTICELLO CANAL

LOWE'S

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GREATER NEW ORLEANS URBAN WATER PLAN HOEY'S BASIN / MONTICELLO CANAL

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image: Bosch Slabbers, Waggonner & Ball

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GREATER NEW ORLEANS URBAN WATER PLAN HOEY'S BASIN / MONTICELLO CANAL

Vie

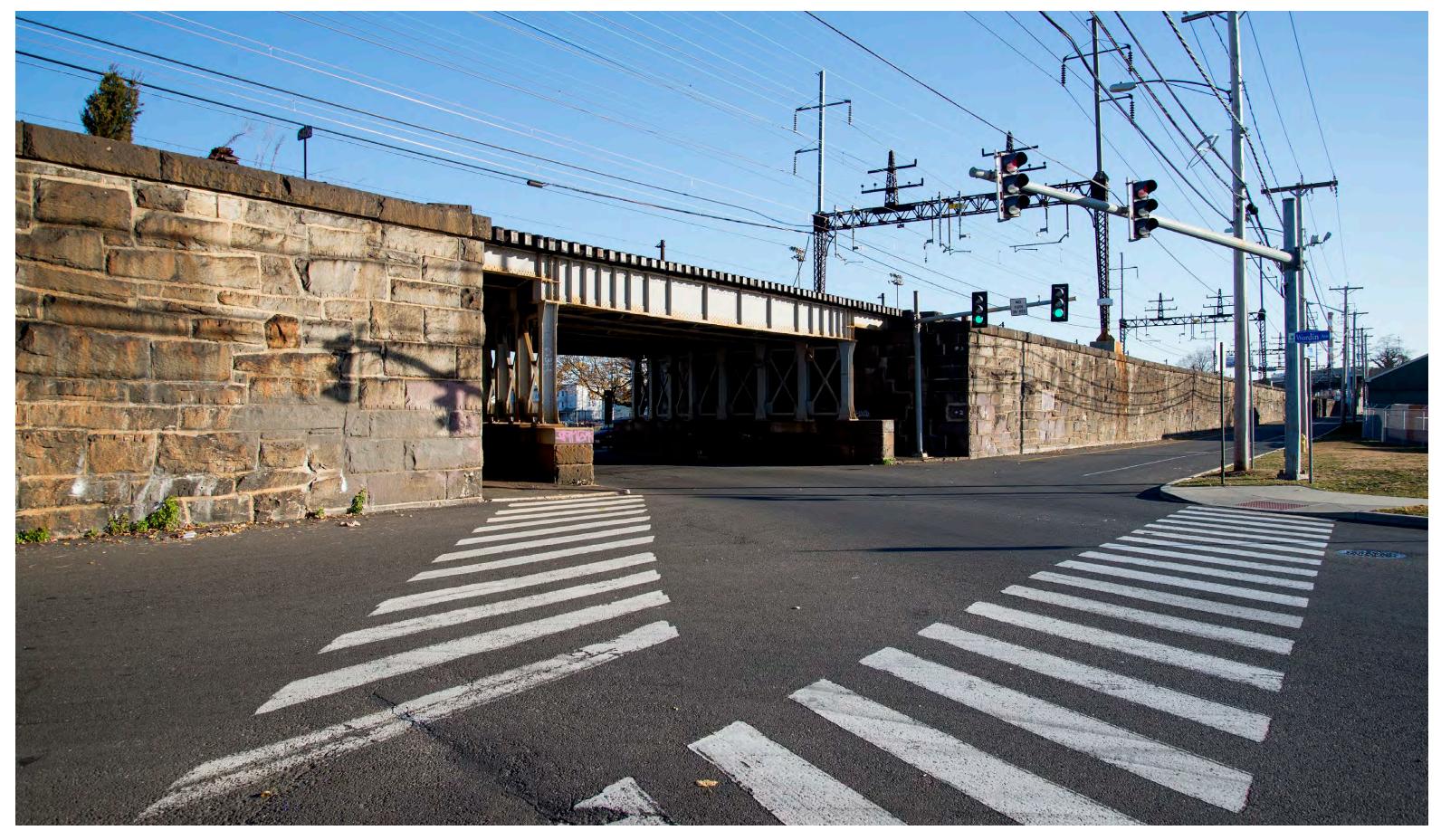
T-BUSA

image: Bosch Slabbers, Waggonner & Ball

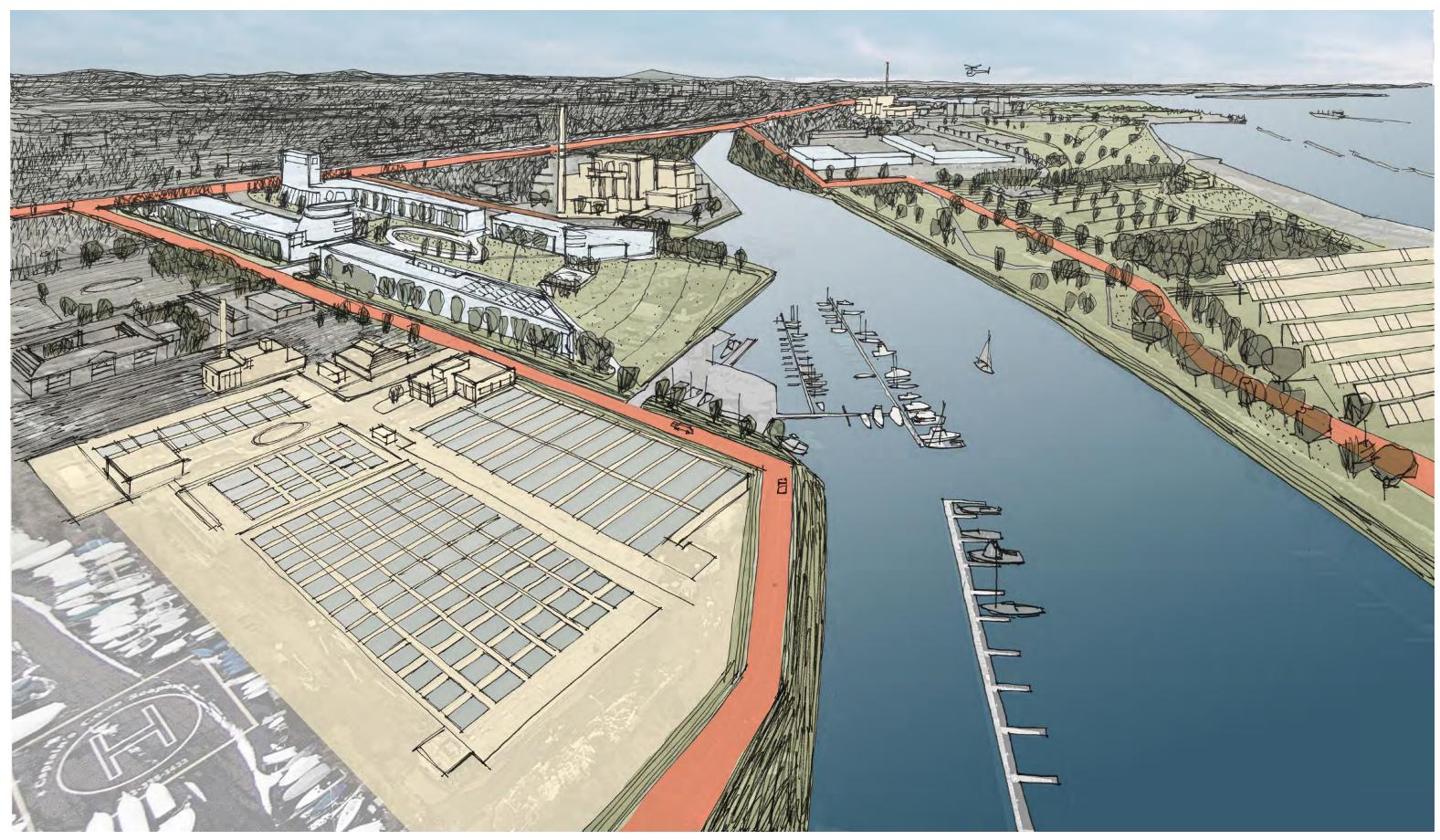




BRIDGEPORT 1840'S RAILROAD



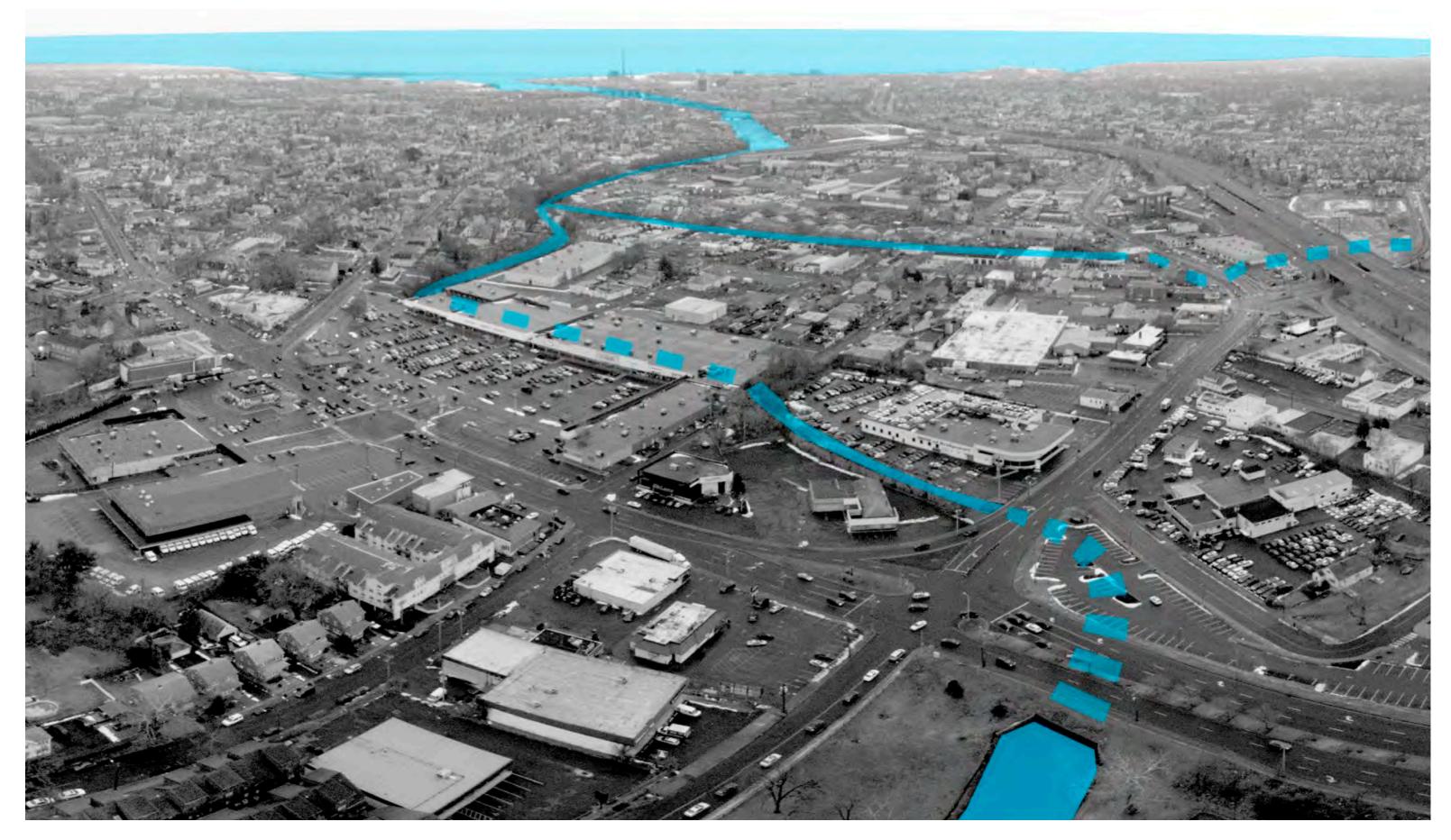
BLACK ROCK HARBOR POWERING THE CITY



REBUILD BY DESIGN SOUTH END



PEQUONNOCK COVERED RIVER AT SHOPPER'S PLAZA

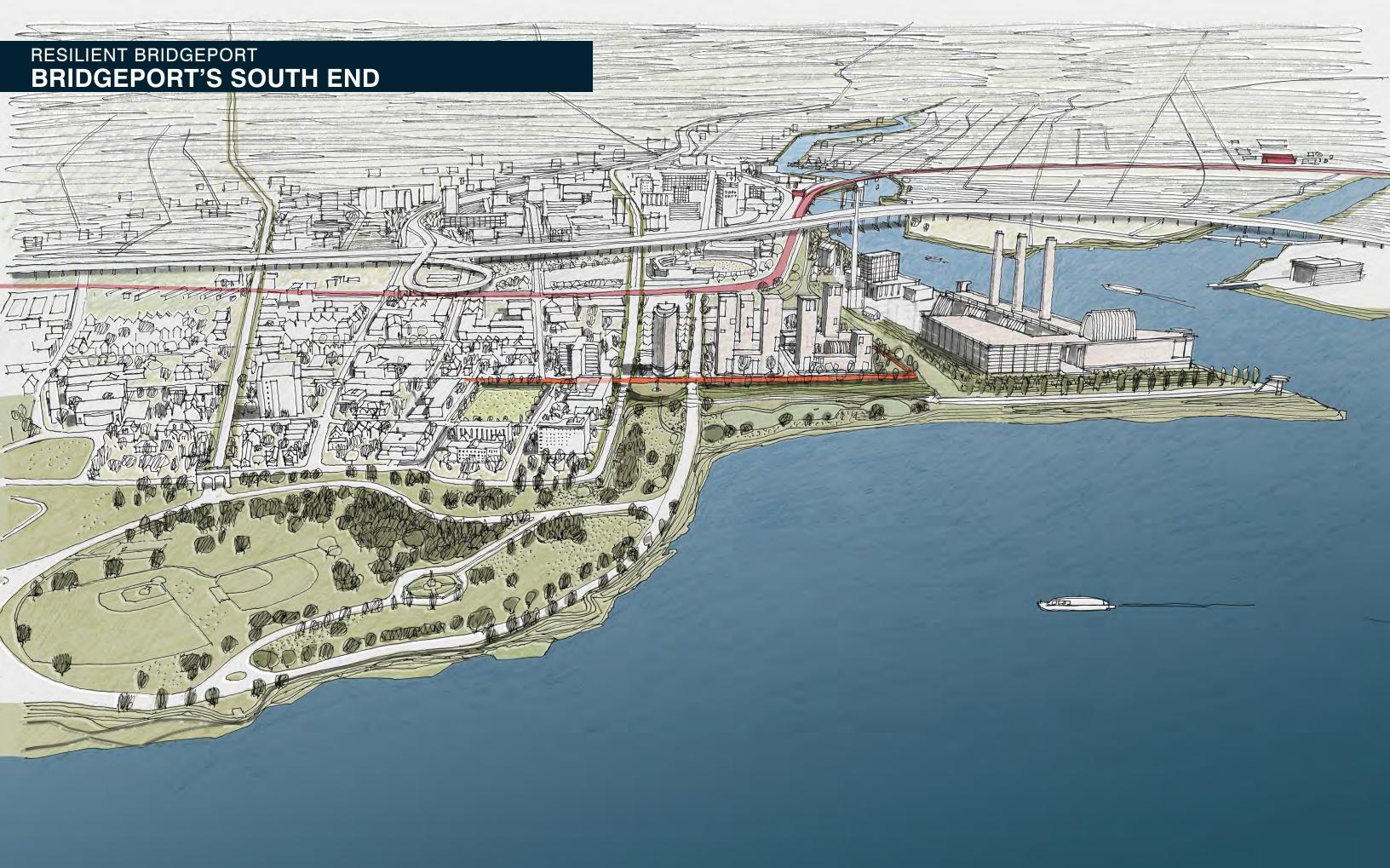


PEQUONNOCK COVERED RIVER AT SHOPPER'S PLAZA

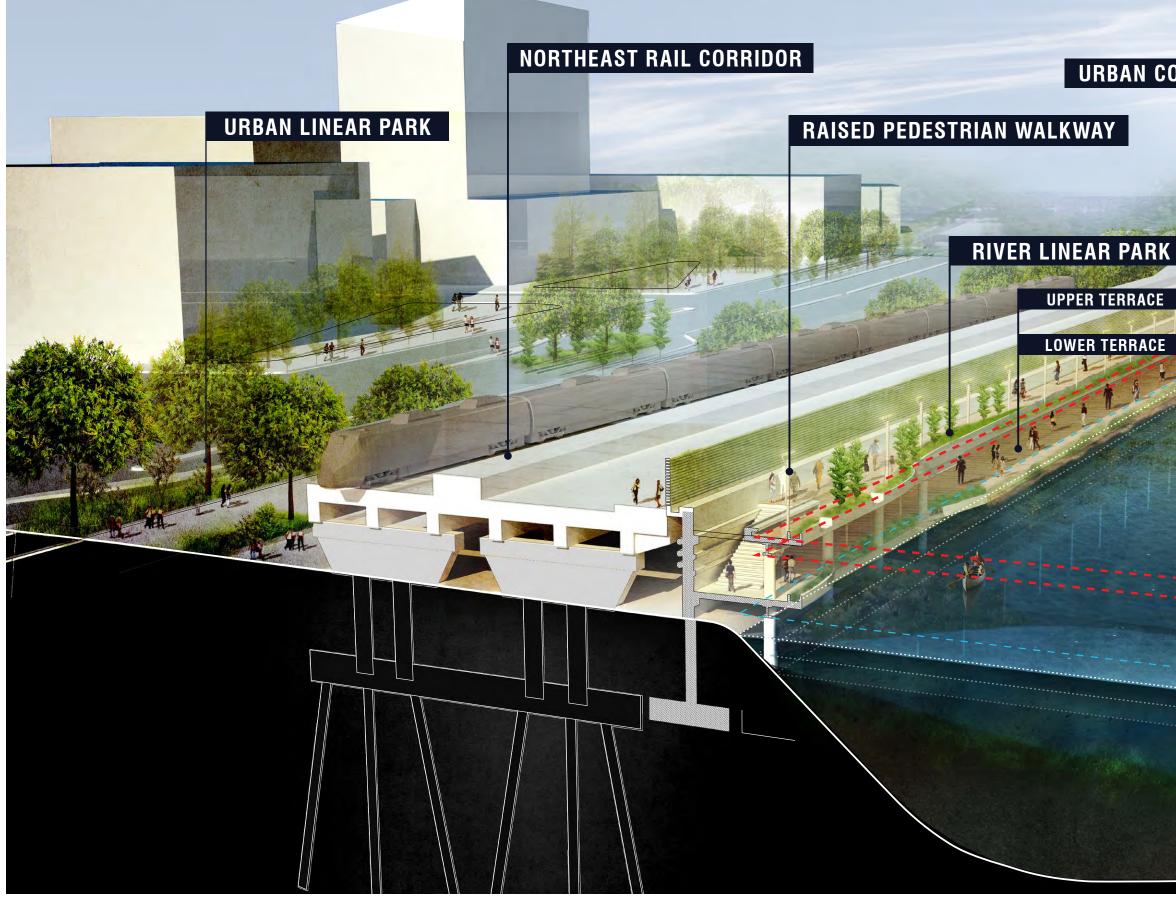


RESILIENT BRIDGEPORT BRIDGEPORT NEXT





DOWNTOWN LOWER + UPPER FLOODWALL

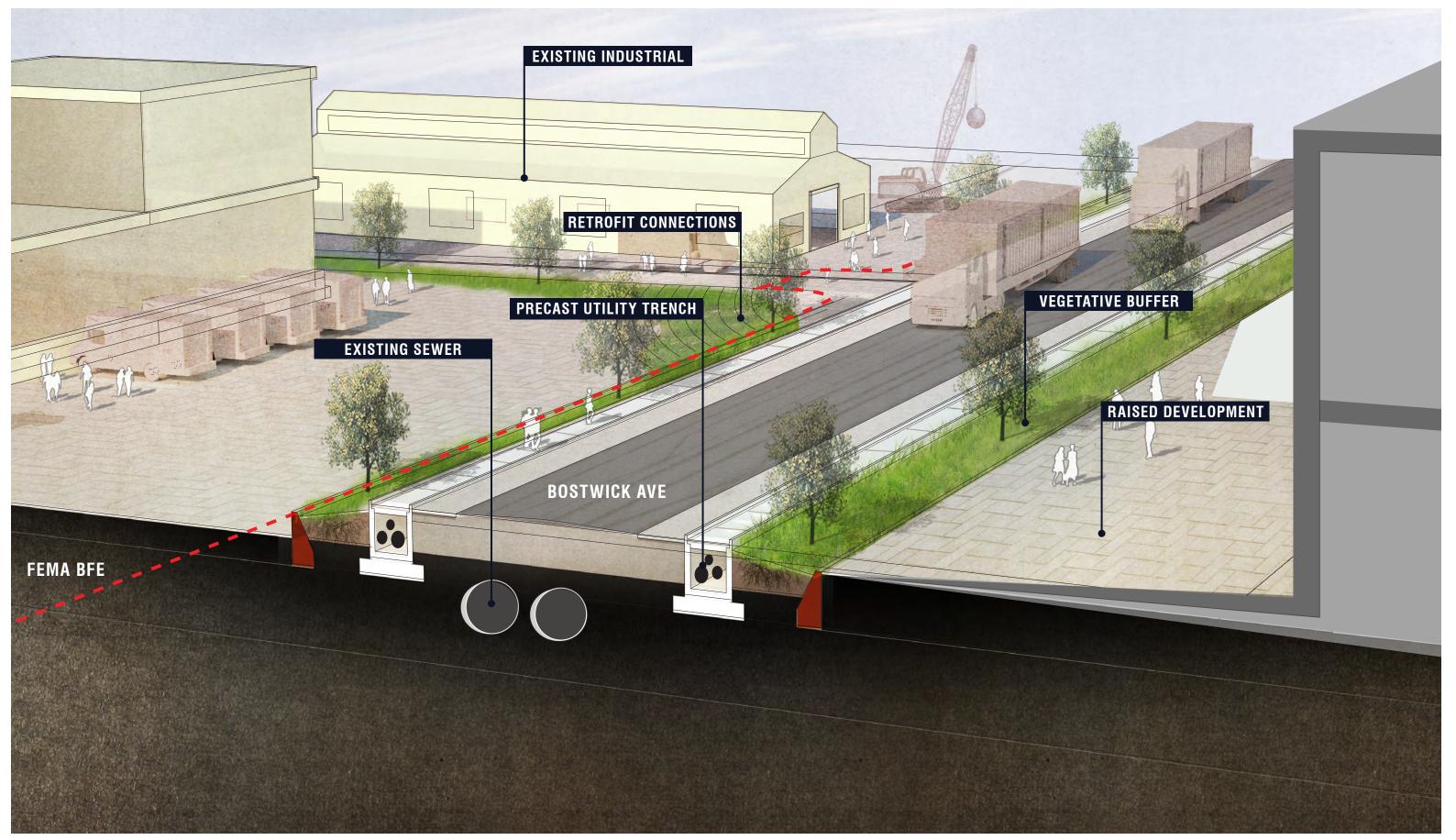


URBAN CONNECTIONS

PEQUONNOCK RIVER 2100 BFE 2050 BFE

2050 SLR

BLACK ROCK HARBOR ELEVATED INFRASTRUCTURE CORRIDOR



GREATER NEW ORLEANS URBAN WATER PLAN UPSLOPE INTERCEPTOR STREET



GREATER NEW ORLEANS URBAN WATER PLAN FLOATING STREETS

image: Bosch Slabbers

1

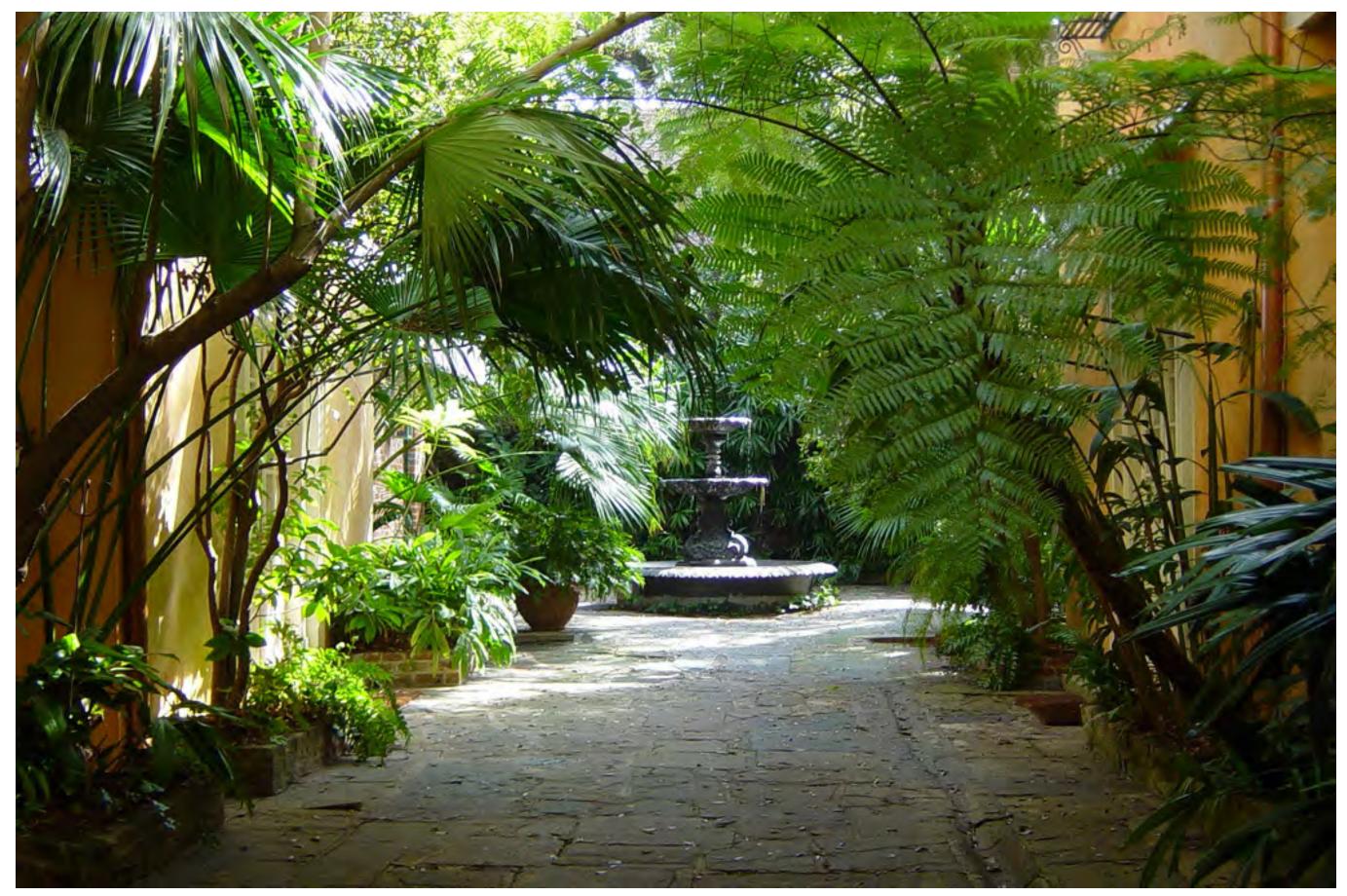
GREATER NEW ORLEANS URBAN WATER PLAN MIRABEAU BLUE STREET



HABITATION



NEW ORLEANS COURTYARD CITY





NDRC NEW ORLEANS **BENEFIT COST ANALYSIS**

Environmental + Social Value:

\$5.2 Million

Reduced Damage from 5 Year Flood: \$20.1 Million

Road Maintenance Cost Reduction Associated with Subsidence:

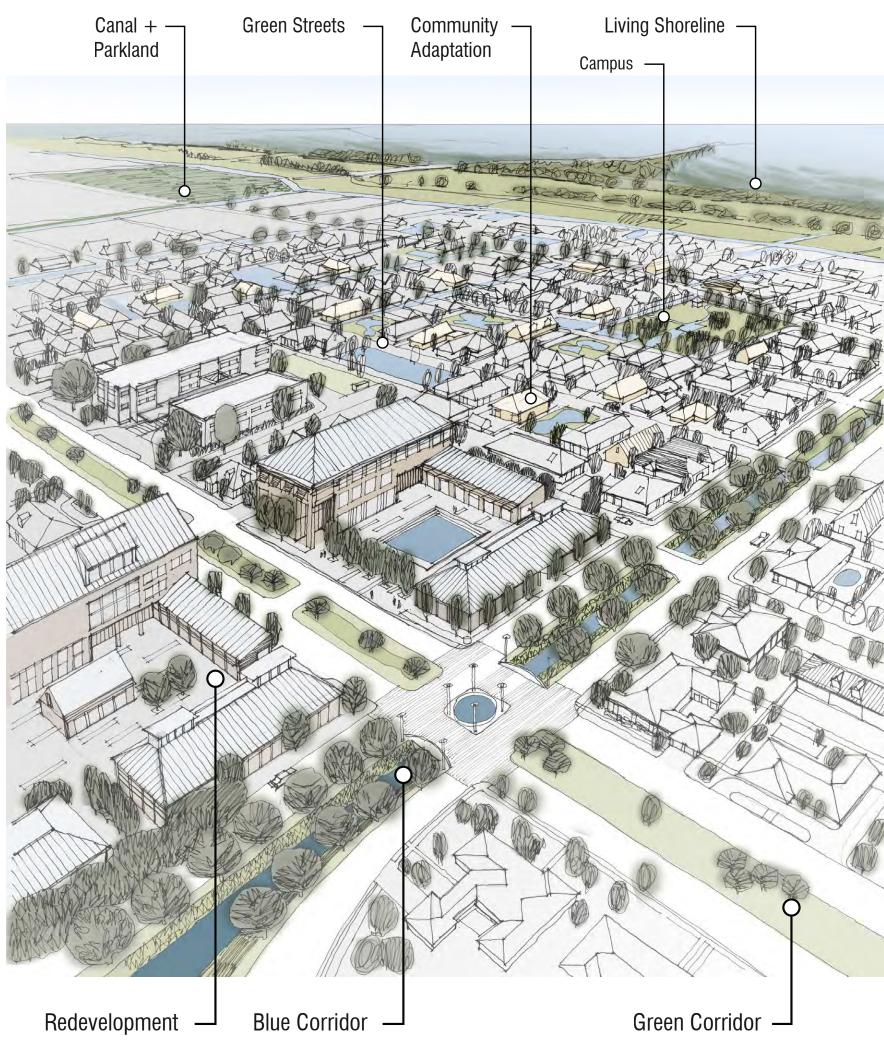
\$123.8 Million

Increased Property Values:

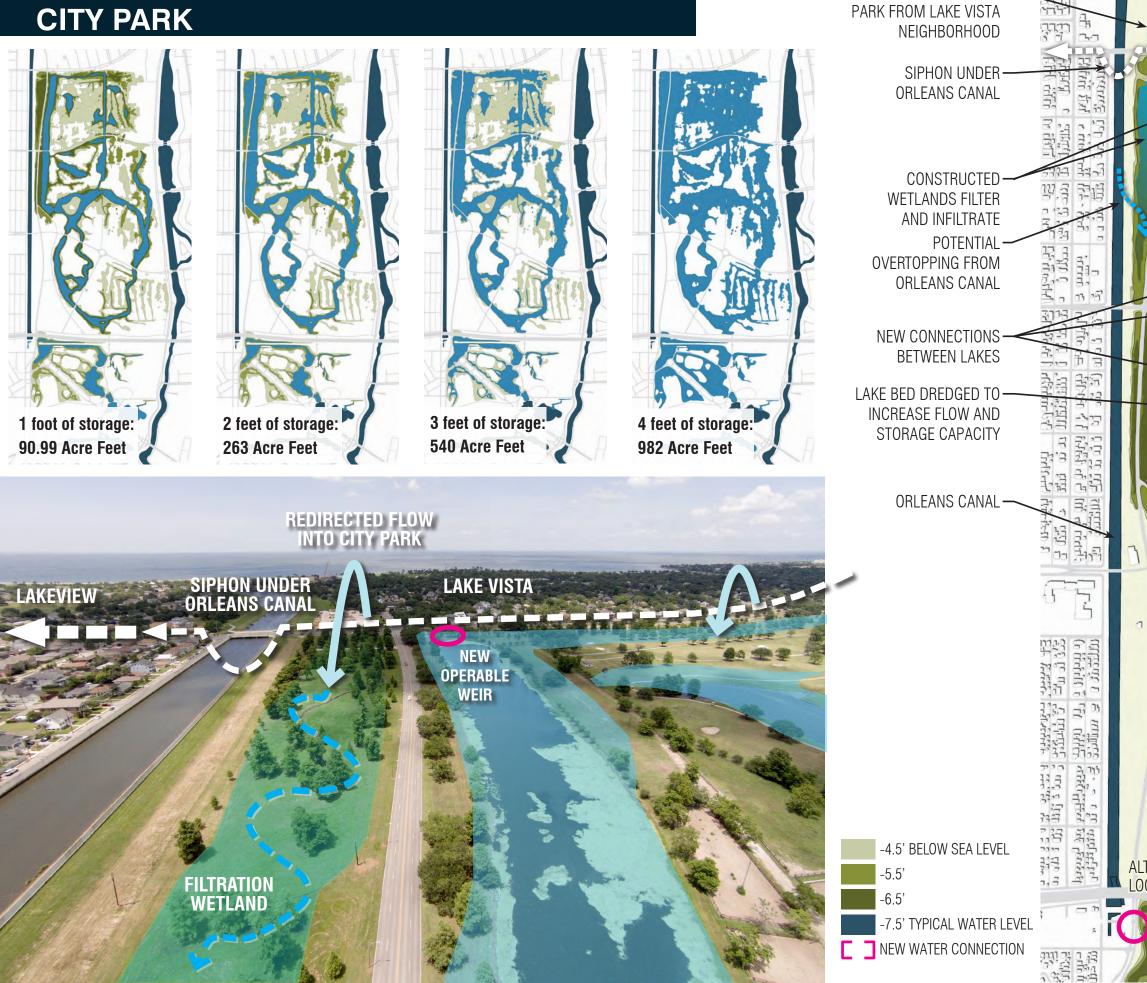
\$392.5 Million

Benefit Cost Ratio:

3.6 to 1



NDRC NEW ORLEANS **CITY PARK**





Line B

RUNOFF INTO CITY

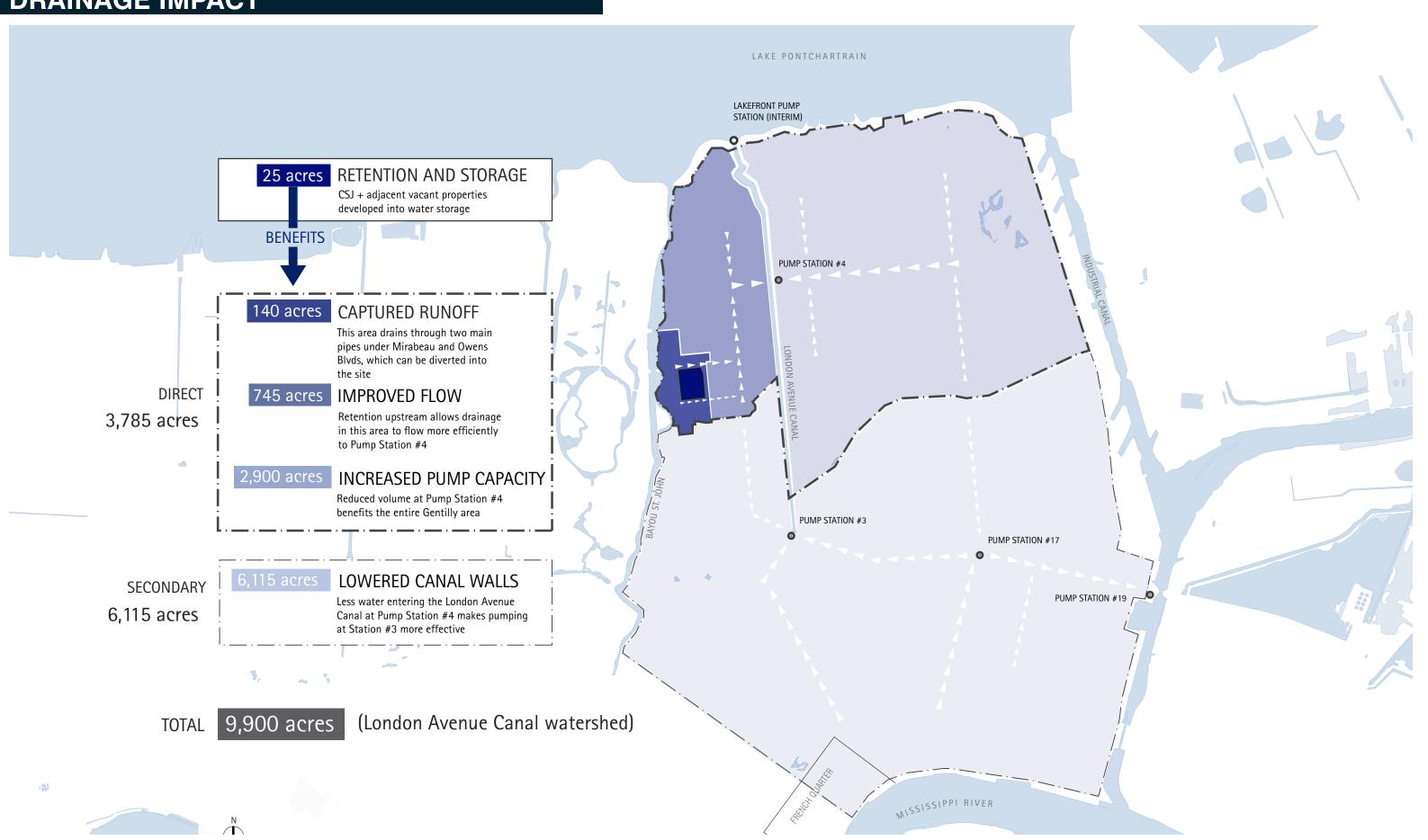
NDRC NEW ORLEANS



MIRABEAU WATER GARDEN VISION



MIRABEAU WATER GARDEN **DRAINAGE IMPACT**

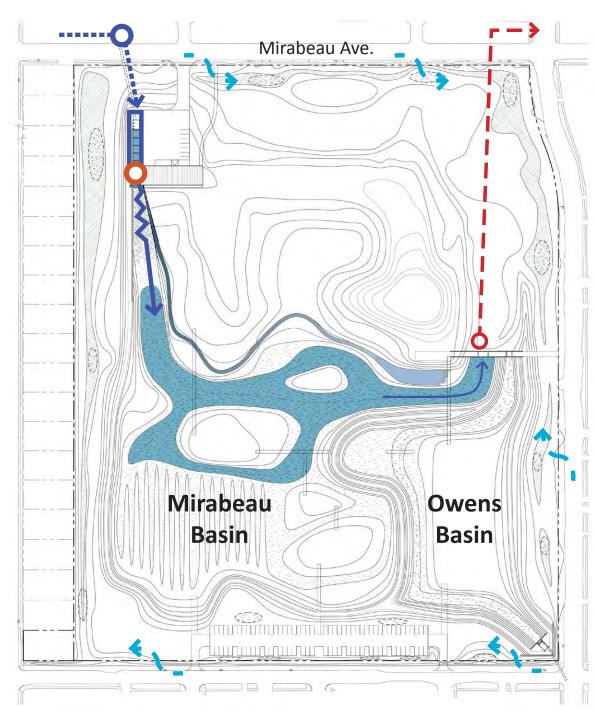


MIRABEAU WATER GARDEN SITE PLAN



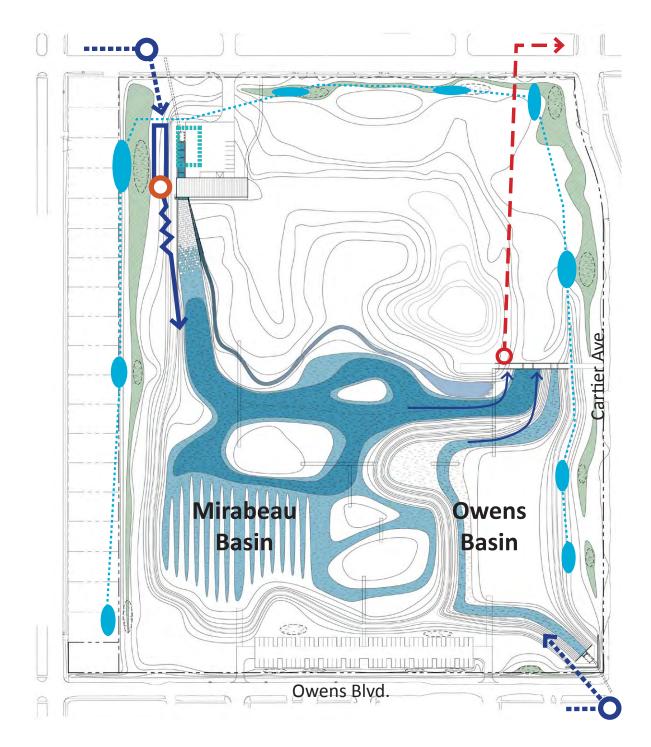
 Intake from Mirabeau Avenue Box Culvert
 Service Court
 Forebay and Wet Well
 Pump and Service Building
 Protect Existing Oak Grove
 Energy Dissipator
 Bio-Infiltration Zone
 Mound
 Recirculating Water Channel
North and Drainage Structure
 Water Plaza
Raised Maintenance Boardwalks
 Social/Institutional Activity Area
Social/Institutional Activity Area
 Gravel Maintenance Paths
 Pine Islands
 Cypress Forest
Pervious Parking Lot
 New Trees
 South Weir and Supply Structure
 Intake from Owens Blvd

MIRABEAU WATER GARDEN WATER FLOW



First Flush

Mirabeau Pump: 0.33 to 2.12 Million Gallons 44,000 to 280,000 Cubic Feet

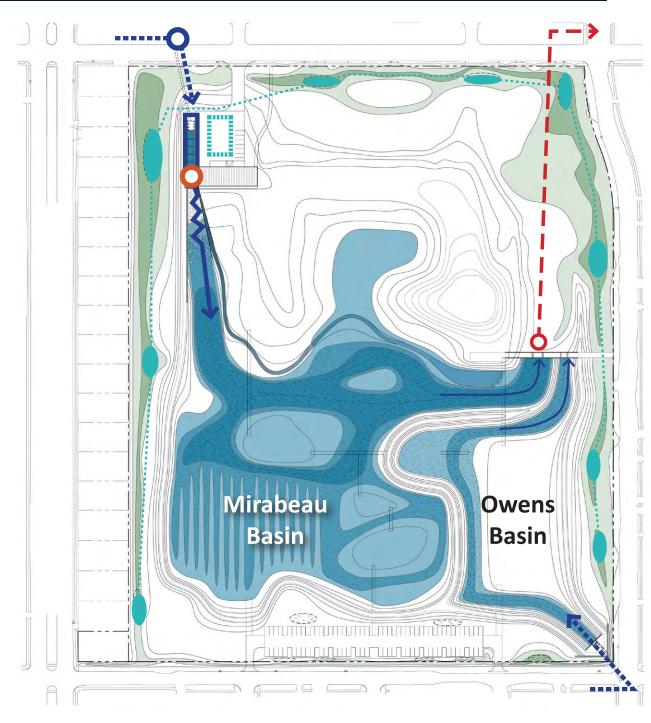


1 Year Storm

Mirabeau Pump: 4.86 Million Gallons 650,000 Cubic Feet

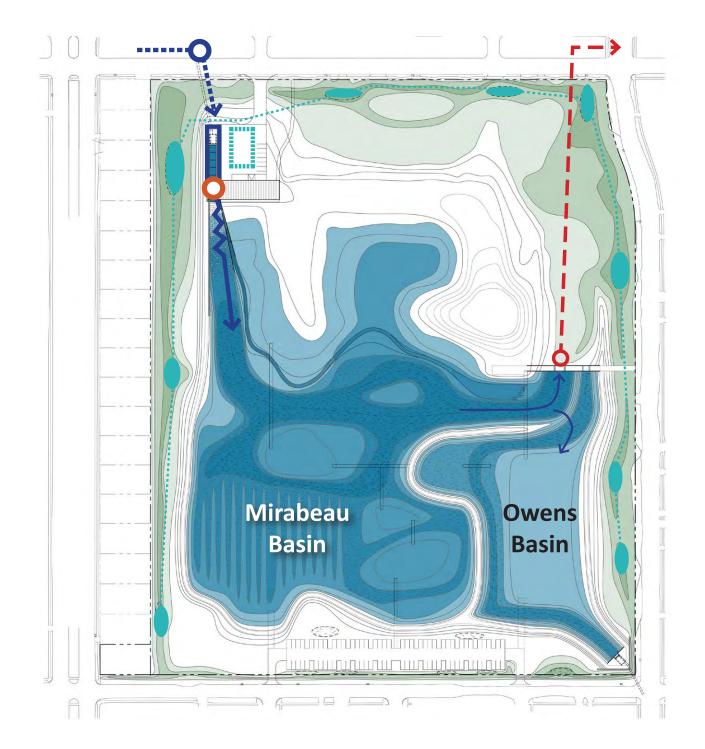
Owens Intake: 0.37 Million Gallons 50,000 Cubic Feet

MIRABEAU WATER GARDEN WATER FLOW



2 Year Storm

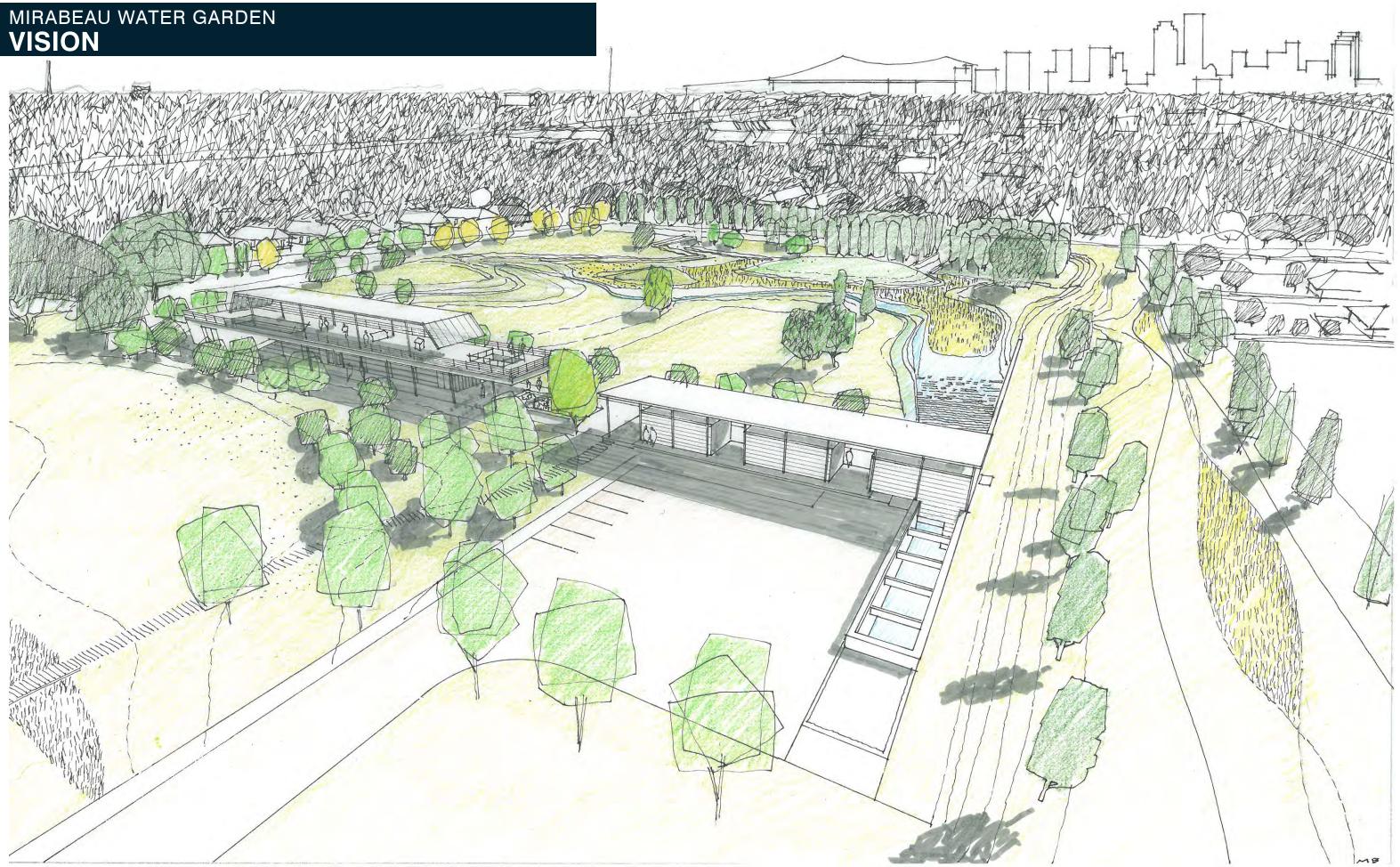
Mirabeau Pump: 7.16 Million Gallons 960,000 Cubic Feet Owens Gravity Intake: 0.6 Million Gallons 80,000 Cubic Feet



10 Year Storm

Mirabeau Pump: 11.3 Million Gallons 1.5 Million Cubic Feet

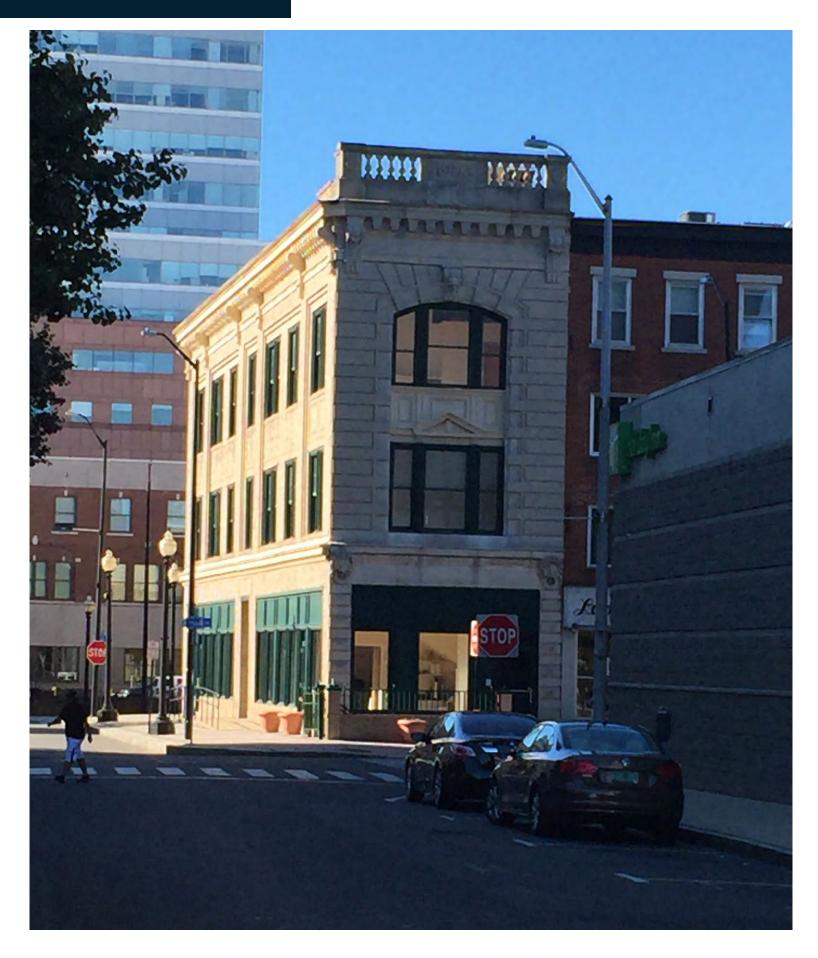
Owens Gravity Intake: 0.98 Million Gallons 130,000 Cubic Feet



BRIDGEPORT ENGAGEMENT - COALITION



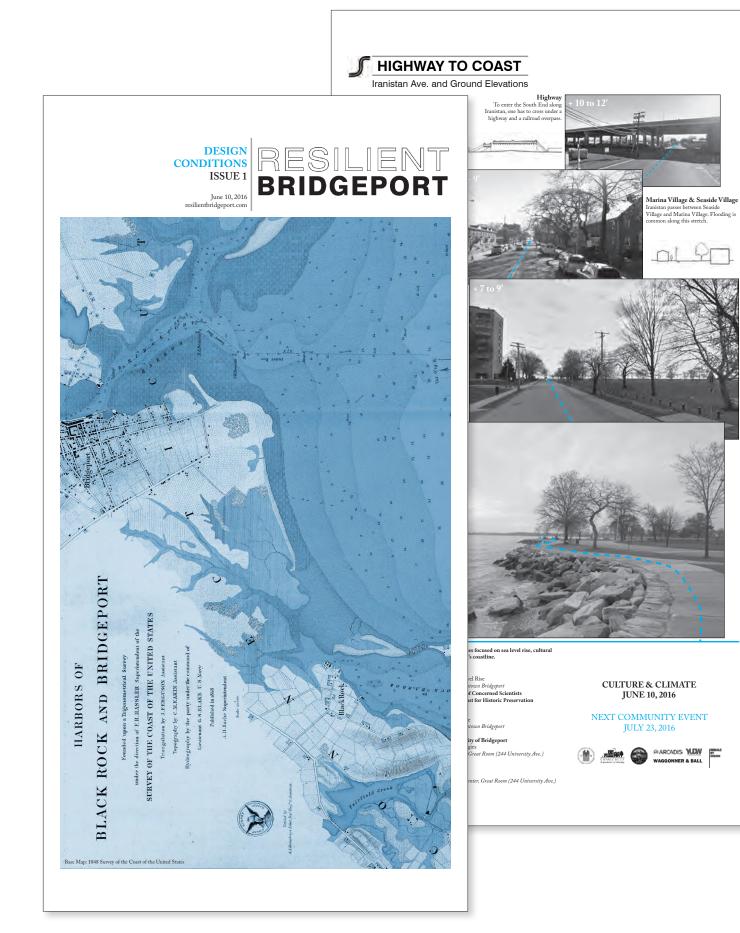
BRIDGEPORT 7 MIDDLE



RESILIENT BRIDGEPORT WORKSHOP, SEPTEMBER 2016

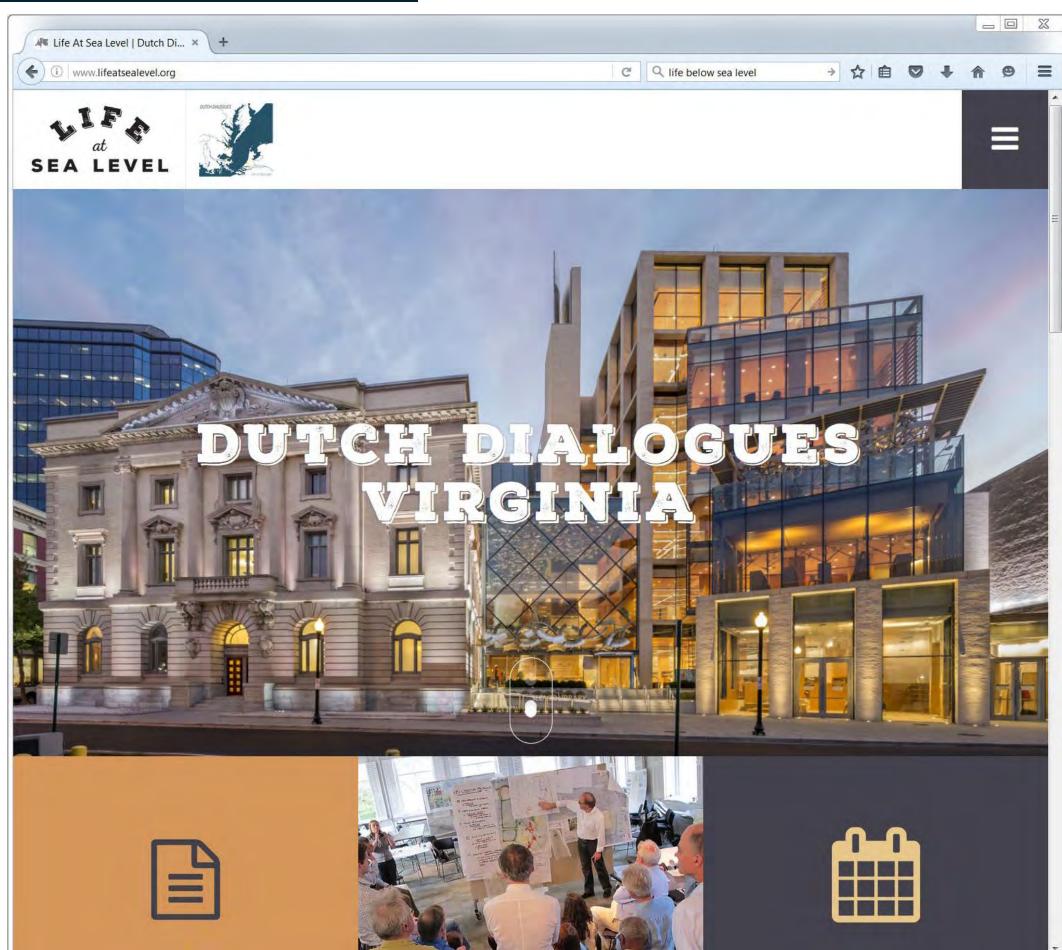


RESILIENT BRIDGEPORT BROADSHEET

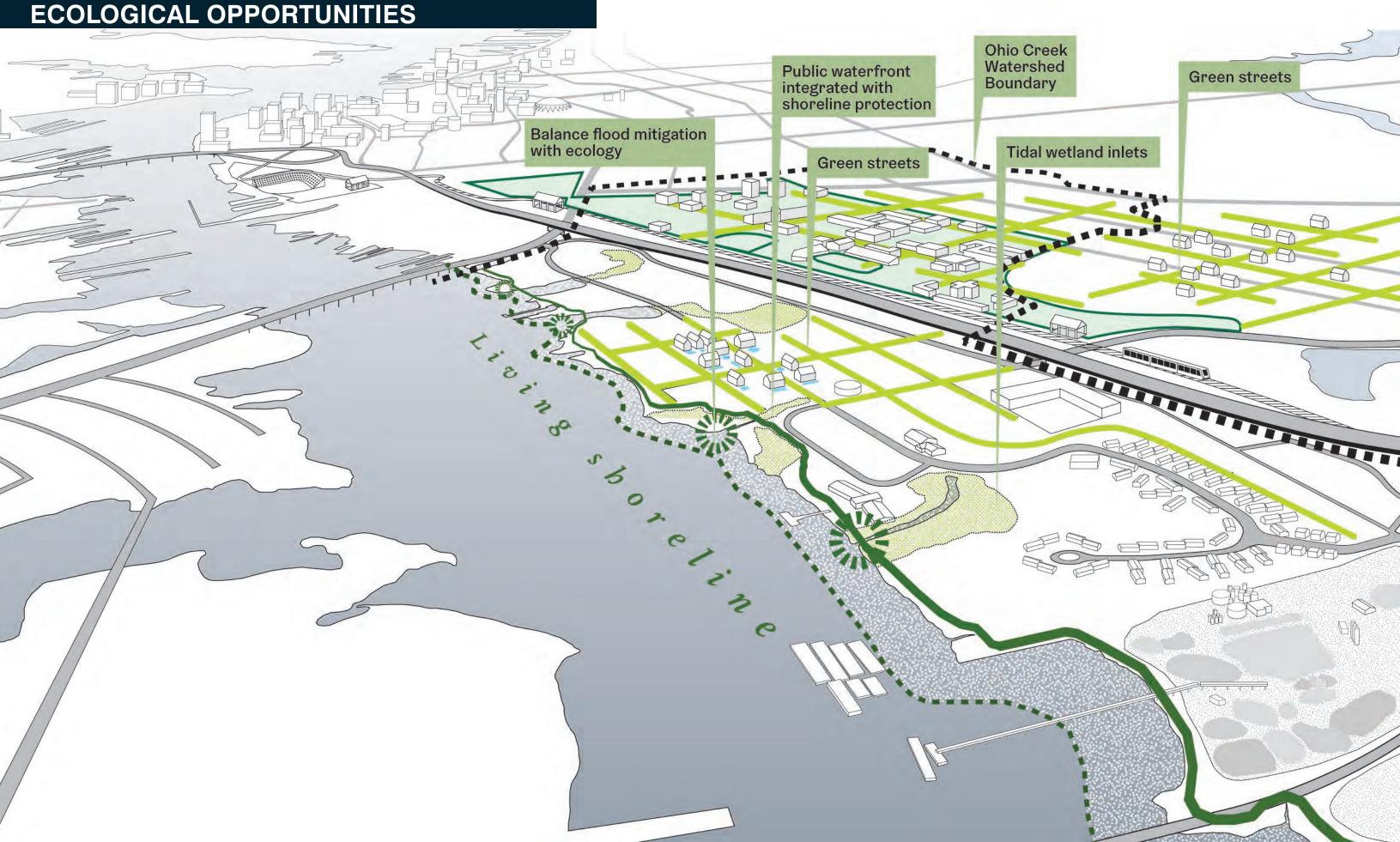




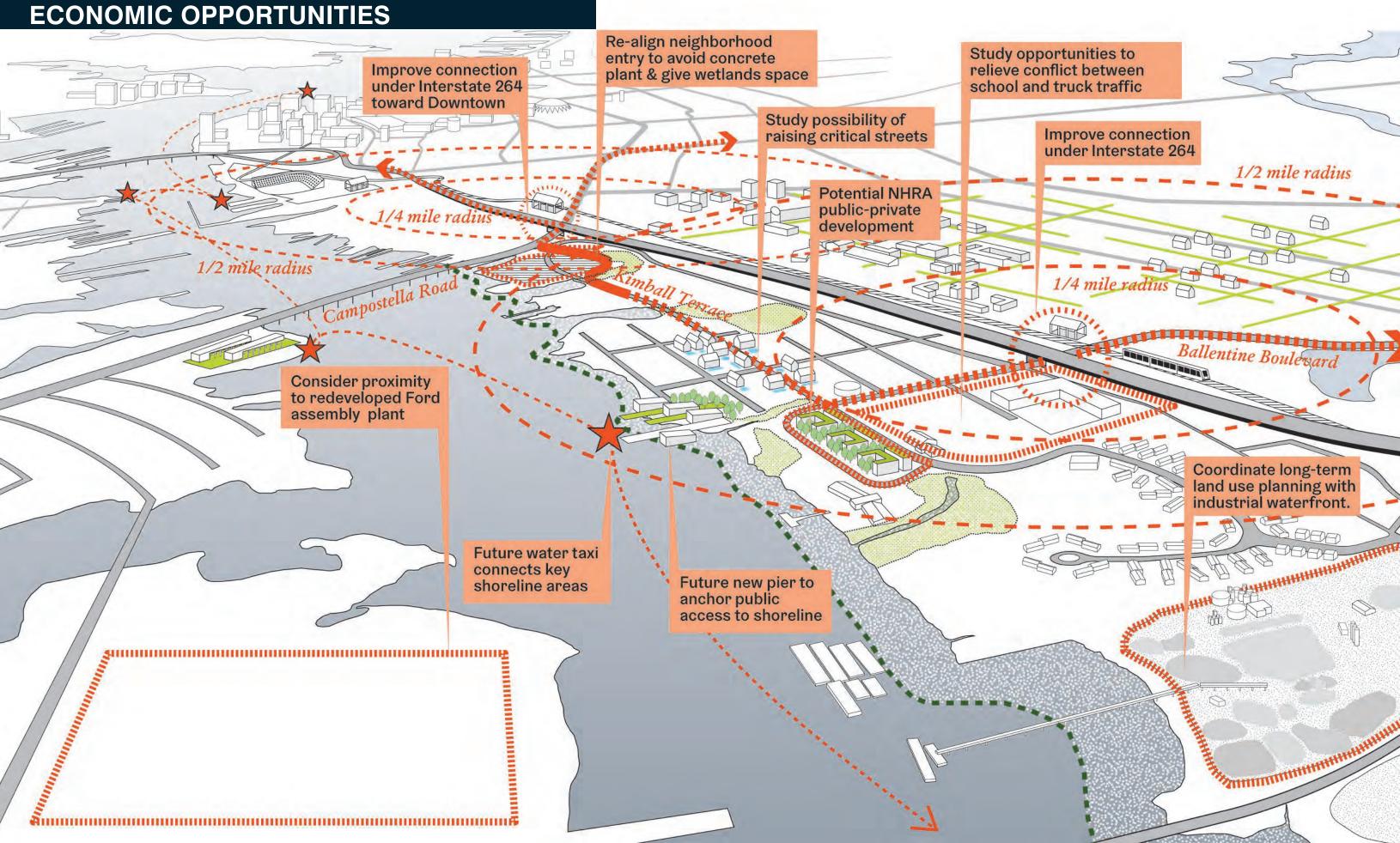
DUTCH DIALOGUES HAMPTON ROADS



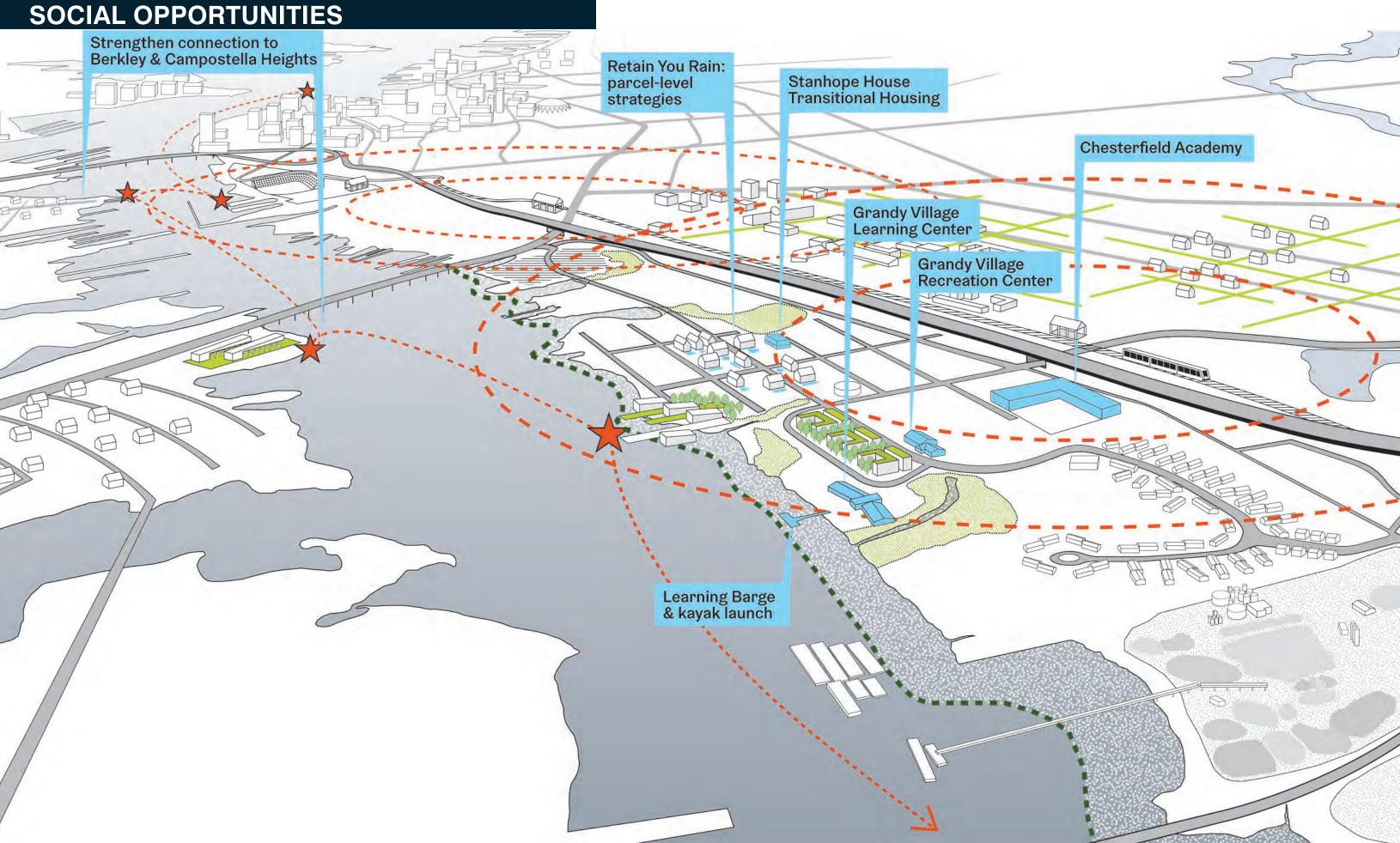
NDRC NORFOLK **ECOLOGICAL OPPORTUNITIES**



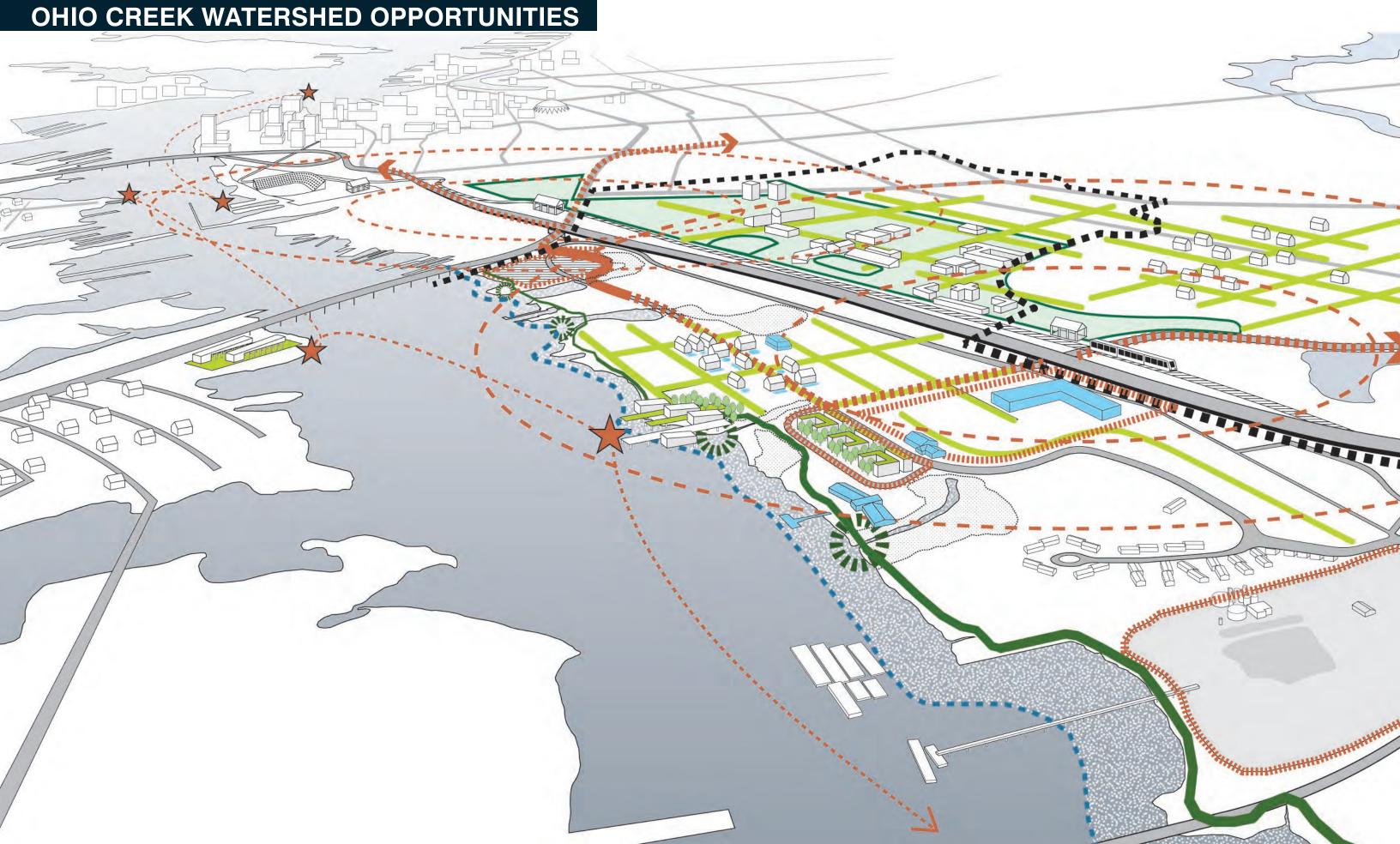
NDRC NORFOLK **ECONOMIC OPPORTUNITIES**







NDRC NORFOLK



GREATER NEW ORLEANS FOUNDATION **DEFINING LEE CIRCLE**

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GREATER NEW ORLEANS FOUNDATION SECTION PERSPECTIVE AT COURTYARD

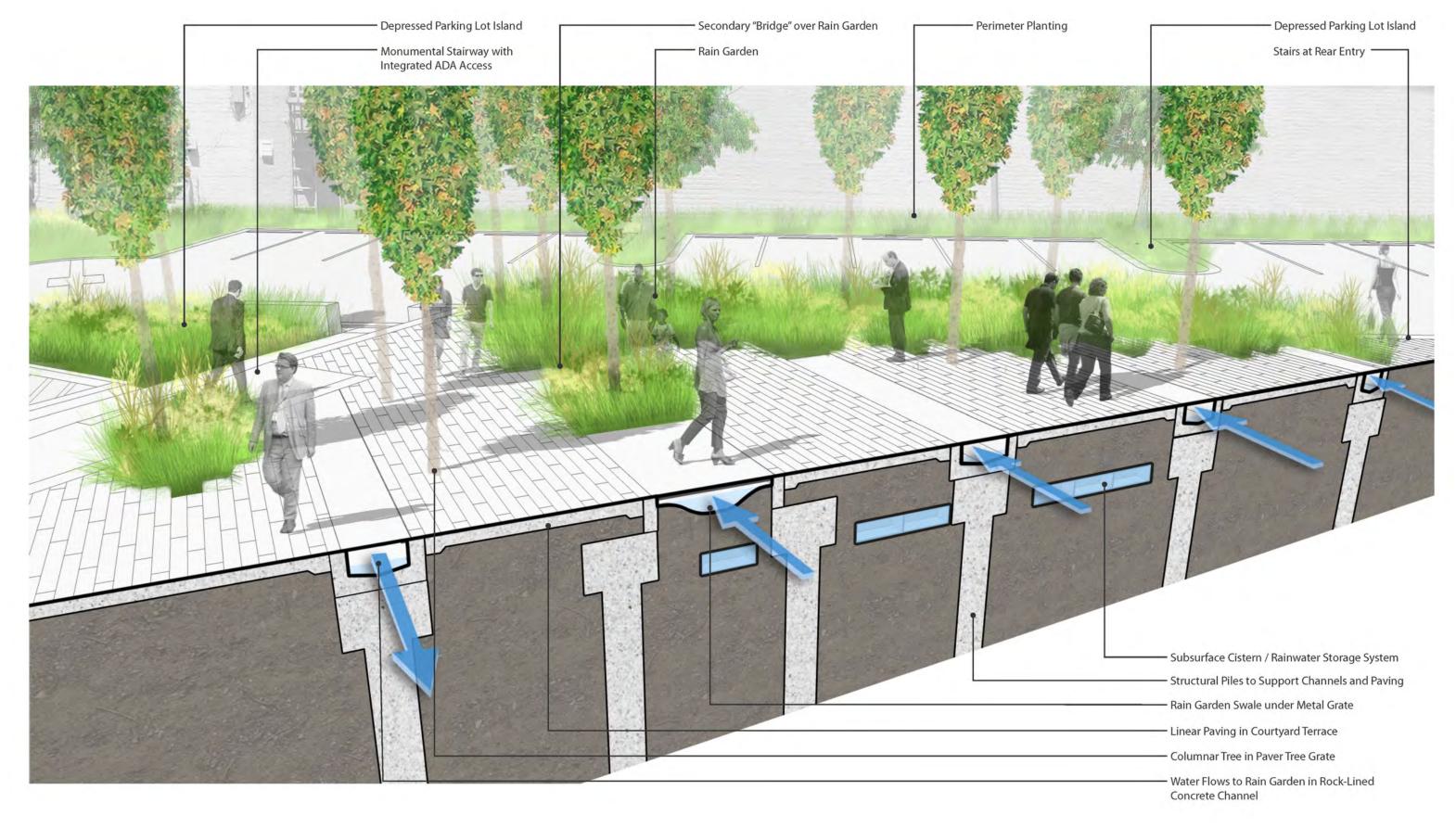


Image: CARBO Landscape Architecture

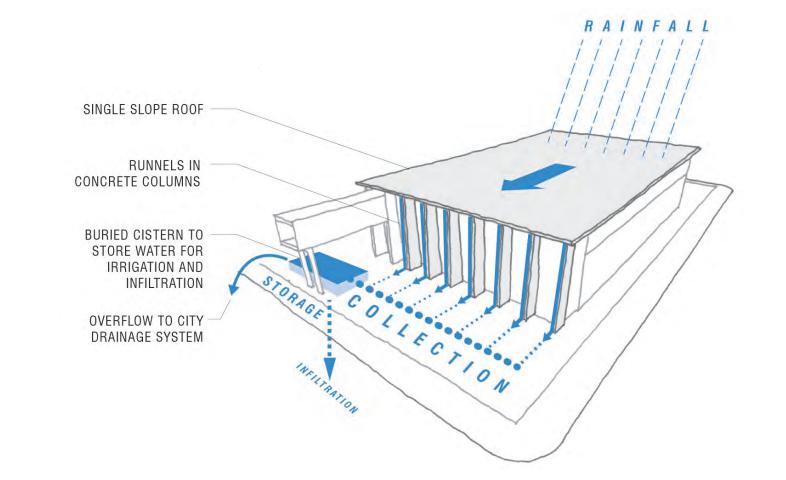
GREATER NEW ORLEANS FOUNDATION COURTYARD

NZ.

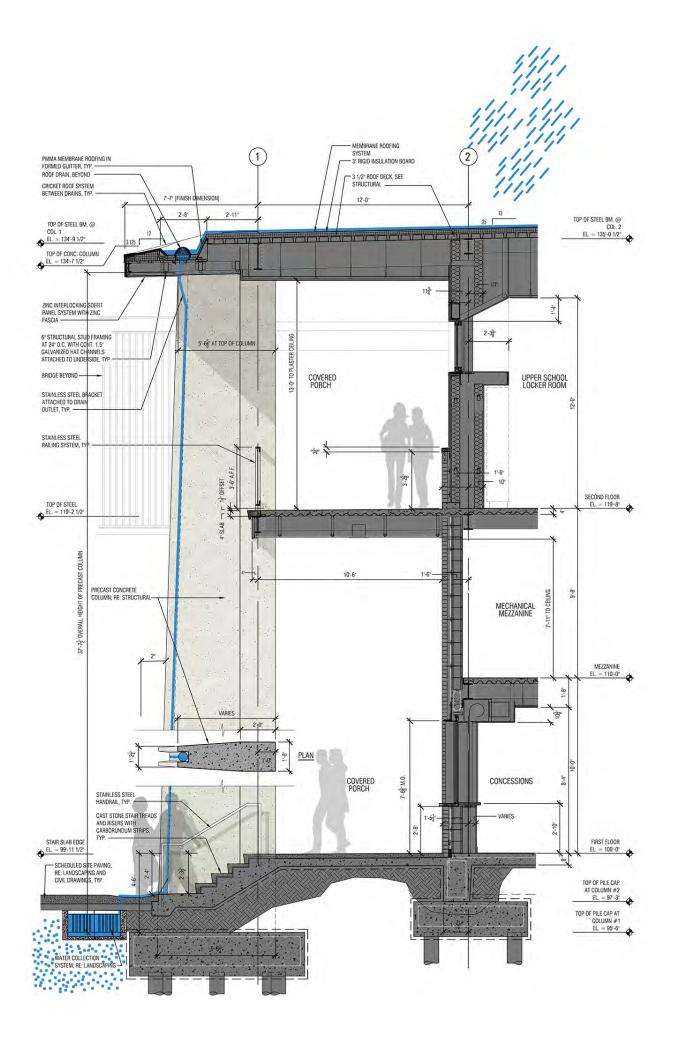




ACADEMY OF THE SACRED HEART WATER STORAGE DETAIL

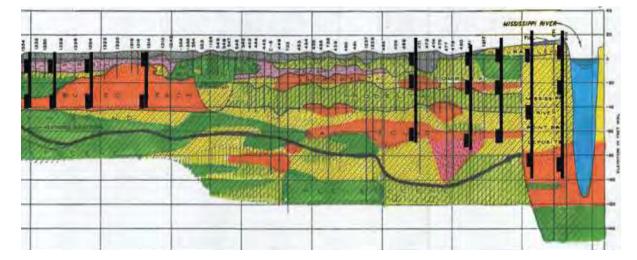






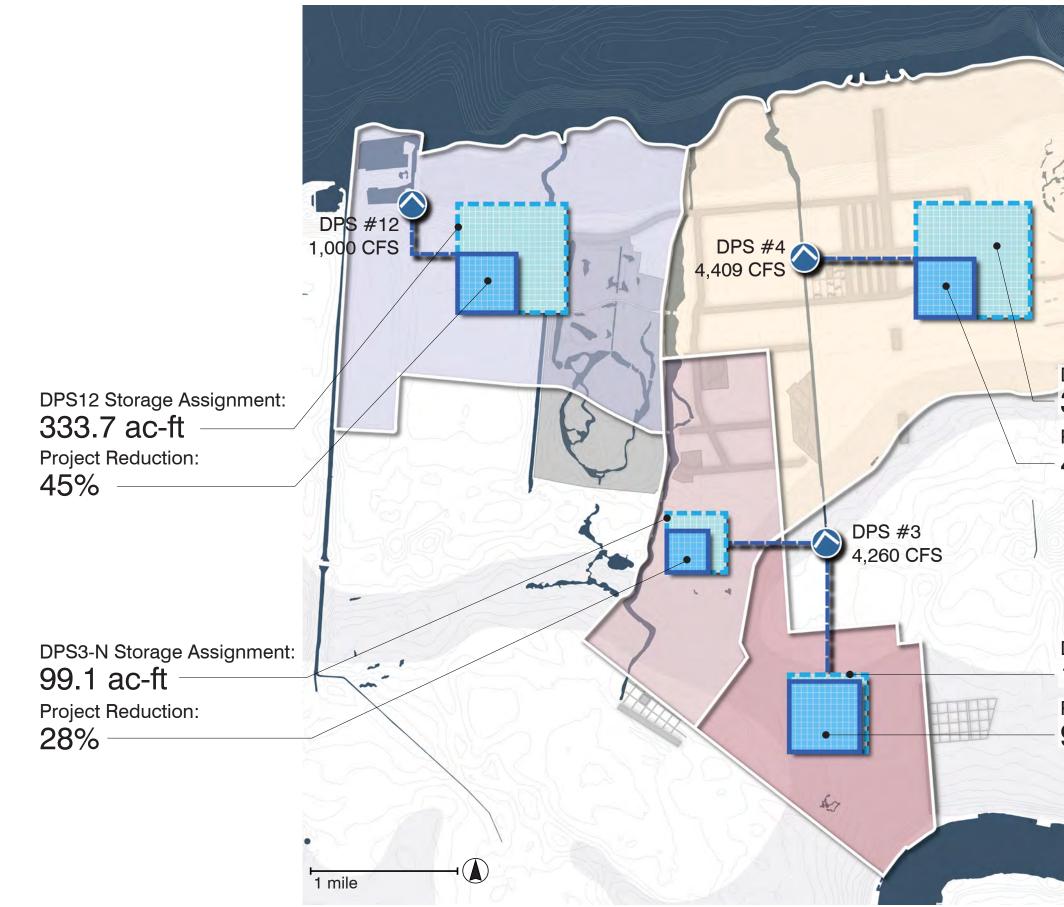
NDRC NEW ORLEANS GROUNDWATER MONITORING NETWORK







NDRC NEW ORLEANS



DPS4 Storage Assignment: 369.2 ac-ft

1

Project Reduction: 49%

DPS3-S Storage Assignment: 168.5 ac-ft Project Reduction: 9%

RESILIENT BRIDGEPORT COLE STREET





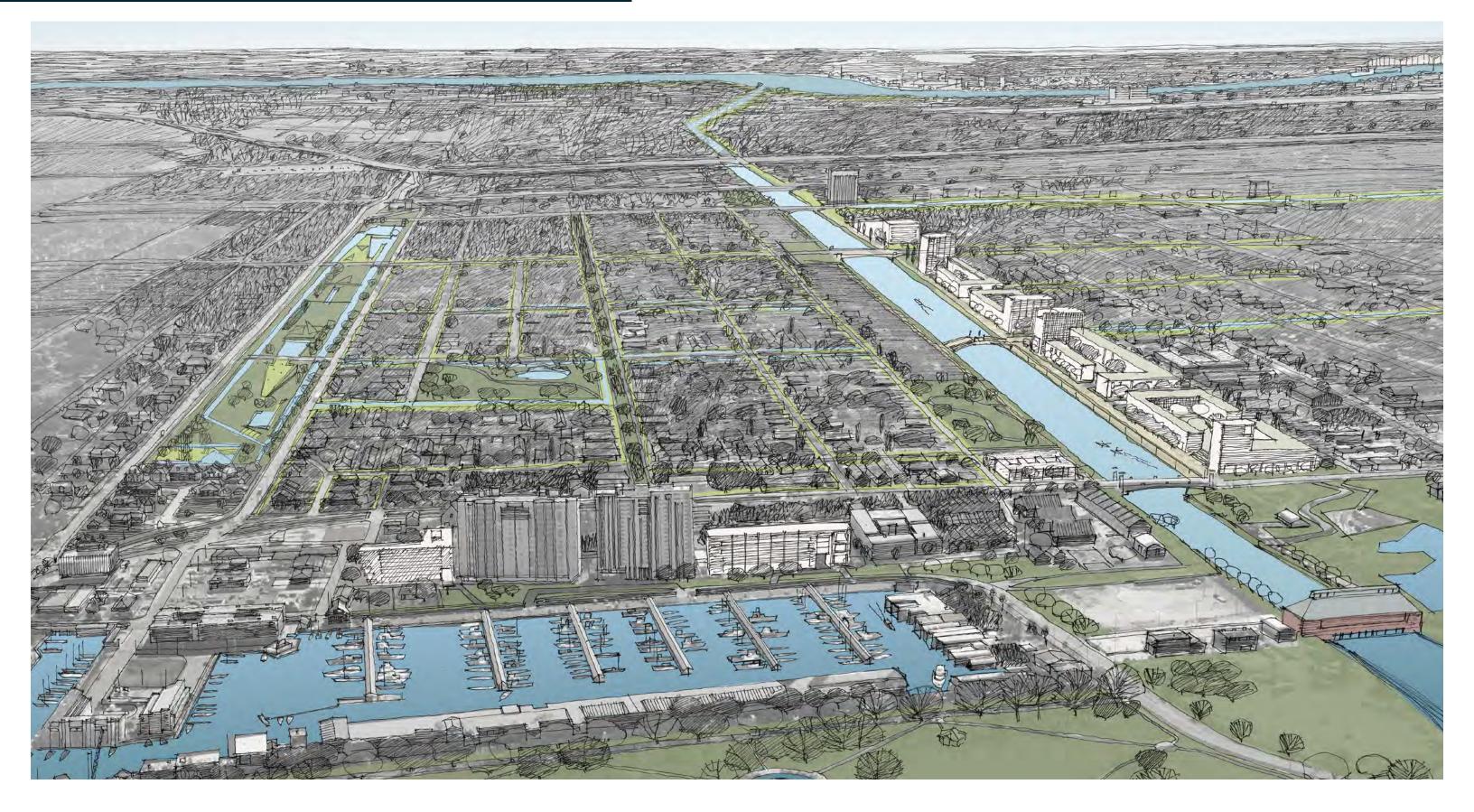
GREATER NEW ORLEANS URBAN WATER PLAN KENNER PARKLANDS



NEW ORLEANS HOLLYGROVE/MONTICELLO CANAL



NEW ORLEANS LAKEVIEW AND BUCKTOWN



DUTCH DIALOGUES VIRGINIA

