

REBUILD BY DESIGN
MEADOWLANDS

CITIZEN ADVISORY GROUP (CAG) MEETING #7

STORMWATER DRAINAGE IMPROVEMENTS



Welcome & Opening Remarks



- Project Status Update and Schedule
- Alternative 2: Stormwater Drainage Improvements
 - Alternative 2 Development
 - Modeling Update
 - Frequently Flooded Areas
 - Stormwater Drainage Improvement Options
 - Collection and Conveyance



- Developed working draft Concept Screening Criteria
- Completed and published to Project Website:
 - Meeting Minutes from CAG Meeting #6
 - December 2016 Newsletter
- Developing Stormwater Drainage Options



PREVIOUS CAG INPUT AND DISCUSSION

TETERBORO AIRPORT
Opportunity for green infrastructure at Teterboro Airport (upgrade of disturbed environments).

TETERBORO AIRPORT, WEST COMMERCIAL AVENUE
Bioswales and green infrastructure (south/east of the Teterboro Airport, West Commercial Avenue, southern end of the Project Area).

EAST AND WEST RISER
Prioritize the East and West Riser ditches for Berry's Creek area, especially in consideration of the nearby mobile home communities.

PATERSON PLANK ROAD
Consider addition of a tide gate along Paterson Plank Road in the Berry's Creek Zone.



TETERBORO FOREST, LOSEN SLOTE, WILLOW LAKE, VACANT LOTS
Utilize existing open spaces.

HACKENSACK RIVER EDGE
Potential for additional habitat creation, water storage, and water access.

MEHRHOF WETLAND ZONE
Area immediately north of Mehrhof pond wetland zone could be a good location for recreational paths.

LOSEN SLOTE
Large migratory bird area would benefit from enhancements such as widening.

STORM WATER DRAINAGE IMPROVEMENTS



Green street example

CURRENT SYSTEMS

- Improve current systems, including ditches and pipes.
- Potential to install backflow preventers.

CONSIDER VARIOUS ENGINEERING IMPROVEMENTS

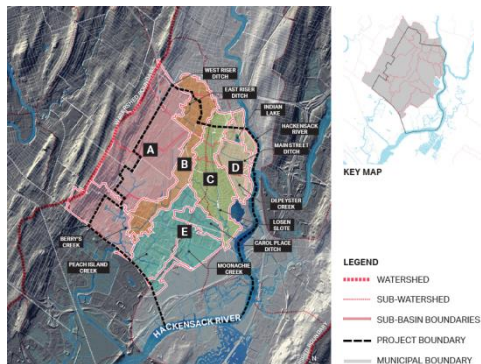
- Green - rain gardens, permeable paving, bioswales, among other green infrastructure elements.
- Grey - pump stations, increase flow capacity of drainage basins, and detention basins.

OPEN SPACES

- Enhance the performance of existing open spaces.

NATURAL CONDITIONS

- Return developed areas to natural conditions and find opportunities for mitigation.



- **CAG Meeting #2A/B**
Areas Prone to Flooding within the Project Area
- **CAG Meeting #3**
Concept Screening Criteria Review
- **CAG Meeting #4**
Concept Development and Ranking for Alternative 2
- **CAG Meeting #5**
Review of Drainage Basin Opportunity Areas

DEVELOPMENT OF ALTERNATIVE 2 CONCEPTS

- Concept development process utilized the following to arrive at the 7 concepts:



ALTERNATIVE 2:

STORMWATER DRAINAGE IMPROVEMENTS

CHRISTOPHER BENOSKY, AECOM



MODELING UPDATE

SIMPLIFIED MODEL PROGRESS

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Conducting modeling to better understand how each of the initial Alternative 2 concepts will function:

- a. Quantity of stormwater
- b. Movement of stormwater
- c. Control of stormwater



Currently, continuing to conduct stormwater system surveys to support more detailed drainage models of each of the concepts



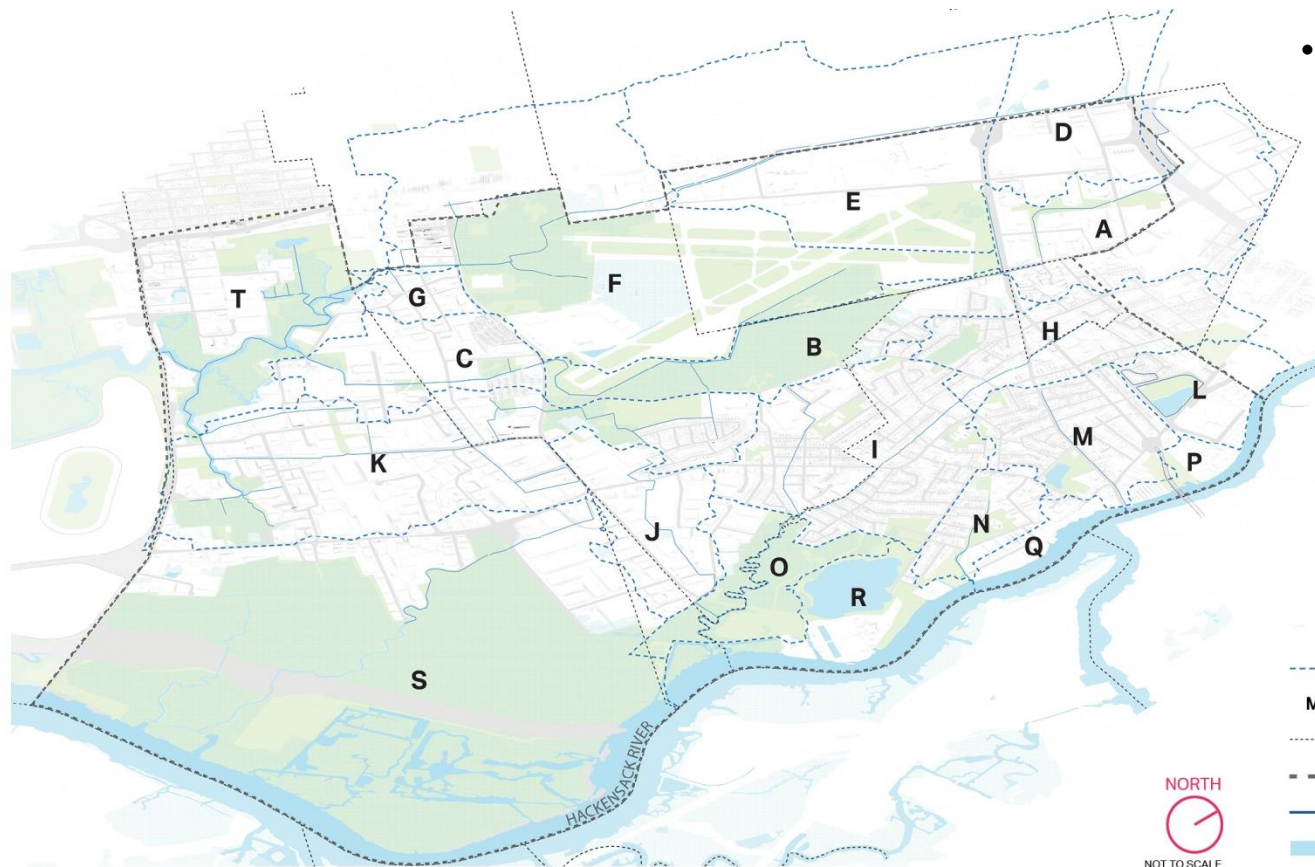
Future use of modeling results:

- a. Assess each concept's hydraulic feasibility (to control and move stormwater volumes)
- b. Preliminarily determine the benefits each concept would provide relative to cost

- Completed development and application of simplified models for:
 - East and West Riser
 - Main Street
 - Carol Place
 - East Carlstadt
 - Losen Slote
 - DePeyster Creek
 - Peach Island Creek

STORMWATER SUBBASINS

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- THERE ARE 20 SUBBASIN AREAS WITHIN THE PROJECT AREA

A: UPPER EAST RISER
B: MIDDLE EAST RISER
C: LOWER EAST RISER
D: UPPER WEST RISER 1
E: UPPER WEST RISER 2
F: MIDDLE WEST RISER
G: LOWER WEST RISER
H: UPPER LOSEN SLOTE 1
I: UPPER LOSEN SLOTE 2
J: MOONACHIE
K: CARLSTADT
L: INDIAN LAKE
M: MAIN STREET
N: DEPEYSTER CREEK
O: LOWER LOSEN SLOTE
P: UPPER HACKENSACK
Q: MIDDLE HACKENSACK 1
R: MIDDLE HACKENSACK 2
S: LOWER HACKENSACK
T: BERRY'S CREEK

--- SUBBASIN BOUNDARY
M SUBBASIN NAME
- - - MUNICIPAL BOUNDARY
- - - PROJECT AREA
— EXISTING DITCH
■ WATER



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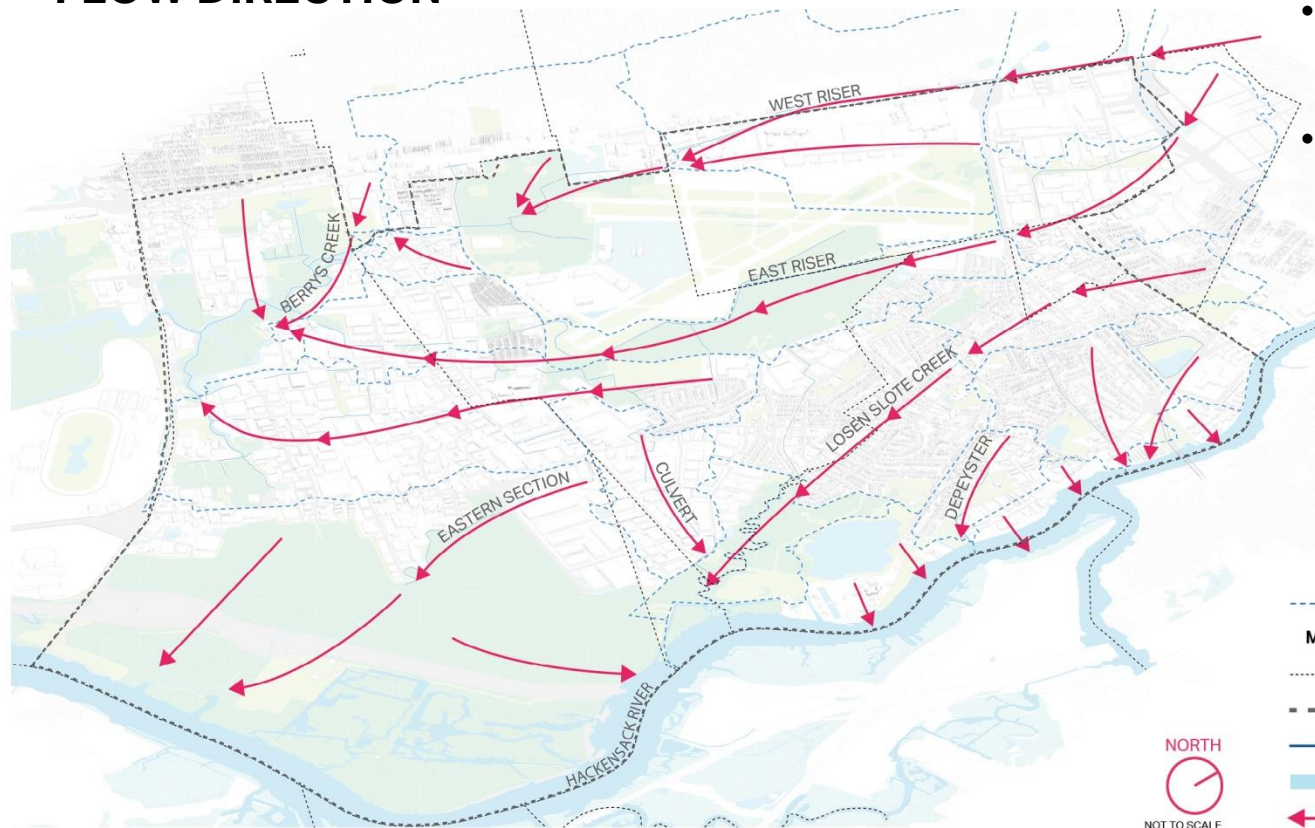
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STORMWATER SUBBASINS

FLOW DIRECTION

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- **SUBBASINS BOUNDARIES IDENTIFY HOW WATER IS FLOWING ON SITE TOWARDS A COMMON POINT**
- **THE HYDROLOGIC MODELING IS BASED ON THESE SUBBASIN AREAS**

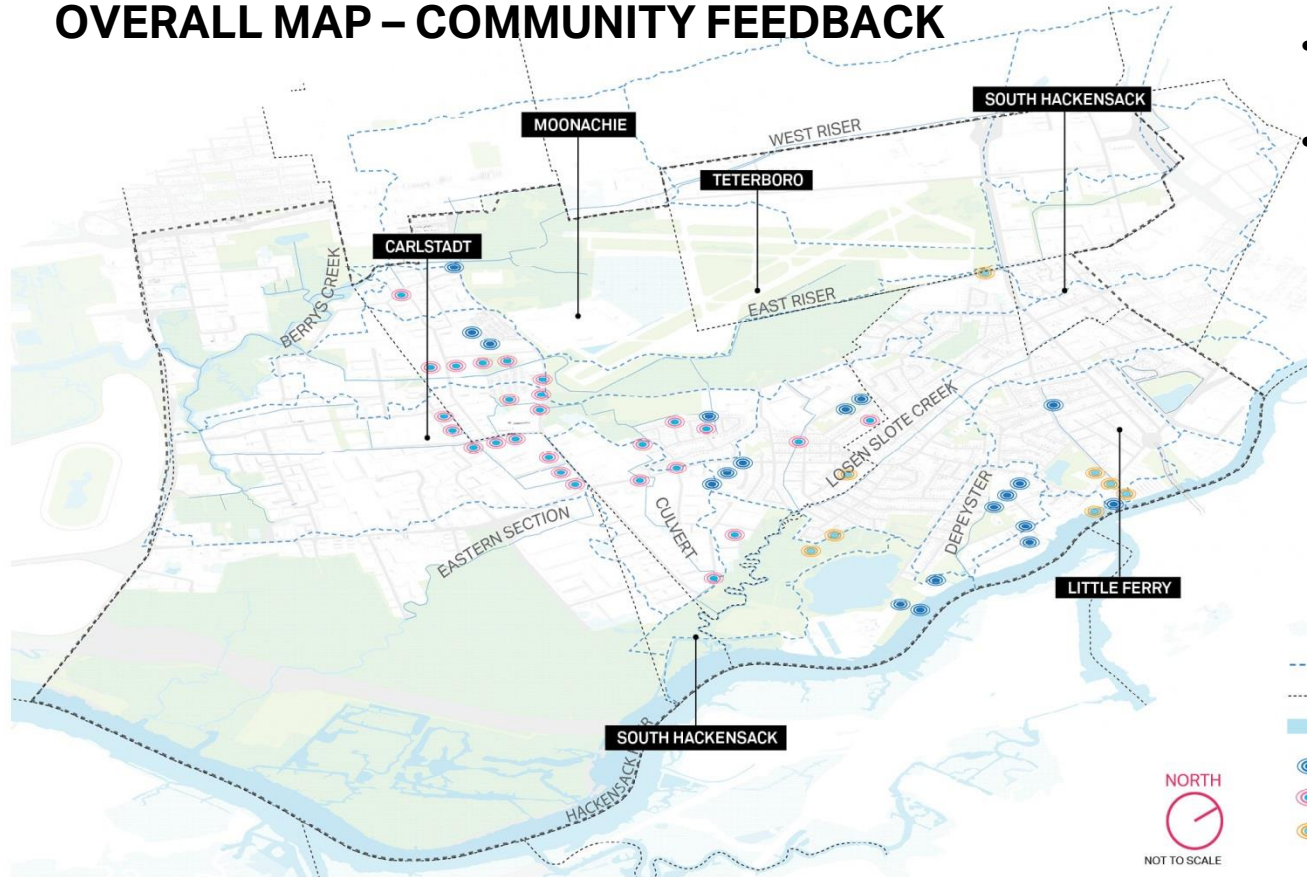


FREQUENTLY FLOODED AREAS

OVERALL MAP – COMMUNITY FEEDBACK

12

- **INTEGRATING COMMUNITY FEEDBACK INTO MODELING**
- **FOCUSING OUR ATTENTION ON FREQUENTLY FLOODED AREAS DURING THE DEVELOPMENT OF STORMWATER DRAINAGE IMPROVEMENT CONCEPTS**



FREQUENTLY FLOODED AREAS

LITTLE FERRY

13

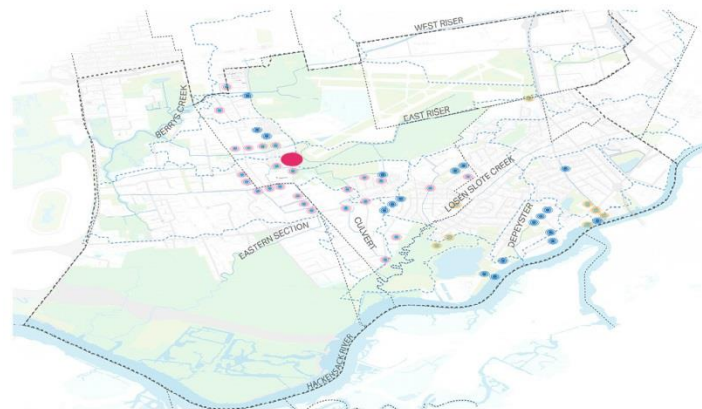


Image Source: Hackensack Meadowlands Floodplain Management Plan (Oct 24, 2005)

BRANDT STREET

Flood Event Date:
OCTOBER 14, 2005

Estimated Flood Elevation:
4.5 NAVD88



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FREQUENTLY FLOODED AREAS

MOONACHIE

14

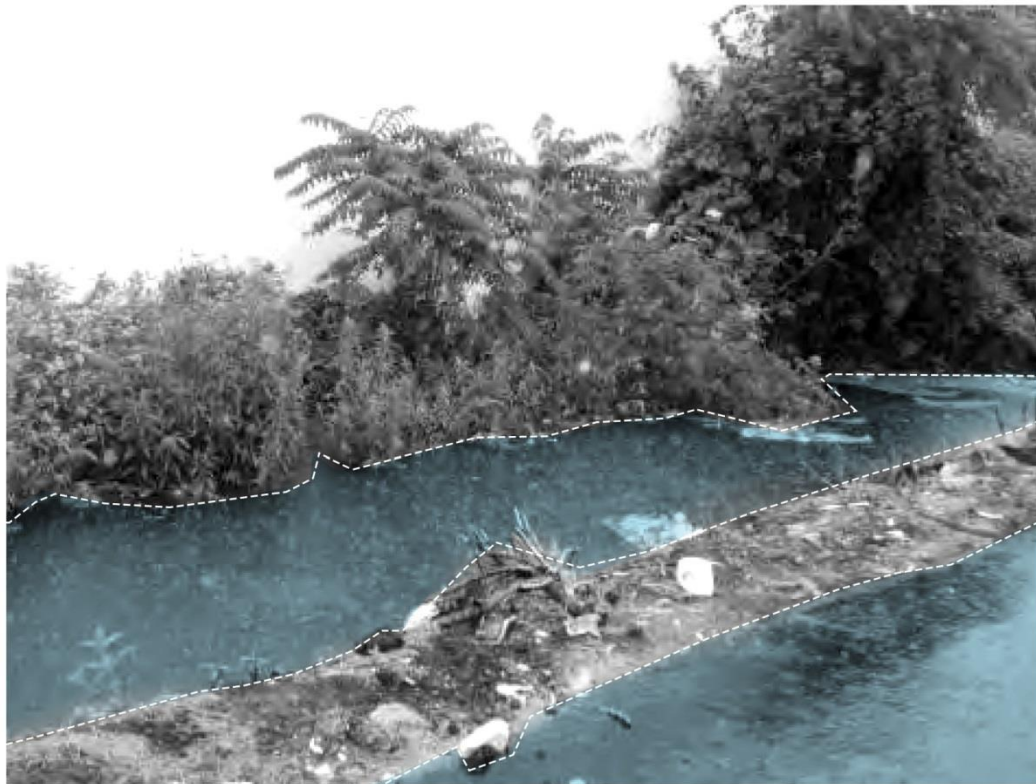
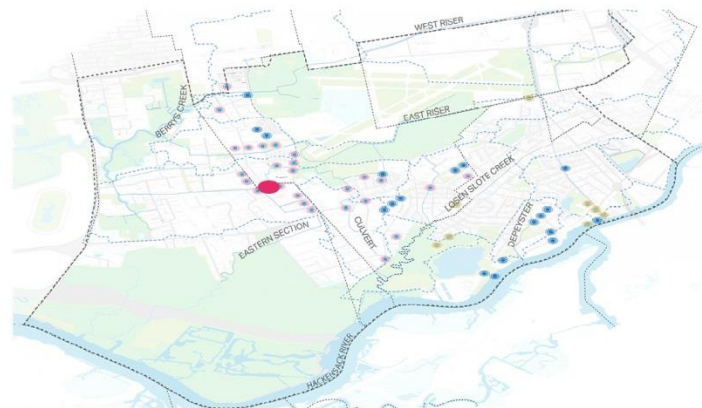


Image Source: Hackensack Meadowlands Floodplain Management Plan (Oct 24, 2005)

110 ASIA PLACE

Flood Event Date:
JUNE 10, 2005

Estimated Flood Elevation:
3.75 NAVD88



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FREQUENTLY FLOODED AREAS

MOONACHIE

15

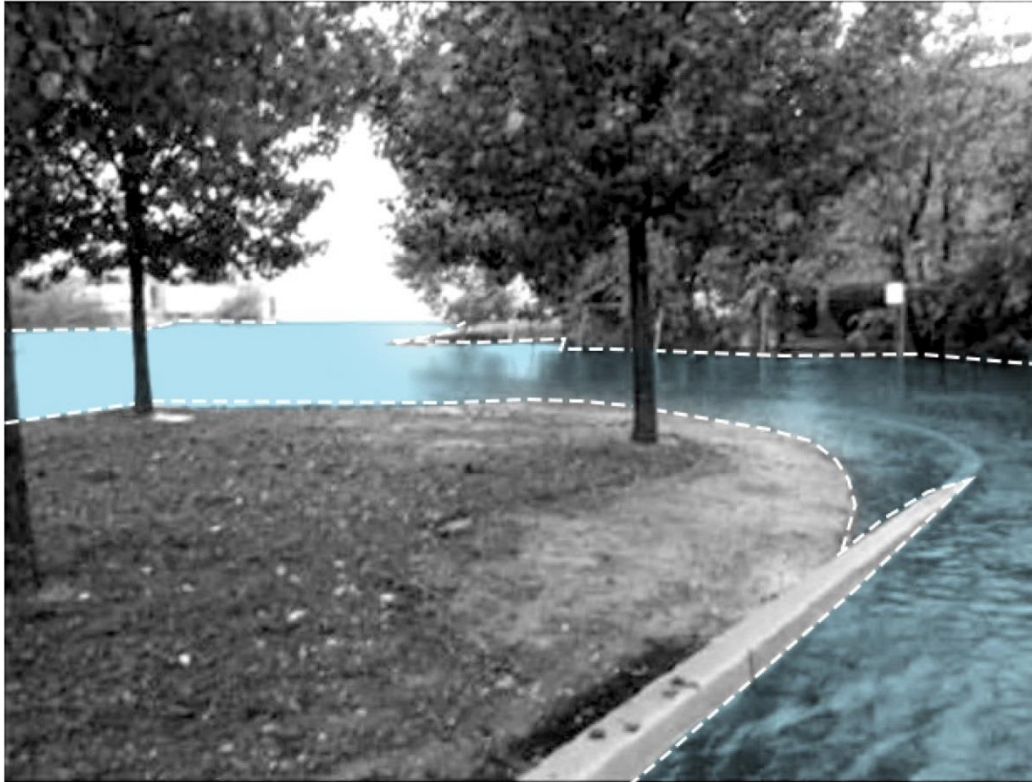
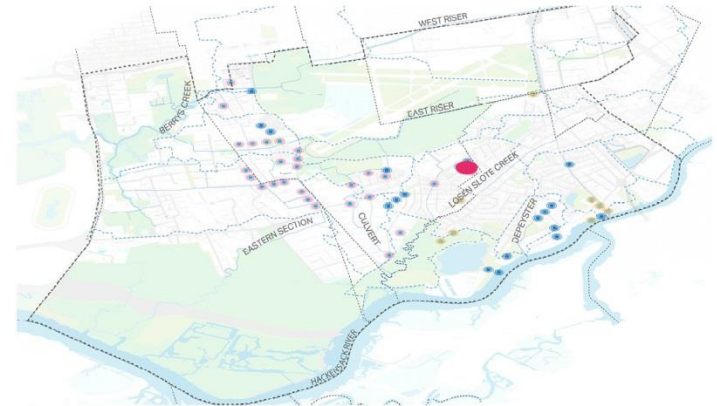


Image Source: Hackensack Meadowlands Floodplain Management Plan (Oct 24, 2005)

1 CAROL PLACE

Flood Event Date:
OCTOBER 12, 2005

Estimated Flood Elevation:
4.8 NAVD88



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FREQUENTLY FLOODED AREAS

CARLSTADT

16

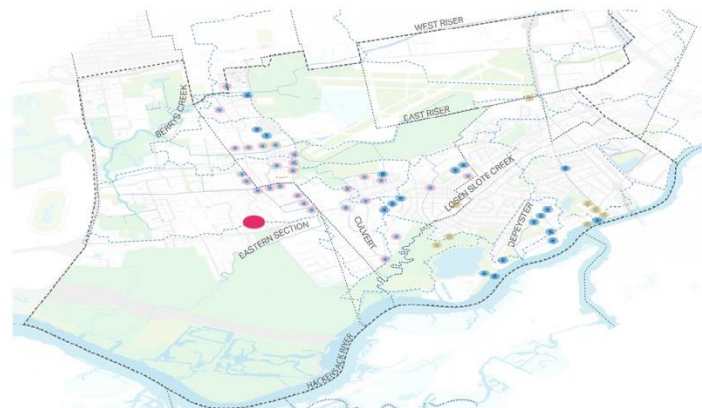


Image Source: Hackensack Meadowlands Floodplain Management Plan (Oct 24, 2005)

140 KERO ROAD

Flood Event Date:
JULY 8, 2005

Estimated Flood Elevation:
4.5 NAVD88



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PRELIMINARY

STORMWATER DRAINAGE IMPROVEMENT AREAS

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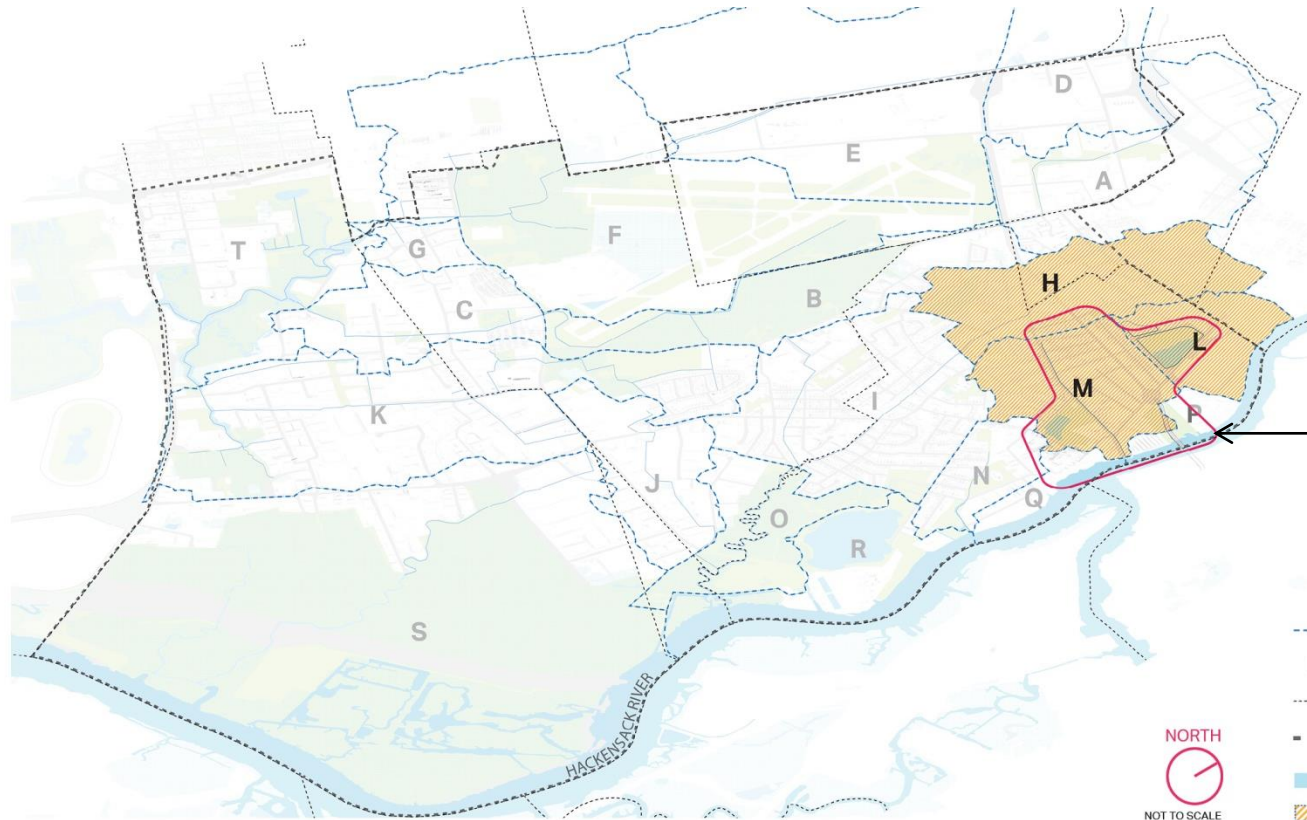
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DRAINAGE IMPROVEMENT CONCEPT 1

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MAIN STREET CONCEPT + AFFECTED SUBBASINS



M: MAIN STREET

L: INDIAN LAKE

H: UPPER LOSEN SLOTE 1

CONCEPT 1

- SUBBASIN BOUNDARY
- M** SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- WATER
- AFFECTED SUBBASIN



DRAINAGE IMPROVEMENT CONCEPT 1

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MAIN STREET COLLECTION



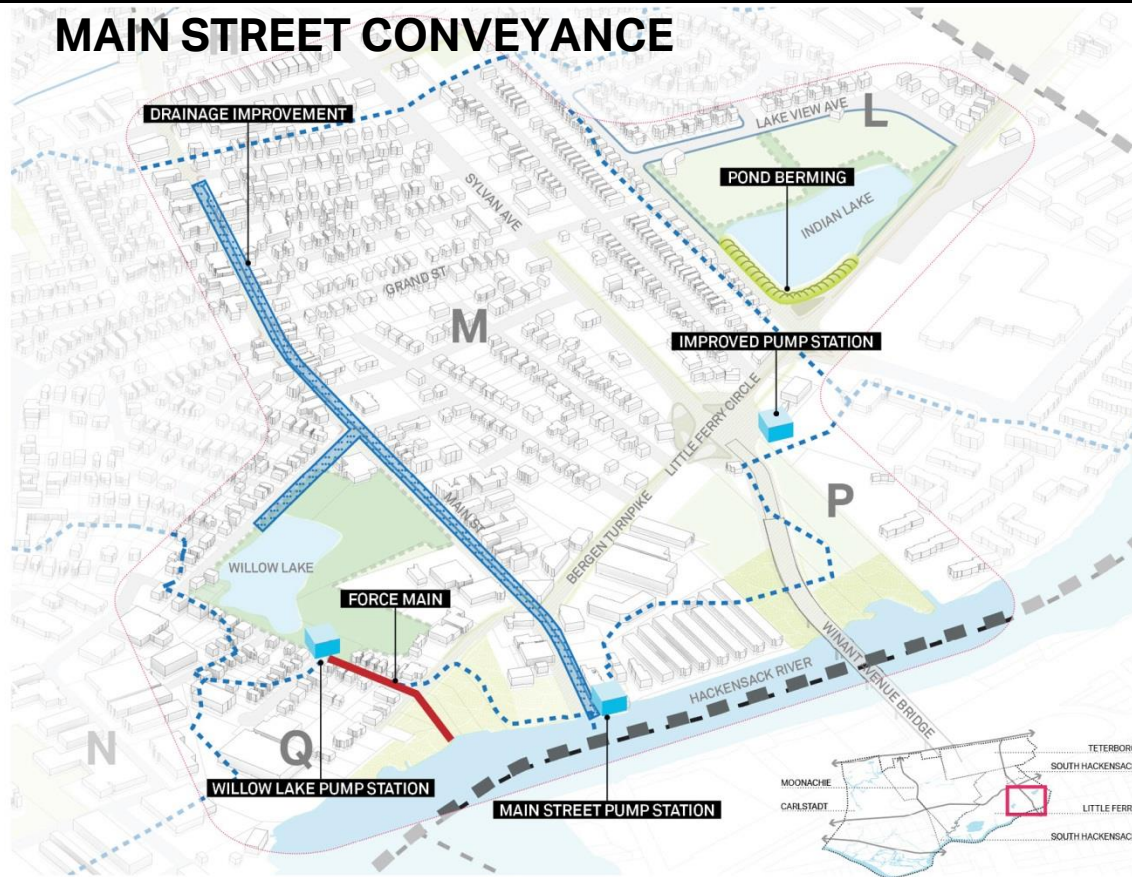
- **CONNECTING FEATURES ALONG MAIN STREET, BERGEN TURNPIKE, SYLVAN AVE, WILLOW LAKE PARK, INDIAN LAKE, AND NEW OPEN SPACE FEATURES ON THE HACKENSACK RIVER**
- **IMPROVEMENTS INCLUDE BIOSWALES, RAIN GARDENS, BUMP OUTS, MEDIAN PLANTING, NEW OPEN SPACE, AND OPEN SPACE IMPROVEMENTS**



DRAINAGE IMPROVEMENT CONCEPT 1

20

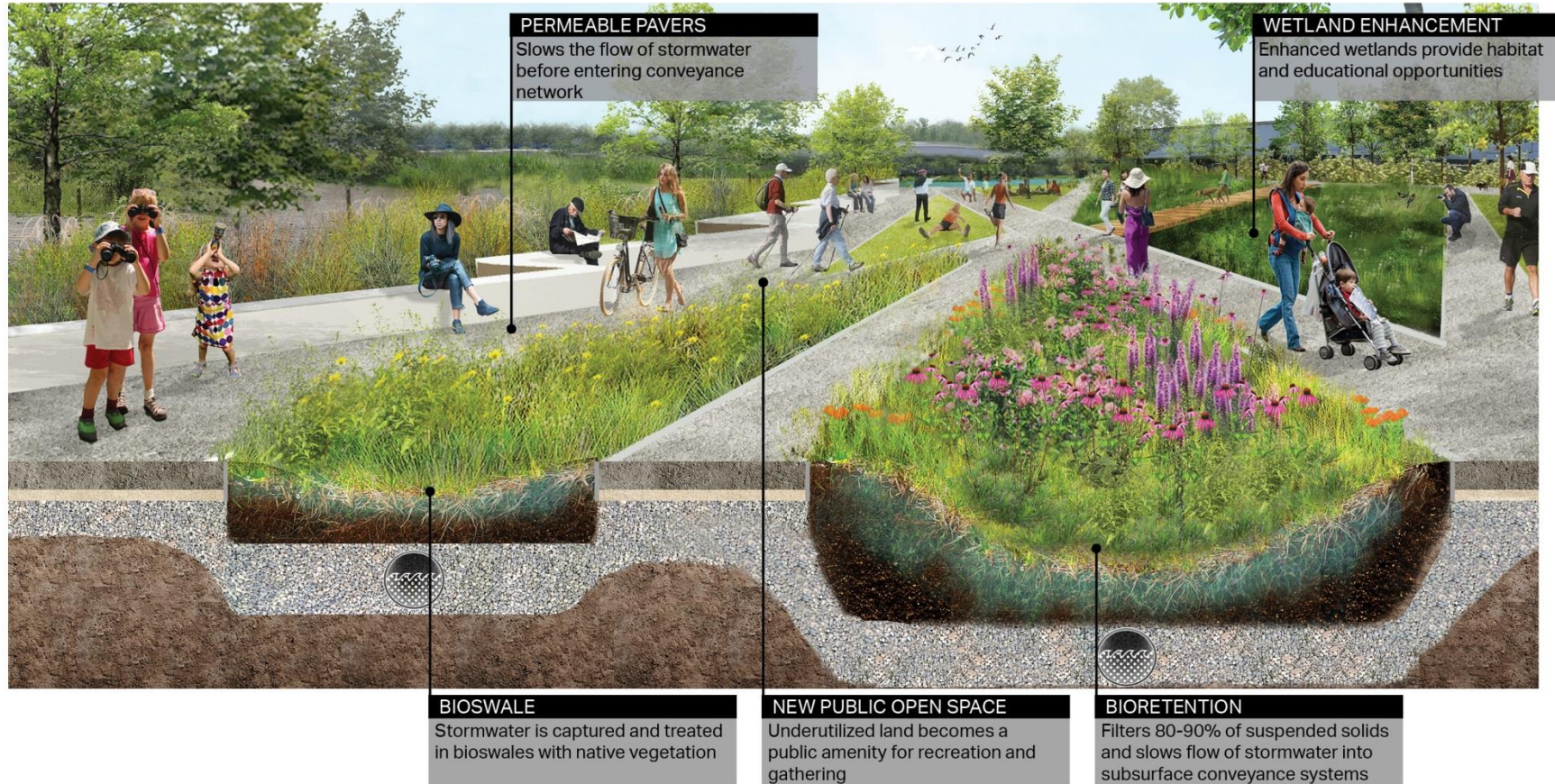
MAIN STREET CONVEYANCE



- **IMPROVED PUMP STATIONS AT LITTLE FERRY CIRCLE, MAIN STREET, AND WILLOW LAKE. BERM TO INCREASE STORAGE CAPACITY AT INDIAN LAKE**
- **IMPROVE CONVEYANCE BY INCREASING CULVERT SIZES ALONG MAIN STREET**

NEW OPEN SPACE

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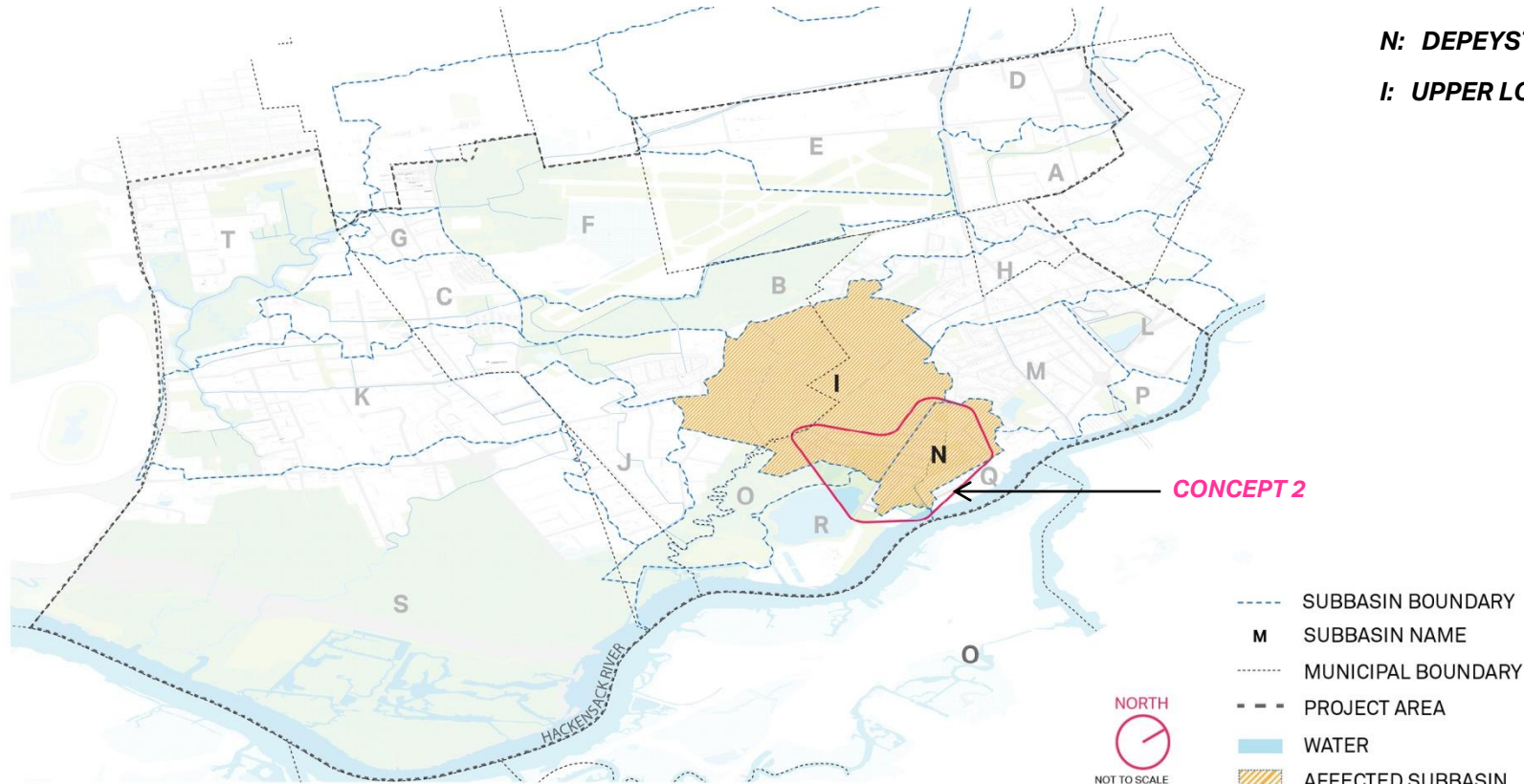
DRAINAGE IMPROVEMENT CONCEPT 2

DEPEYSTER CREEK CONCEPT + AFFECTED SUBBASINS

22

N: DEPEYSTER CREEK

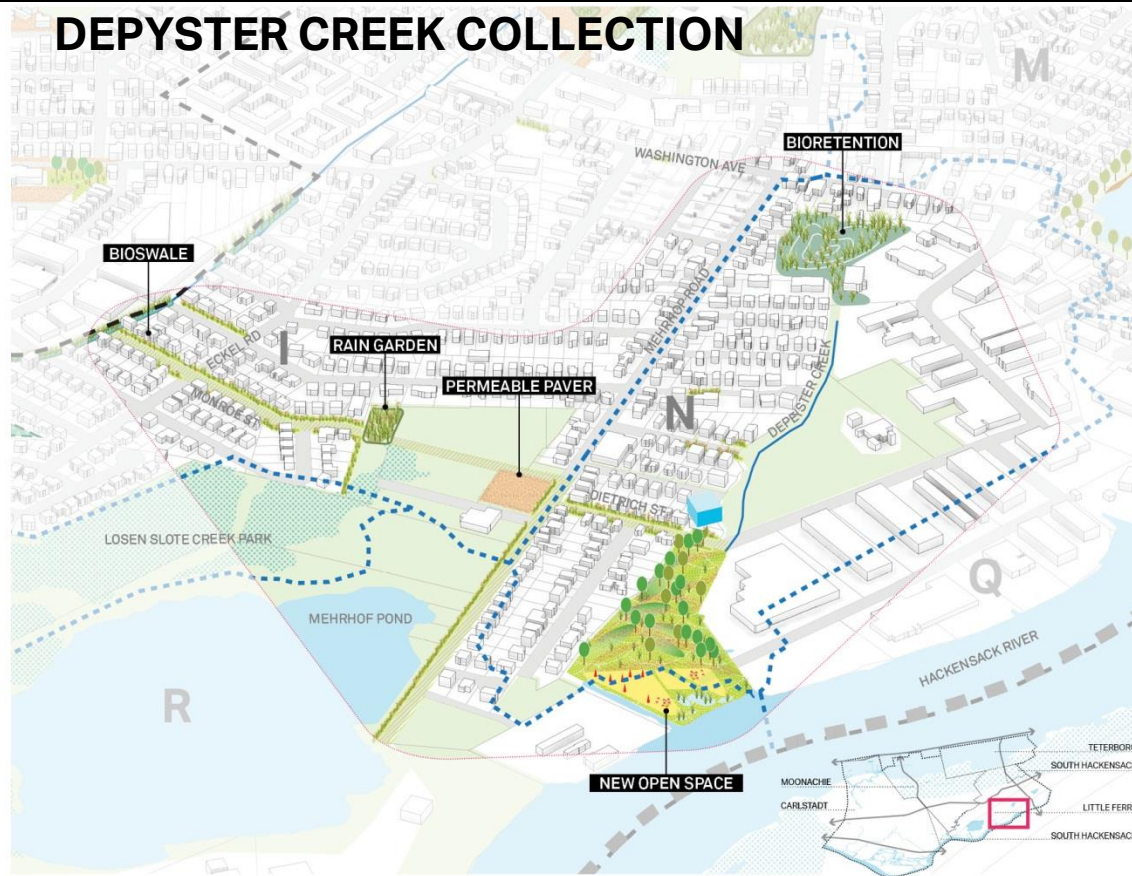
I: UPPER LOSEN SLOTE 1



DRAINAGE IMPROVEMENT CONCEPT 2

23

DEPYSTER CREEK COLLECTION



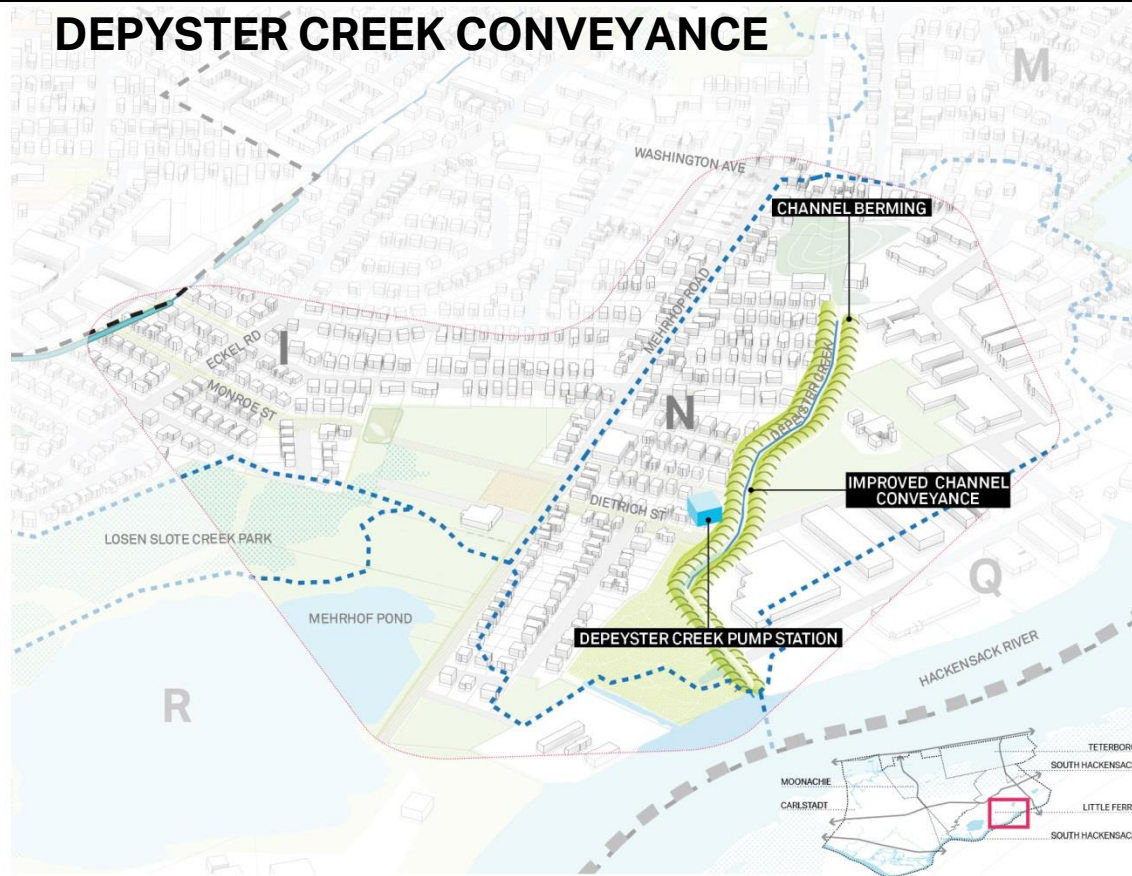
- **CONNECTING FEATURES ALONG DEPYSTER CREEK, MEHRHOF RD, MONROE ST, AND THE HACKENSACK RIVER**
- **IMPROVEMENTS INCLUDE NEW OPEN SPACE, OPEN SPACE IMPROVEMENTS, RECREATION, BIOSWALES, PERMEABLE PAVING, BIORETENTION, AND RAIN GARDENS**



DRAINAGE IMPROVEMENT CONCEPT 2

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DEPYSTER CREEK CONVEYANCE



- **INCREASE CHANNEL CONVEYANCE AND IMPROVE PUMP STATION AT DEPEYSTER CREEK**
- **CHANNEL BERING TO INCREASE CAPACITY AT DEPEYSTER CREEK**

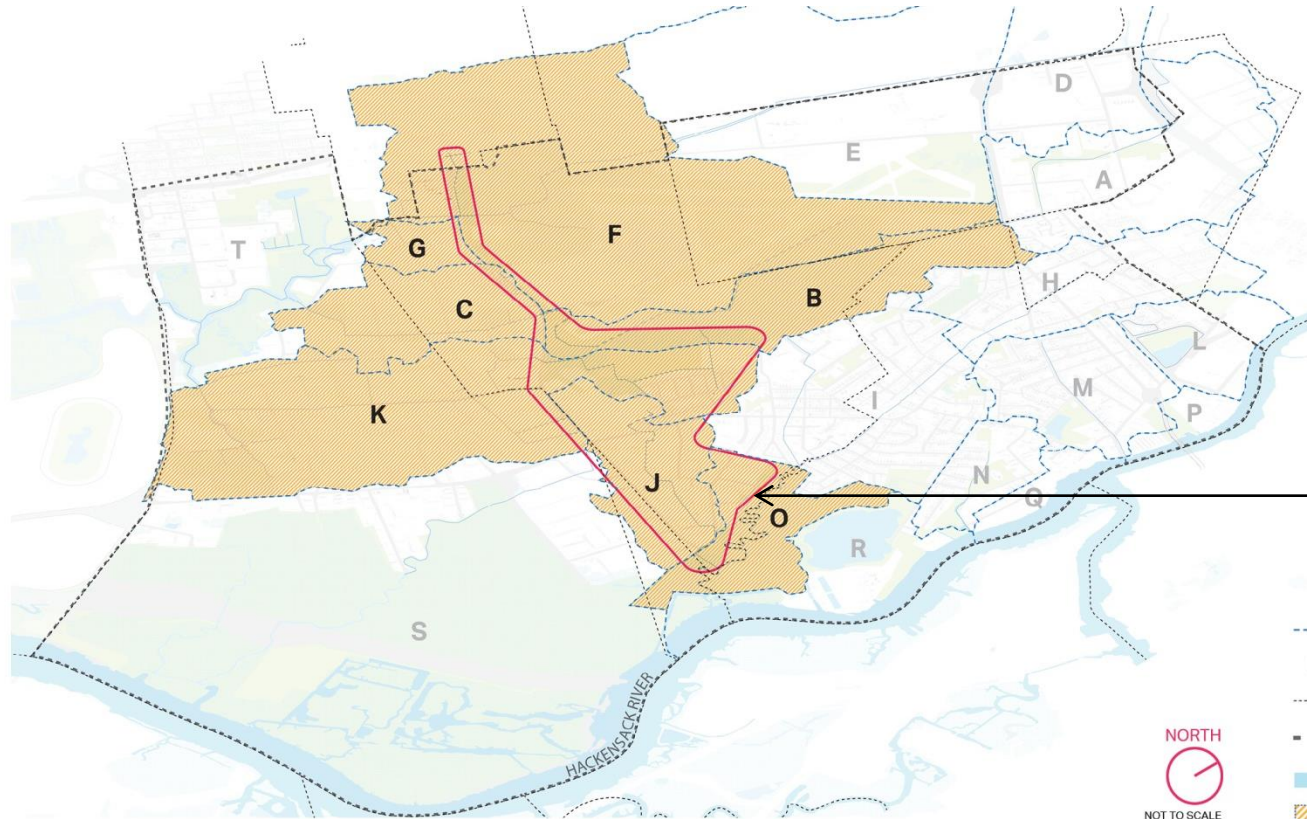
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DRAINAGE IMPROVEMENT CONCEPT 3

26

MOONACHIE CONCEPT + AFFECTED SUBBASINS



O: LOWER LOSEN SLOTE
J: MOONACHIE
K: CARLSTADT
B: MIDDLE EAST RISER
F: MIDDLE WEST RISER
C: LOWER EAST RISER
G: LOWER WEST RISER

CONCEPT 3

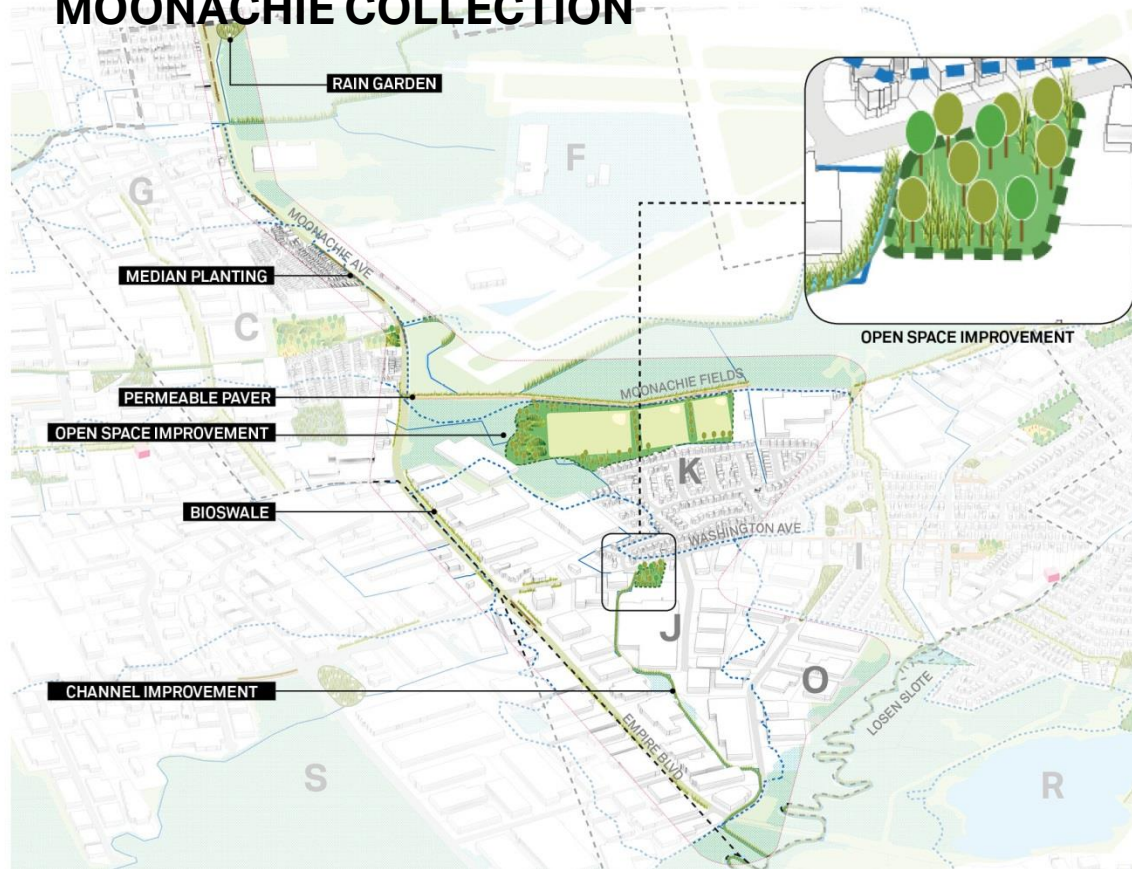
- SUBBASIN BOUNDARY
- M** SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- WATER
- AFFECTED SUBBASIN



DRAINAGE IMPROVEMENT CONCEPT 3

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MOONACHIE COLLECTION



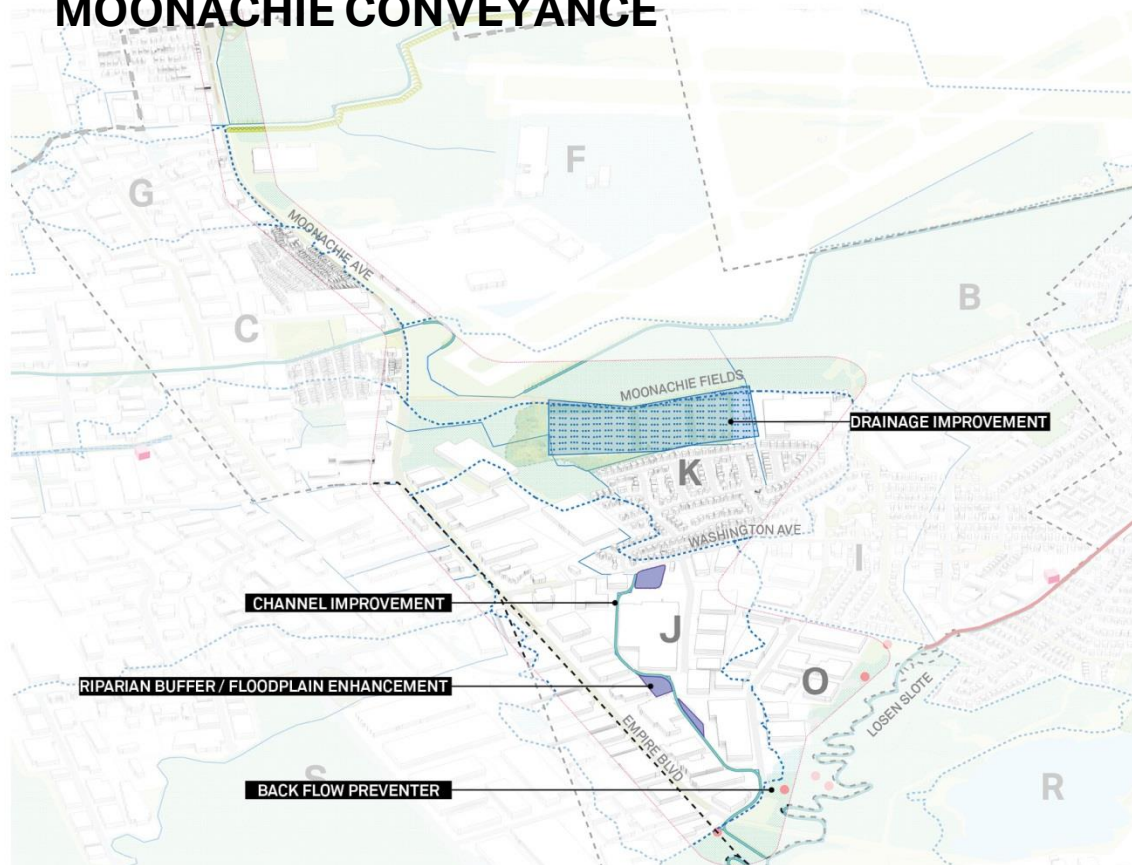
- **CONNECTING FEATURES ALONG EMPIRE BLVD, AND MOONACHIE ROAD**
- **IMPROVEMENTS INCLUDE BIOSWALES, MEDIAN PLANTING, NEW OPEN SPACE, AND RECREATION**



DRAINAGE IMPROVEMENT CONCEPT 3

28

MOONACHIE CONVEYANCE



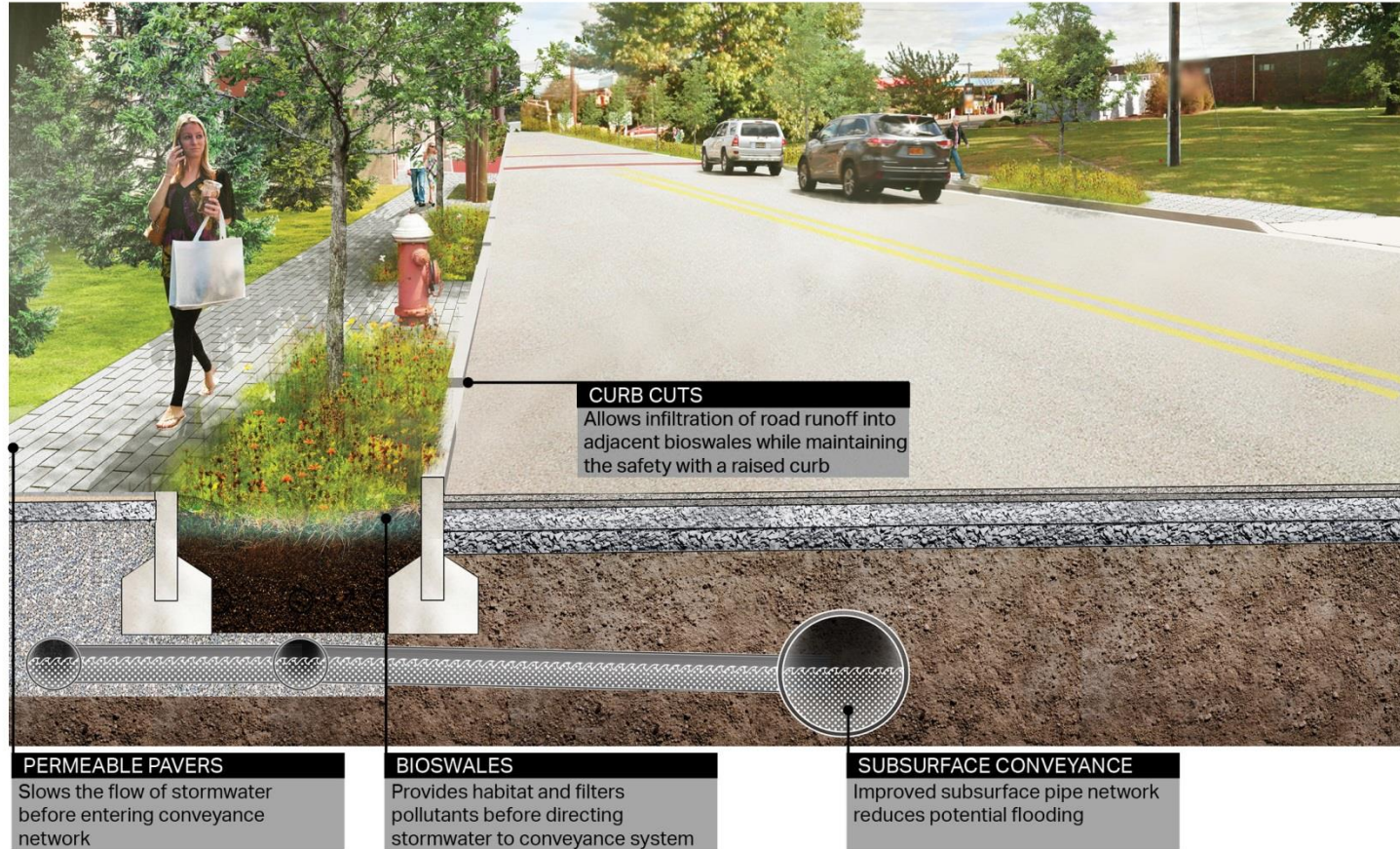
- **OFF CHANNEL STORAGE, INCREASED CONVEYANCE, AND LOCAL DRAINAGE IMPROVEMENTS**
- **BACK FLOW PROTECTION FOR OUTFALLS TO LOSEN SLOTE**



- SUBBASIN BOUNDARY
- M SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- EXISTING DITCH/CREEK
- WATER
- ROAD
- LOCAL DRAINAGE IMPROVEMENT
- RIPARIAN BUFFER / FLOODPLAIN ENHANCEMENT
- CHANNEL IMPROVEMENT
- BACK FLOW PREVENTER

BIOSWALES + STREET IMPROVEMENTS

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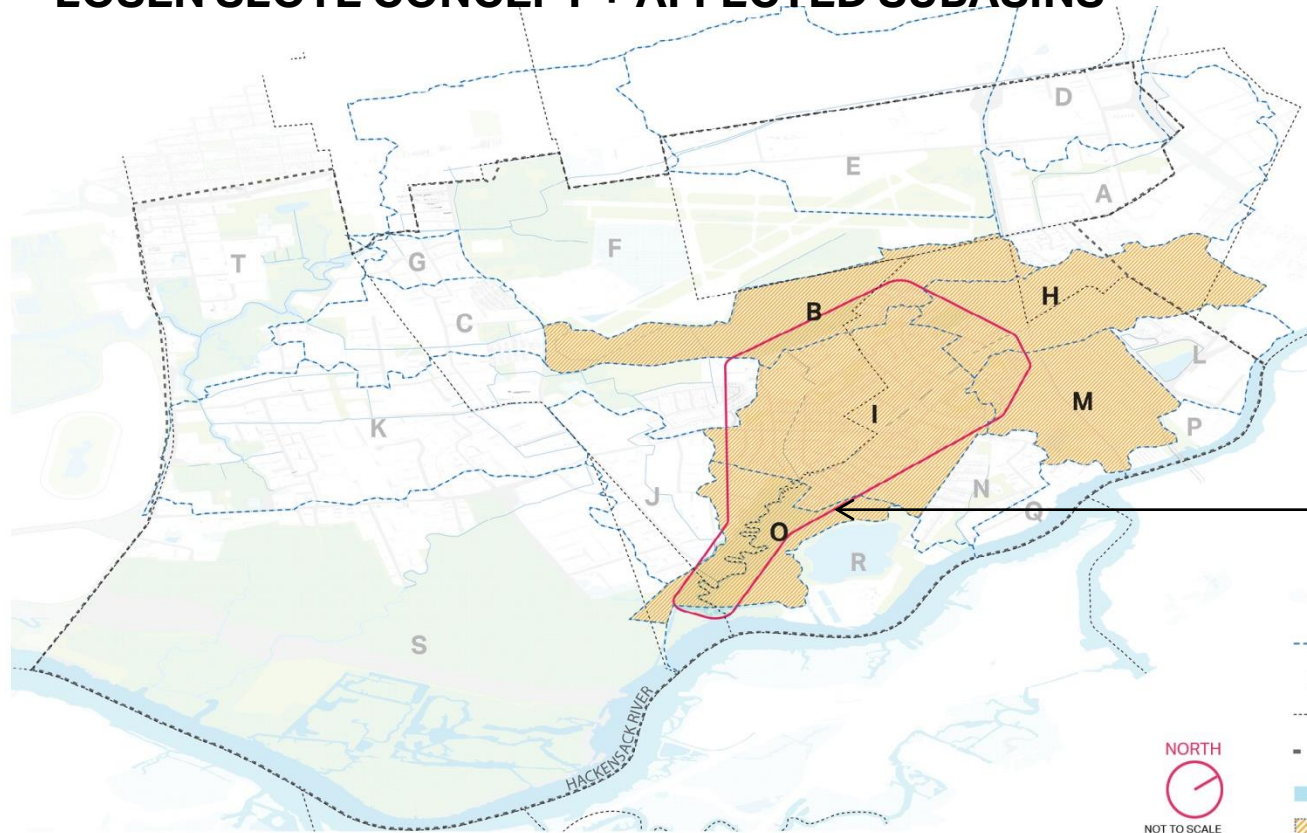
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DRAINAGE IMPROVEMENT CONCEPT 4

30

LOSEN SLOTE CONCEPT + AFFECTED SUBBASINS



- O:** LOWER LOSEN SLOTE
- I:** UPPER LOSEN SLOTE 2
- M:** MAIN STREET
- H:** UPPER LOSEN SLOTE 1
- B:** MIDDLE EAST RISER

CONCEPT 4

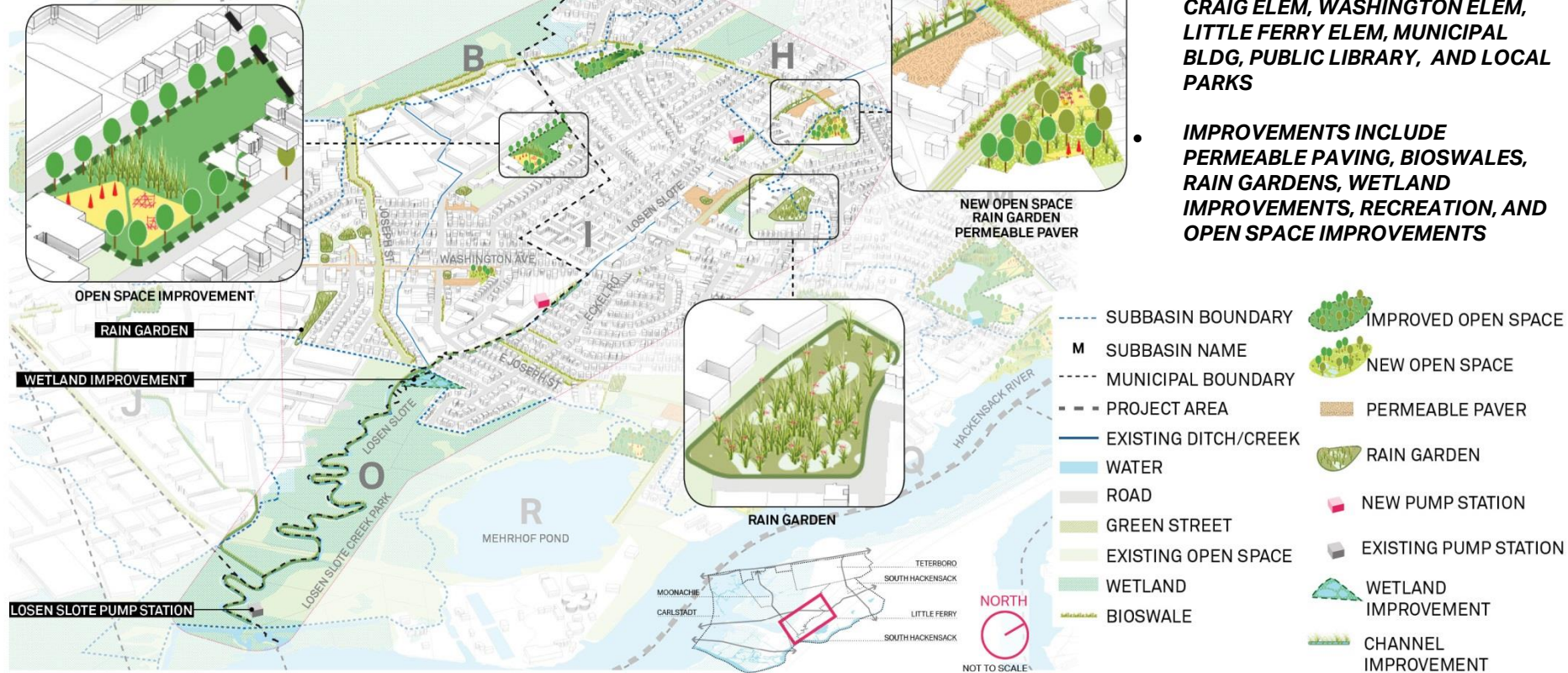
- SUBBASIN BOUNDARY
- M** SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- WATER
- AFFECTED SUBBASIN



DRAINAGE IMPROVEMENT CONCEPT 4

31

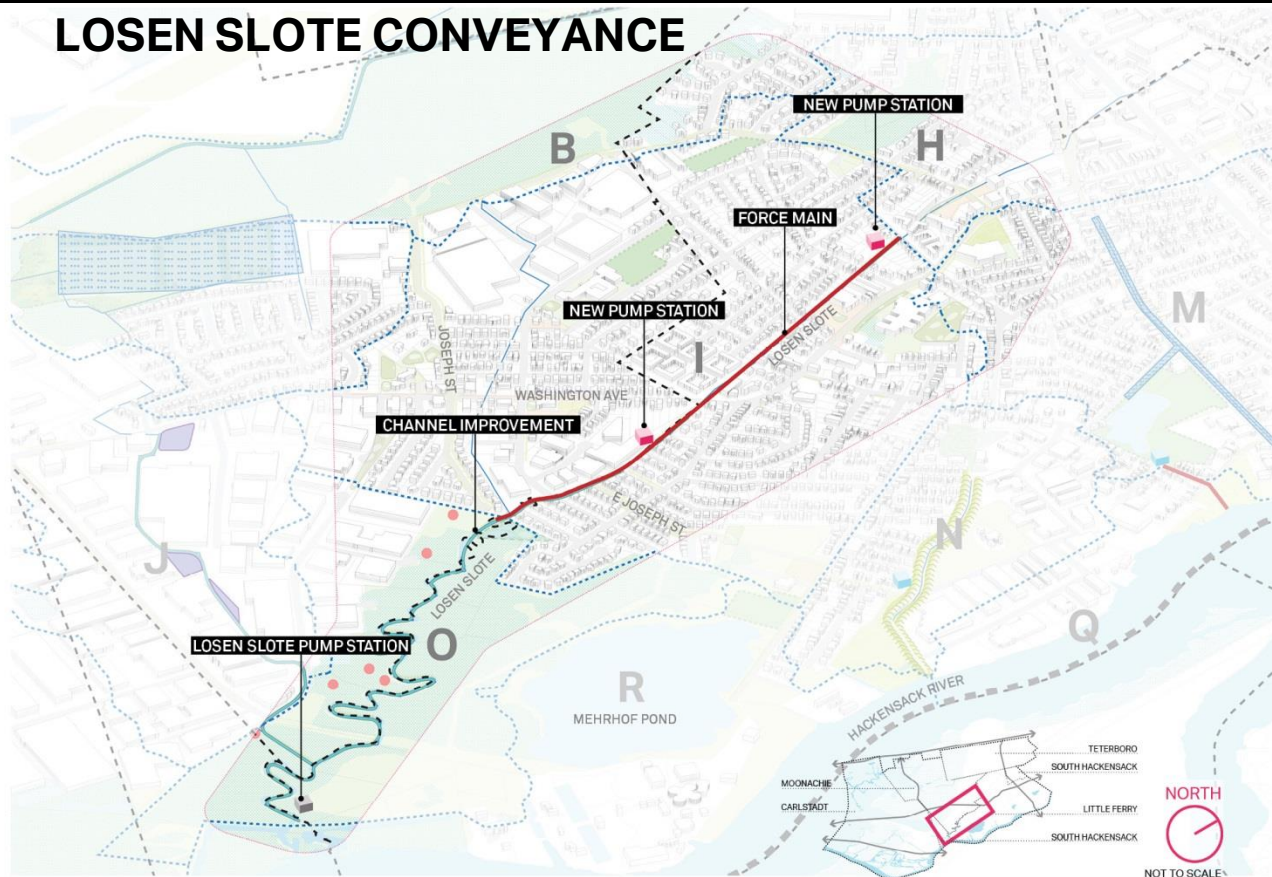
LOSEN SLOTE COLLECTION



DRAINAGE IMPROVEMENT CONCEPT 4

32

LOSEN SLOTE CONVEYANCE



- CHANNEL IMPROVEMENTS, HABITAT RESTORATION, NEW PUMP STATION, FORCE MAINS, AND BOOSTER PUMPS
- SUPPLEMENTAL DREDGING, SETTLING BASIN/FOREBAY TO RECEIVE FLOW FROM FORCE MAINS FOR UPPER LOSEN SLOTE, AND BACKFLOW PROTECTION FOR RESIDENTIAL OUTFALLS

- SUBBASIN BOUNDARY
- M SUBBASIN NAME
- - - MUNICIPAL BOUNDARY
- - - PROJECT AREA
- EXISTING DITCH/CREEK
- WATER
- ROAD
- CHANNEL IMPROVEMENT
- FORCE MAIN
- NEW PUMP STATION
- EXISTING PUMP STATION
- BACK FLOW PREVENTER

IMPROVEMENTS TO CIVIC AMENITY PROPERTY

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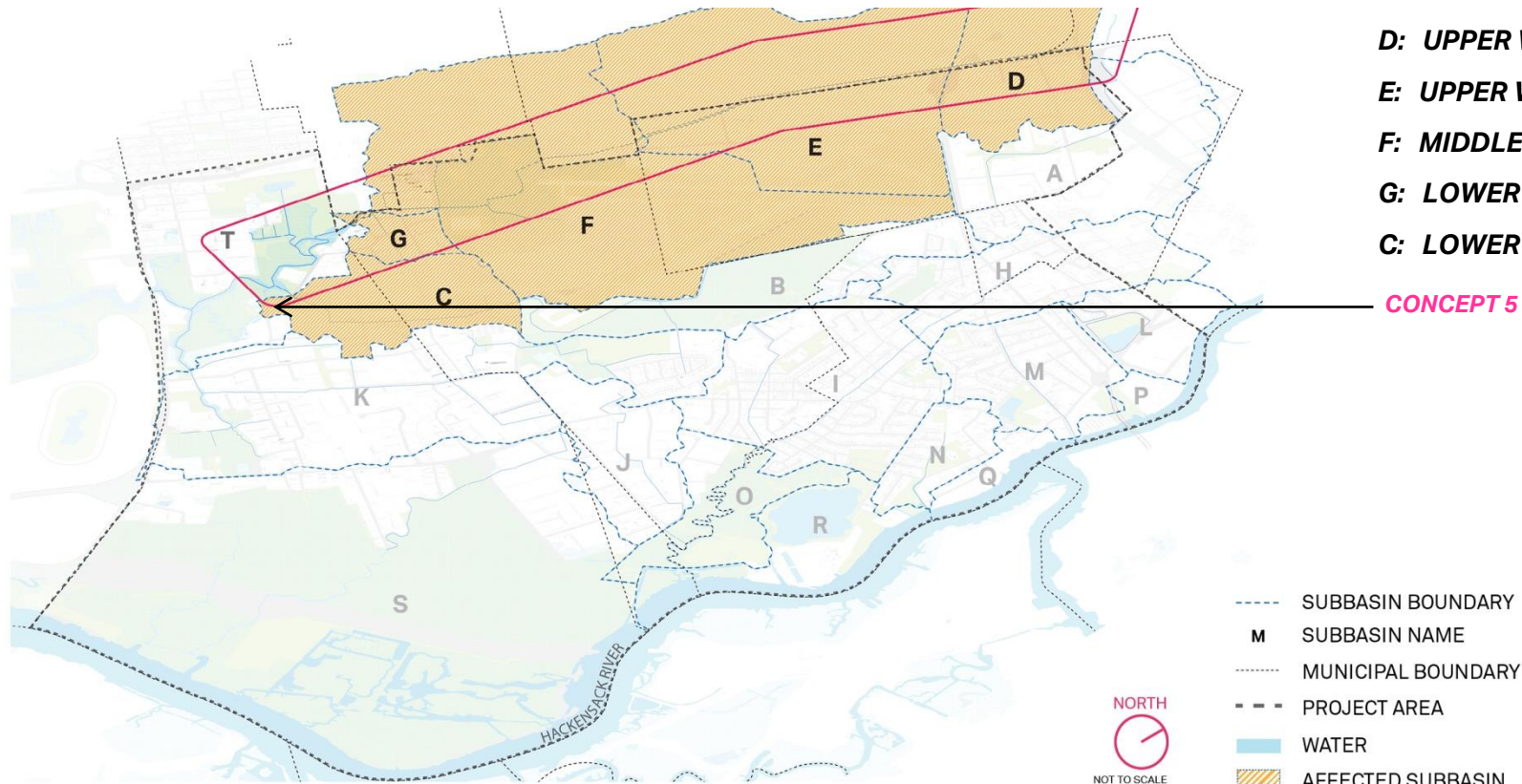
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DRAINAGE IMPROVEMENT CONCEPT 5

34

ALL WEST RISER CONCEPT + AFFECTED SUBBASINS

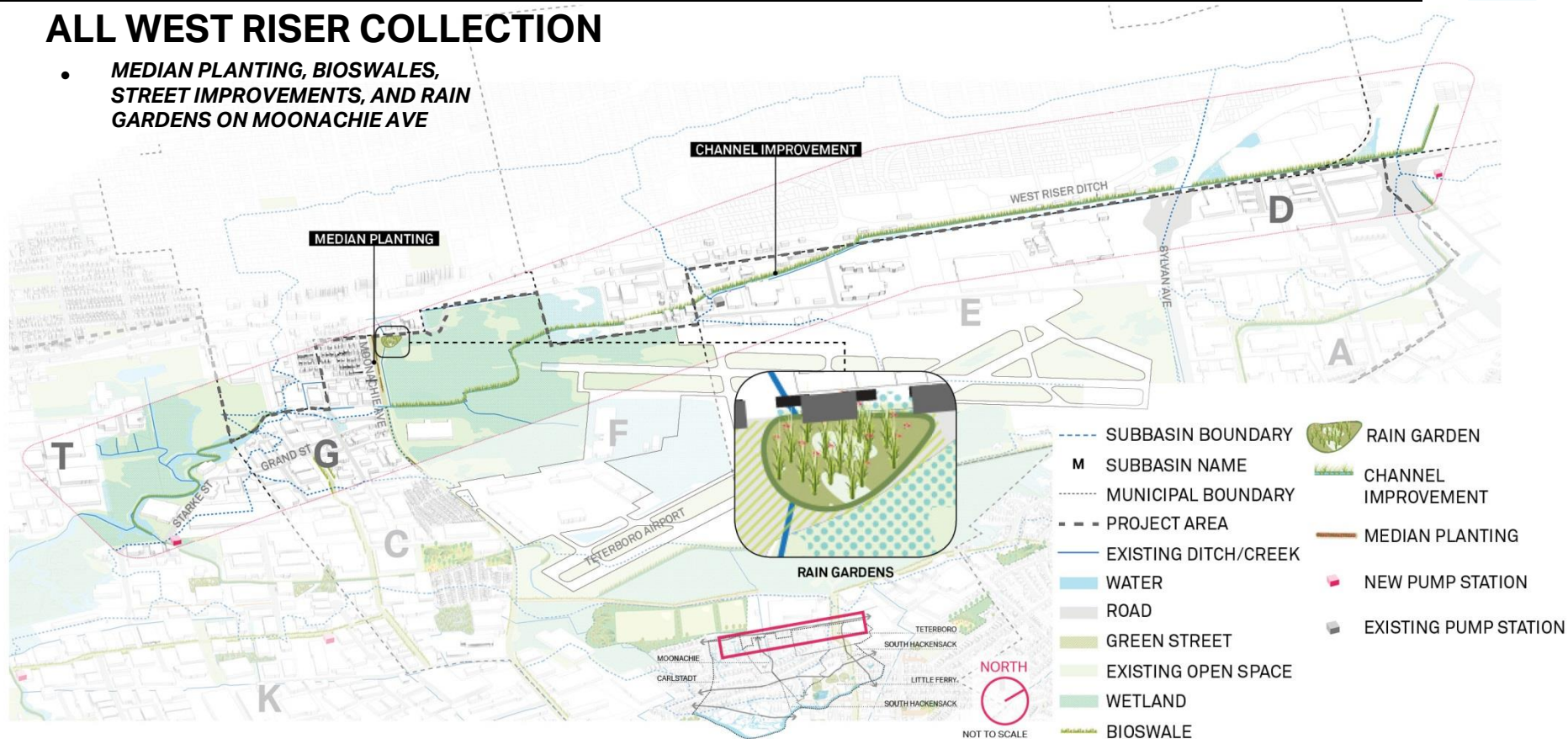


DRAINAGE IMPROVEMENT CONCEPT 5

35

ALL WEST RISER COLLECTION

- MEDIAN PLANTING, BIOSWALES, STREET IMPROVEMENTS, AND RAIN GARDENS ON MOONACHIE AVE

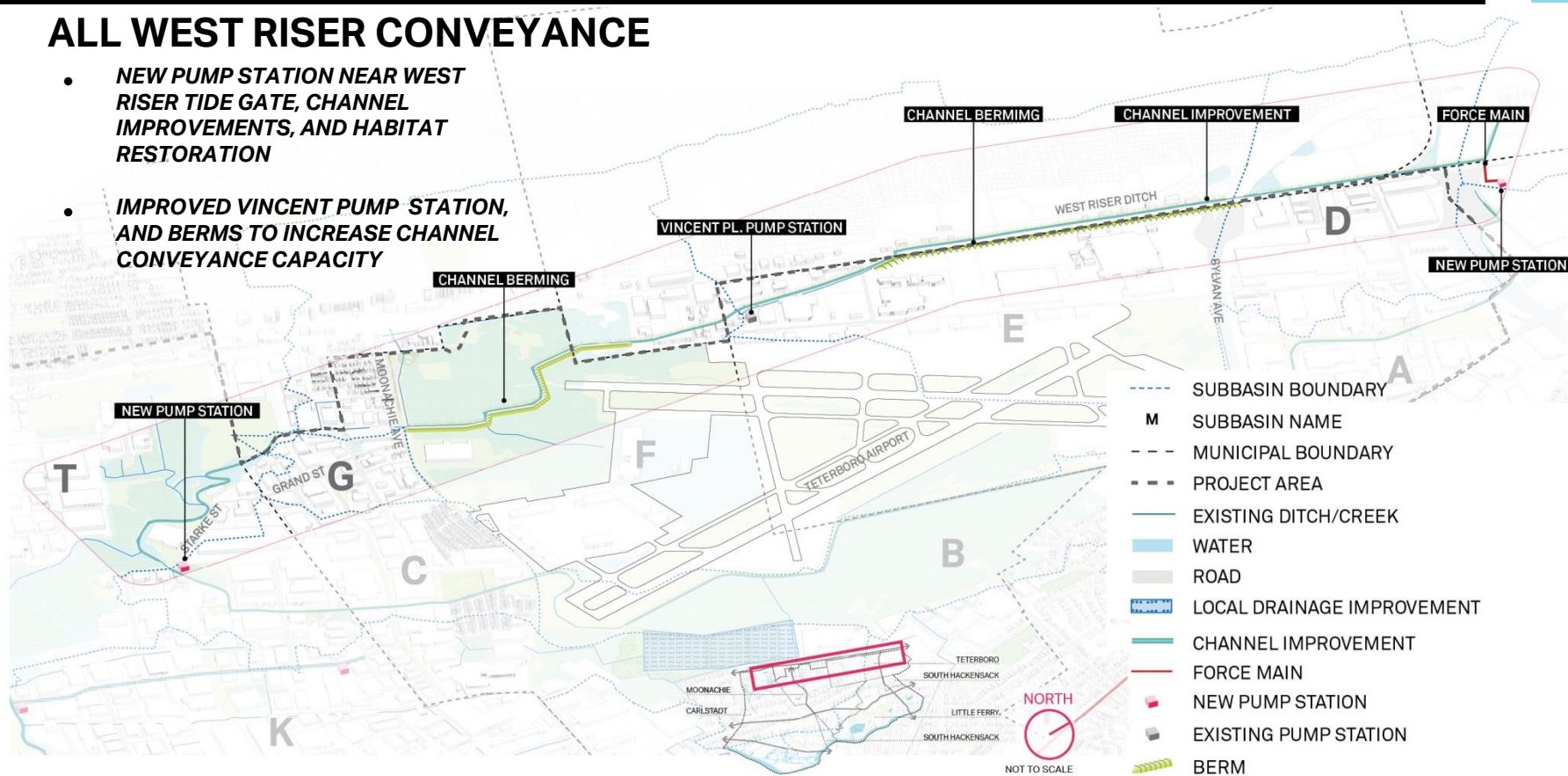


DRAINAGE IMPROVEMENT CONCEPT 5

36

ALL WEST RISER CONVEYANCE

- NEW PUMP STATION NEAR WEST RISER TIDE GATE, CHANNEL IMPROVEMENTS, AND HABITAT RESTORATION
- IMPROVED VINCENT PL. PUMP STATION, AND BERMS TO INCREASE CHANNEL CONVEYANCE CAPACITY



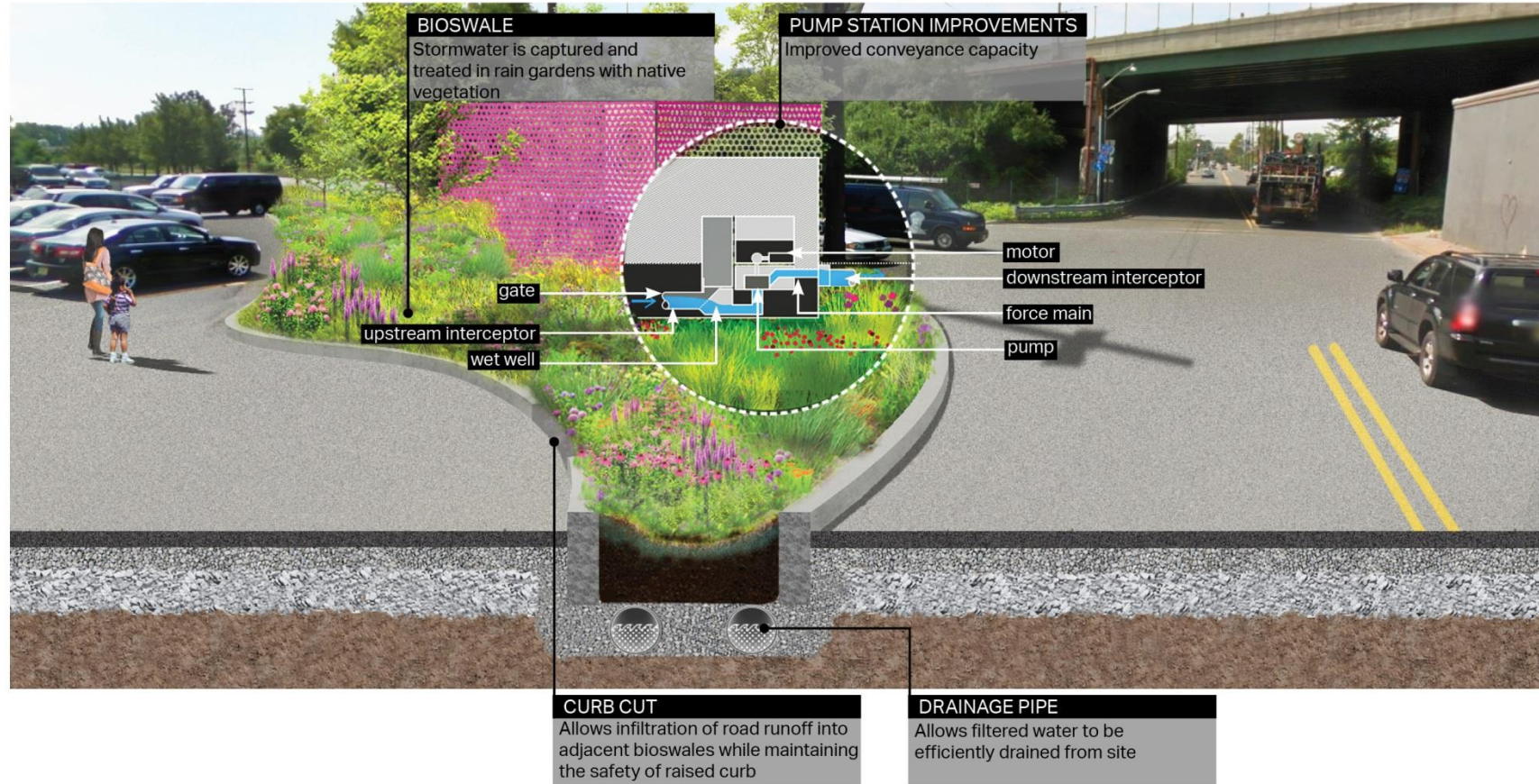
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NEW PUMP STATION

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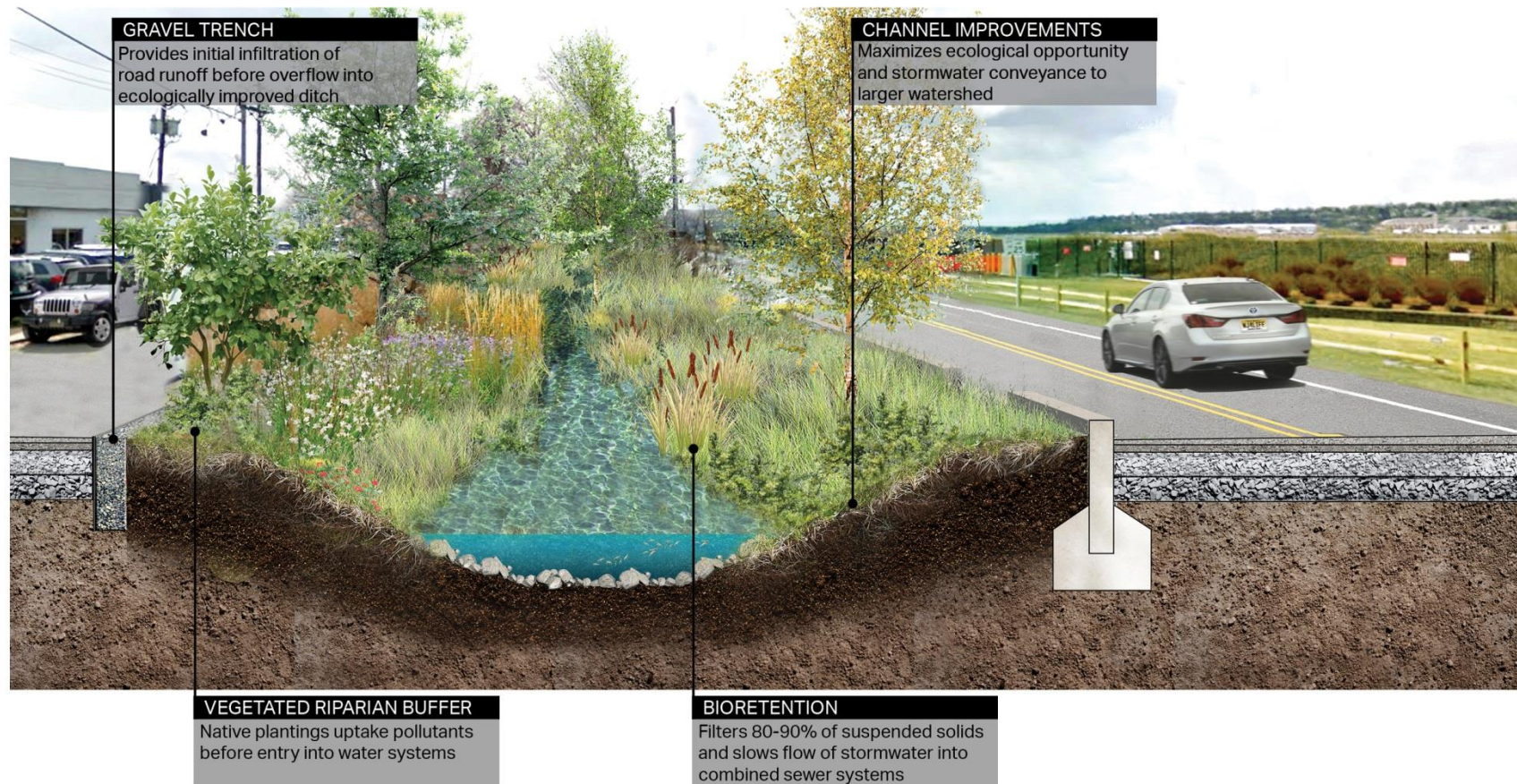
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CHANNEL + HABITAT IMPROVEMENTS

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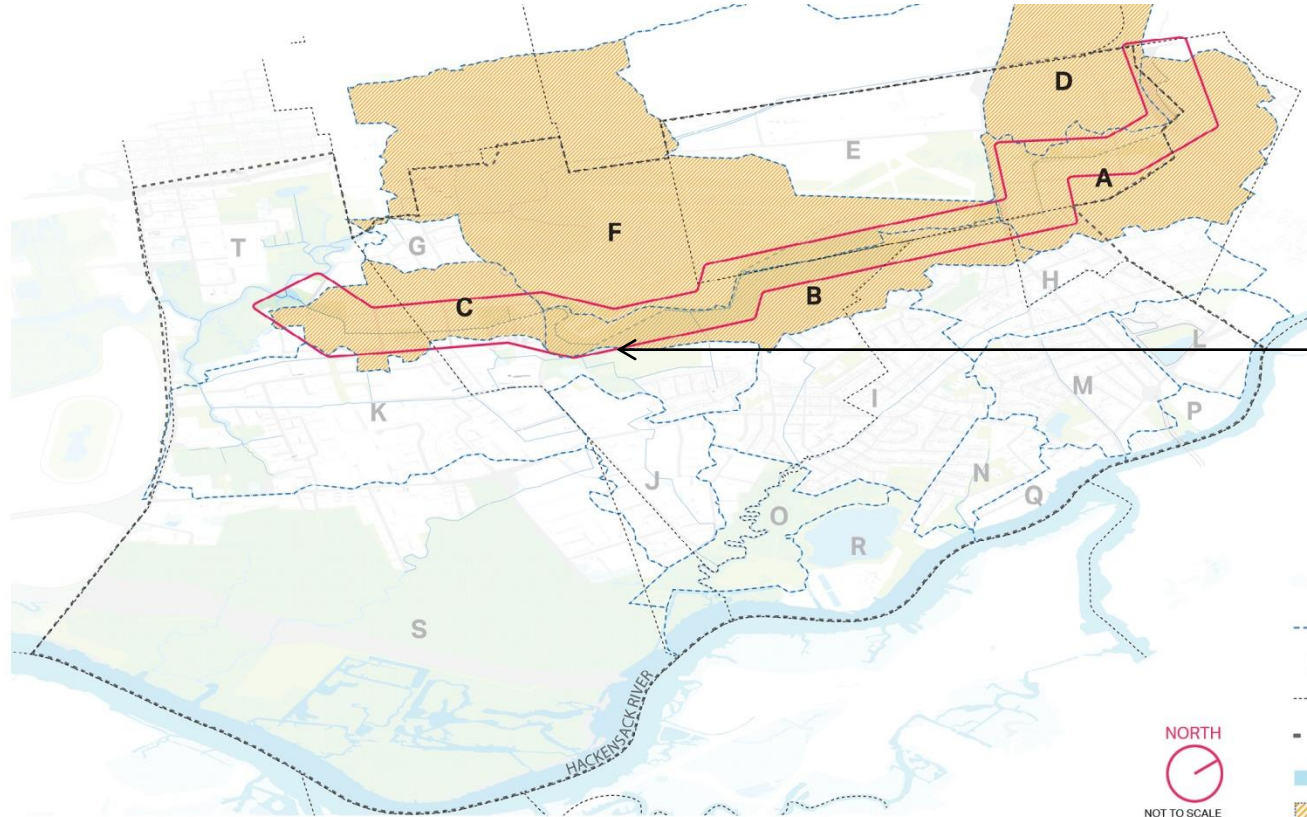
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DRAINAGE IMPROVEMENT CONCEPT 6

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ALL EAST RISER CONCEPT + AFFECTED SUBBASINS



- A: UPPER EAST RISER**
- D: UPPER WEST RISER 1**
- E: UPPER WEST RISER 2**
- F: MIDDLE WEST RISER**
- B: MIDDLE EAST RISER**
- C: LOWER EAST RISER**

CONCEPT 6

- SUBBASIN BOUNDARY
- M** SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- WATER
- AFFECTED SUBBASIN

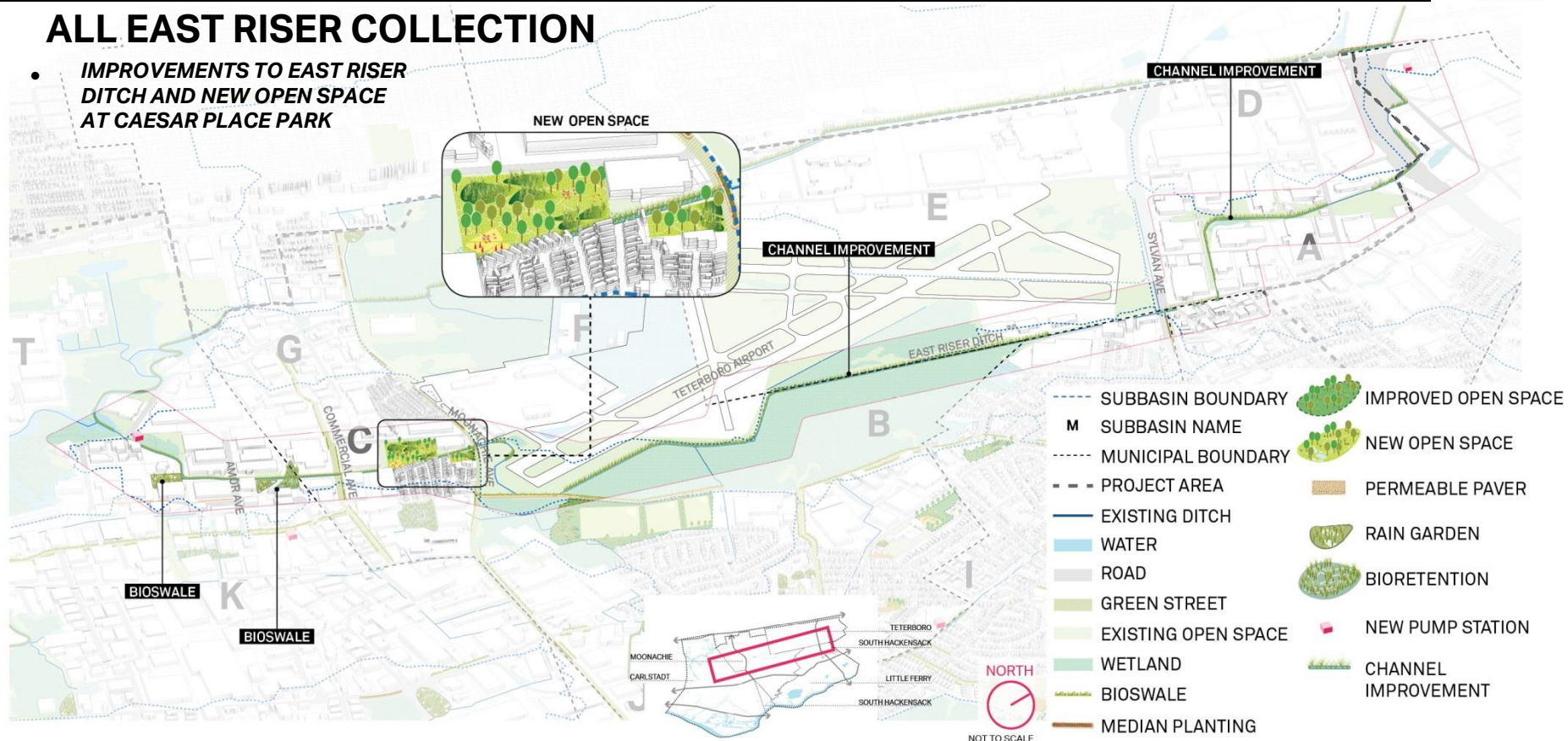


DRAINAGE IMPROVEMENT CONCEPT 6

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ALL EAST RISER COLLECTION

- IMPROVEMENTS TO EAST RISER DITCH AND NEW OPEN SPACE AT CAESAR PLACE PARK



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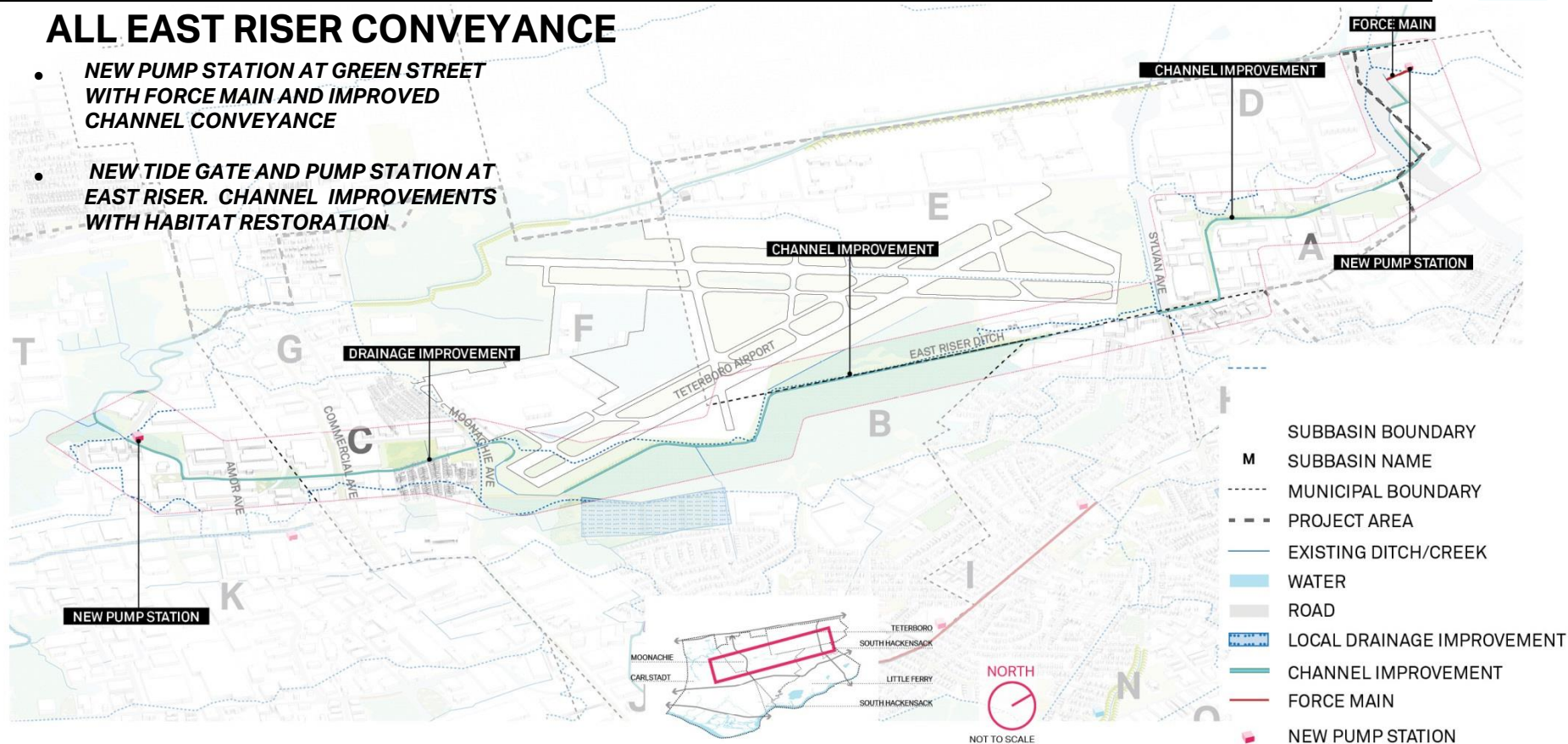
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DRAINAGE IMPROVEMENT CONCEPT 6

41

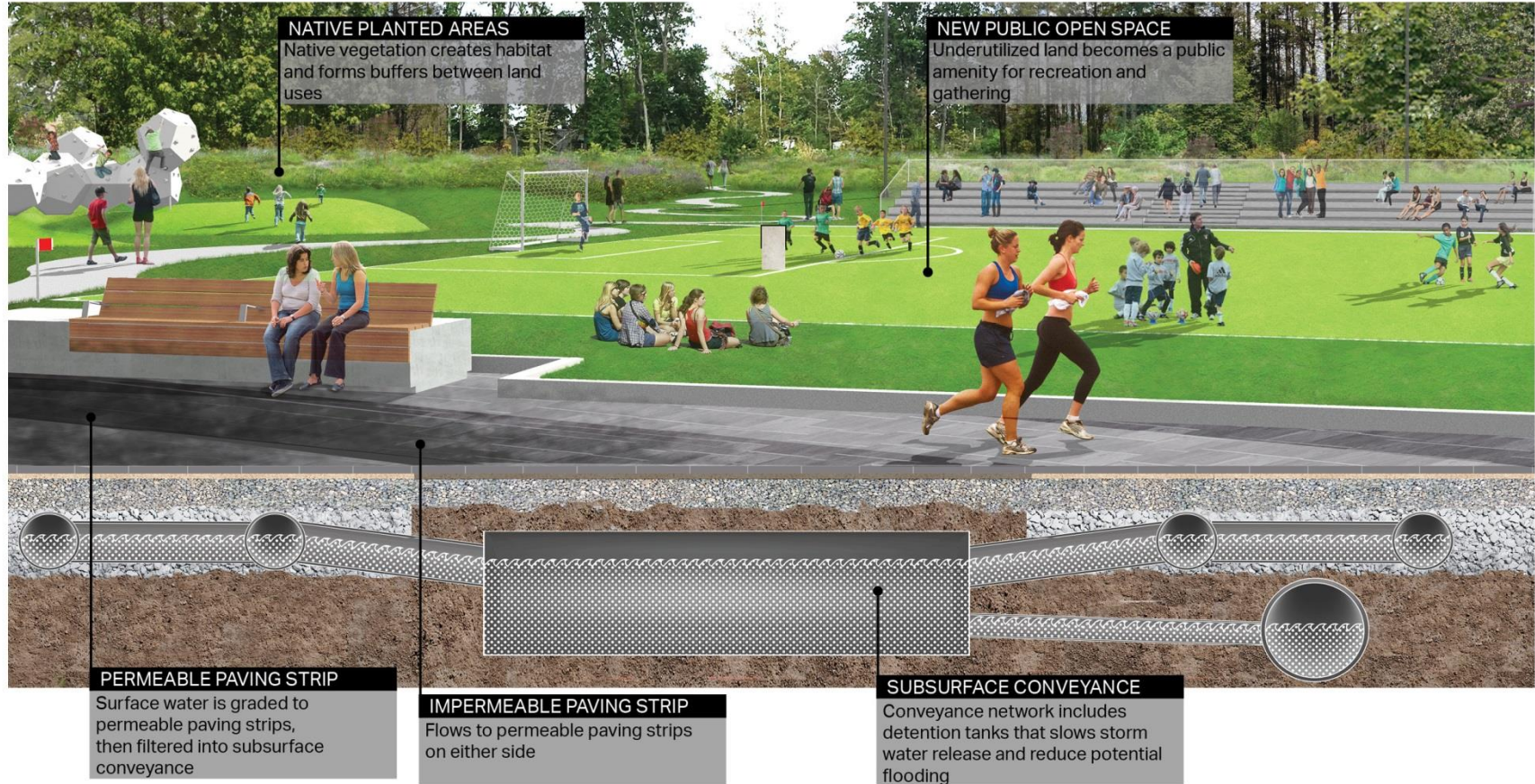
ALL EAST RISER CONVEYANCE

- NEW PUMP STATION AT GREEN STREET WITH FORCE MAIN AND IMPROVED CHANNEL CONVEYANCE
- NEW TIDE GATE AND PUMP STATION AT EAST RISER. CHANNEL IMPROVEMENTS WITH HABITAT RESTORATION



OPEN SPACE IMPROVEMENTS

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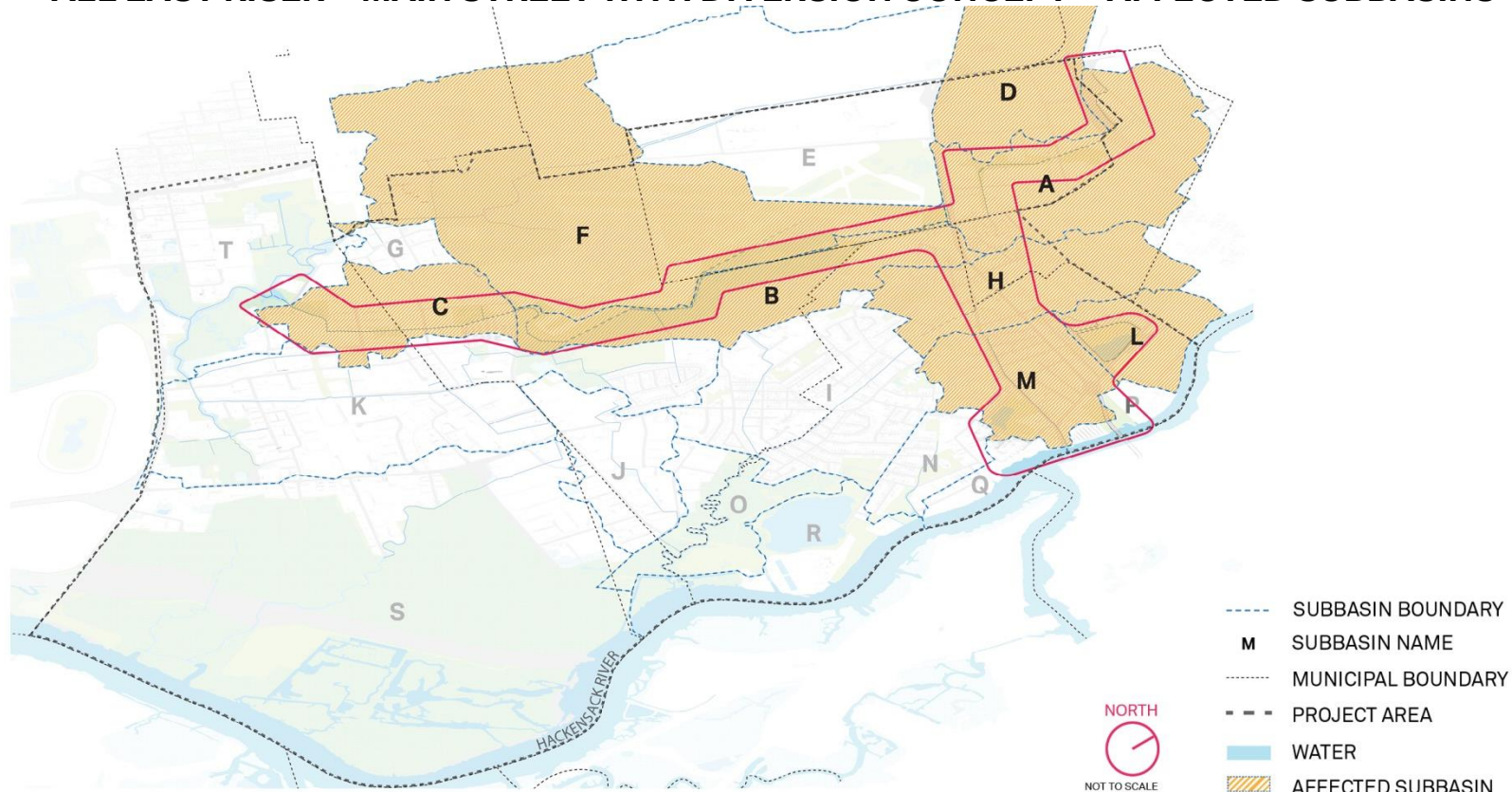
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DRAINAGE IMPROVEMENT CONCEPT 7

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ALL EAST RISER + MAIN STREET WITH DIVERSION CONCEPT + AFFECTED SUBBASINS



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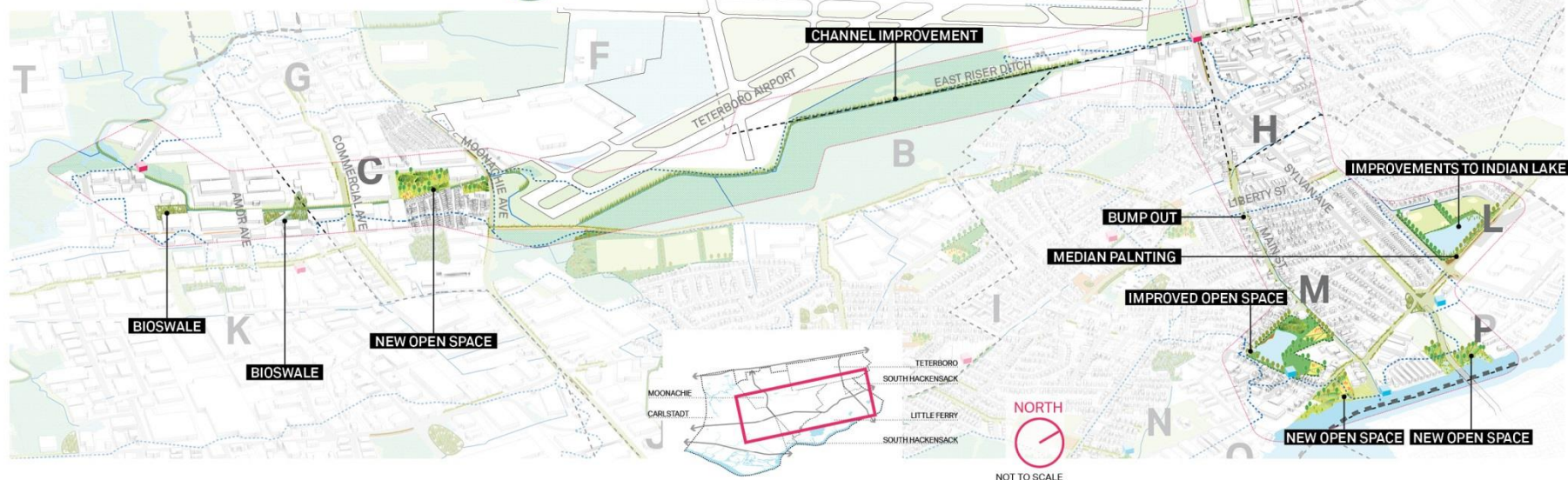
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DRAINAGE IMPROVEMENT CONCEPT 7

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ALL EAST RISER + MAIN STREET WITH DIVERSION COLLECTION

- SUBBASIN BOUNDARY
- M** SUBBASIN NAME
- MUNICIPAL BOUNDARY
- - - PROJECT AREA
- EXISTING DITCH/CREEK
- WATER
- ROAD
- GREEN STREET
- EXISTING OPEN SPACE
- WETLAND
- BIOSWALE
- BUMP OUT
- MEDIAN PLANTING
- CHANNEL IMPROVEMENT
- IMPROVED OPEN SPACE
- NEW OPEN SPACE
- PERMEABLE PAVER
- RAIN GARDEN
- BIORETENTION
- NEW PUMP STATION
- IMPROVED PUMP STATION



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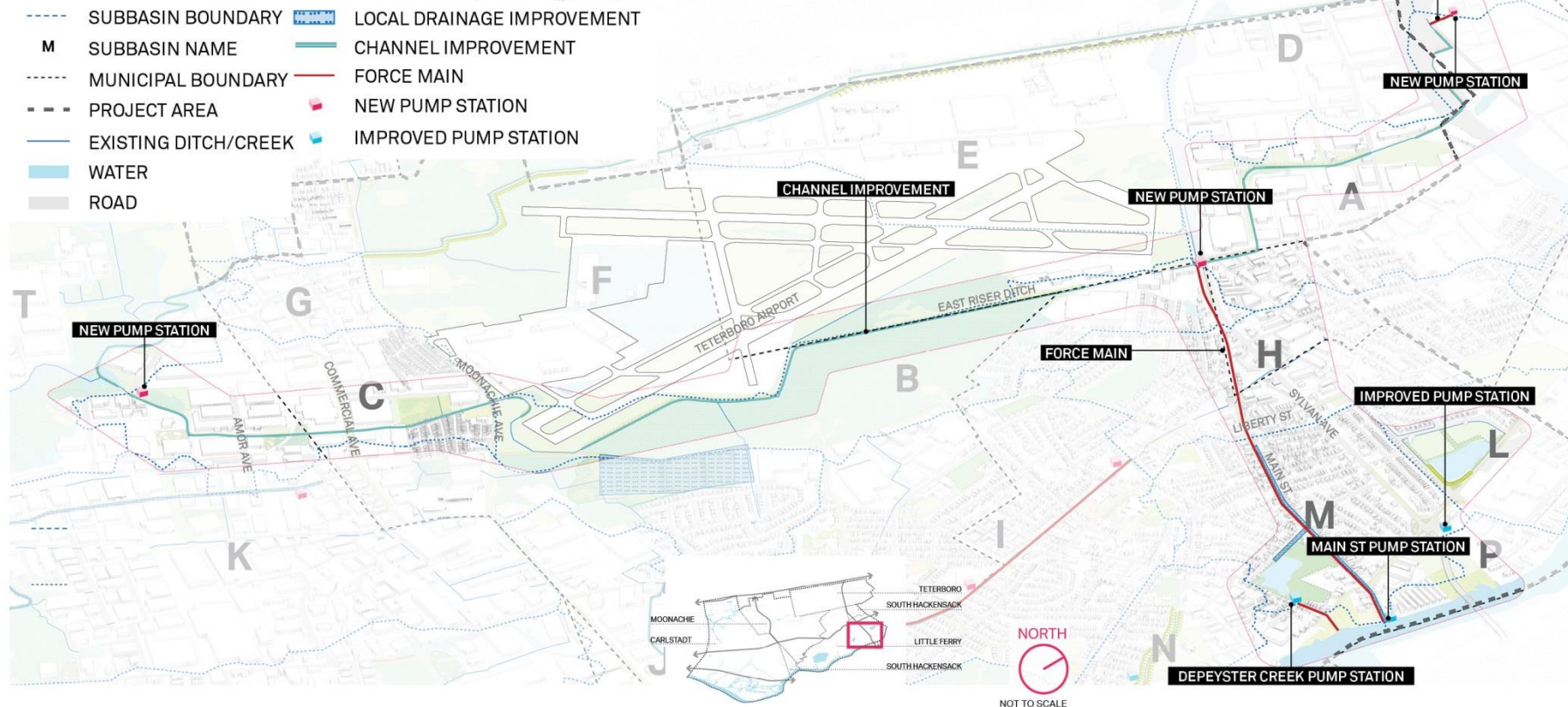
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DRAINAGE IMPROVEMENT CONCEPT 7

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ALL EAST RISER + MAIN STREET WITH DIVERSION CONVEYANCE



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BUMP OUTS + STREET IMPROVEMENTS

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NEXT STEPS

CHRISTOPHER BENOSKY, AECOM



NJDEP / AECOM UPCOMING ACTIVITIES

- Prepare Meeting Summary for CAG #7
- Continue developing:
 - Concepts and Alternatives
- CAG #8 in March
 - Alternative 1 – Structural Flood Reduction

CAG: CALL TO ACTION

- Submit comments from CAG #7 meeting by **February 7, 2017**
- Share information from this meeting with friends and neighbors
- Continue to build interest in the Project
- Ensure the public knows about upcoming information (to be posted on Project website)



Critical Information

March, 2017 - TBD

CAG Meeting #8: Alternative 1: Structural Flood Reduction

Project Website

www.rbd-meadowlands.nj.gov

Project Email

rbd-meadowlands@dep.nj.gov

Question & Answer

THANK YOU!



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