REBUILD BY DESIGN
MEADOWLANDS
CITIZENS ADVISORY GROUP MEETING #10
ALTERNATIVE 3: HYBRID
June 27, 2017
AGENDA

Christopher Benosky, AECOM

- Welcome
- The Meadowlands Challenge
- Concept Review
  - Alternative 1
  - Alternative 2
- Building the Hybrid
  - Development Process
  - Initial Ideas
  - Building Blocks
- Next Steps
- Question & Answer
THE MEADOWLANDS CHALLENGE

CHALLENGE 1: STORM SURGE FLOODING
THE MEADOWLANDS CHALLENGE

FACTOR: LOW-LYING ELEVATIONS
THE MEADOWLANDS CHALLENGE

CHALLENGE 2: FREQUENT RAIN STORMS FLOOD INTERIOR
THE MEADOWLANDS CHALLENGE
FACTOR: UNDERSIZED & UNDERPERFORMING INTERIOR DRAINAGE
THE MEADOWLANDS CHALLENGE

FACTOR: INFRASTRUCTURE CHALLENGED TO PUMP & PROTECT
THE MEADOWLANDS CHALLENGE
PROJECT STRATEGY: DEVELOP 3 BUILD ALTERNATIVES

Alternative 1: Storm Surge Flooding

Alternative 2: Stormwater Flooding

Alternative 3: Storm Surge & Stormwater Flooding
HYBRID BUILDING BLOCKS

ALTERNATIVE 1: STORM SURGE FLOODING

GARRETT AVERY, AECOM
By connecting the existing topographical high points, the project can reduce construction costs and minimize additional regrading of the Hackensack River edge.

The ecological systems are essential to the Meadowlands. The approach will minimize disturbance, consider habitat improvements to fragmented systems, and creation of new ecological zones.

With numerous public agencies in the project area, the project seeks to connect existing public parks as well as provide new park space on existing public land.
HYBRID BUILDING BLOCKS // STORM SURGE
CONCEPTS CONSIDERED DURING SECOND SCREENING

- 11 Alignment Tie-In options were presented at CAG Meeting #6
- 7 Alignment Tie-In options were presented at CAG Meeting #8
HYBRID BUILDING BLOCKS // STROM SURGE
SCREENING RESULTS: SELECTED LINE OF PROTECTION

Selected Line of Protection:
- Northeast Tie-In Option 3
- Southeast Tie-In Option 2
- Berry’s Creek Option 1
HYBRID BUILDING BLOCKS // STORM SURGE
PROTECTION TO A ~50 YEAR STORM

Alignment shown as a continuous line for illustrative clarity.
Built components only occur where land falls below 7ft elevation (NAVD88)

Berry's Creek Surge Barrier

Hackensack River
HYBRID BUILDING BLOCKS

ALTERNATIVE 2: STORMWATER
LULU LOQUIDIS, AECOM
# HYBRID BUILDING BLOCKS // STORMWATER

## APPROACH & GOALS

<table>
<thead>
<tr>
<th>IMPROVE CHANNELS</th>
<th>PROTECT</th>
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<td>Through deepening and regrading, the existing channels of the project area will have capacity to convey stormwater away from flood-prone areas</td>
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<tr>
<th>CREATE HABITAT // FILTER POLLUTANTS</th>
<th>CULTIVATE</th>
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<td>Native plantings and naturalized channel edges provide habitat and improve water quality.</td>
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<th>RE-ENERGIZE THE PUBLIC REALM</th>
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<td>The creation of new public parks creates more opportunities for gathering and recreation. The public realm is enhanced by providing landscape and park improvements to existing public parks, municipal buildings, schools yards, and libraries.</td>
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HYBRID BUILDING BLOCKS // STORMWATER
ALTERNATIVE 2: SCREENING FROM 7

- Main Street
- DePeyster Creek
- Losen Slote
- Carol Place
- East Riser
- West Riser
- Main Street + East Riser Extension
Components of the 7 original concepts under consideration:

1. Main Street Green Features
   - Fluvial Park
   - Riverside Park
   - Willow Lake GI
   - Street GI

2. DePeyster Features
   - New Pump Station
   - Channel Improvements
   - Open Space
   - Street GI

3. Losen Slote Features
   - New Pump Station
   - Force Main
   - Municipal & School Improvements

4. Carol Place Features
   - Open Space
   - Street GI

5. East Riser Features
   - New Pump Station
   - Open Space
   - Channel Improvements
BUILDING THE HYBRID
INTEGRATING STORM SURGE FLOOD REDUCTION AND STORMWATER DRAINAGE IMPROVEMENTS
GARRETT AVERY, AECOM
BUILDING THE HYBRID
CONSIDERATIONS

Performance
Testing concepts throughout development with hydraulic model to better understand and optimize performance.

Screening
The Hybrid is being developed from components previously assessed and screened under Alt 1 or Alt 2.
For Alternative 3, criteria such as ‘Ability to Complete Project by 2022’ take on new meaning.

Future Plan
Once performance modeling and screening are complete, system function will guide a project build plan.
Components that aren’t selected for the build plan could become elements of a Future Plan, which could be implemented by others over time as new funding sources become available.
BUILDING THE HYBRID PERFORMANCE // CHANNELS & PARKS

1. ALTERNATIVE 1
   - PARK GREEN INFRASTRUCTURE
     - Rain gardens catch on site run-off from sports field, as well as street run-off

2. STREET GREEN INFRASTRUCTURE
   - Rain gardens filter and slow down stormwater before it runs into the Berry's Creek hydrologic system

3. IMPROVED CHANNELS
   - Deepening and widening, will improve capacity to convey stormwater away from flood-prone areas

4. PUMP STATION
   - Will ensure water moves from improved channel through Berry's Creek, and past surge barrier

BERRY'S CREEK SURGE BARRIER
- Protects from coastal storm surge when needed while allowing Berry's Creek to flow normally at other times

CAG Meeting #10 // June 27, 2017
BUILDING THE HYBRID

BENEFITS // CHANNELS & PARKS

1. BERRY’S CREEK SURGE BARRIER
   Protects from coastal storm surge when needed while allowing Berry’s Creek to flow normally at other times.

2. GREEN INFRASTRUCTURE
   Rain gardens and native plantings at the park provide a new ecological area between Teterboro Airport and Berry’s Creek.

3. RECREATION
   Provides much needed passive and active recreation for communities along Moonachie Ave.

4. PUMP STATION
   Assists in rainfall conveyance through low-lying and flat areas.

5. WETLANDS
   Planted berms and wetlands at the channel edge provide new habitat and integrate native vegetation.

PROTECT
CULTIVATE
ENERGIZE
BUILDING THE HYBRID
PERFORMANCE // RIVER’S EDGE & NEIGHBORHOODS

1. CANTILEVER WALKWAY
Provides protection from coastal storm surge along the Hackensack River

2. RIVERSIDE PARK
The runoff from the surrounding open space and path system flows into a series of bioswales at the park’s edges

3. OUTFALL
Outfall at cantilever is fitted with back flow prevention

4. RAIN GARDENS
Rain gardens at Willow Lake intercept storm water from open lawn before it reaches the lake, increasing storage capacity.

5. PUMP STATION
Stormwater is pumped from Willow lake back into the sewer system

6. WILLOW LAKE
Acts as a storage basin for stormwater overflow

7. RAIN GARDENS
Rain gardens filter and slow down stormwater before it reaches the sewer system

ALTERNATIVE 1
ALTERNATIVE 2
BUILDING THE HYBRID BENEFITS // RIVER’S EDGE & NEIGHBORHOODS

1. CANTILEVER WALKWAY
Provides protection from coastal storm surge along the Hackensack River

2. NEW OPEN SPACE
A new public park along the Hackensack River featuring native plantings, open space, and landforms that allow parkgoers to see the river beyond the cantilever

3. RIVERFRONT ACCESS
Creates publicly accessible riverfront with additional width for seating and planting amenities

4. RECREATION
Opportunities for passive and active recreation within new open space

5. GREEN INFRASTRUCTURE
Willow lake is enhanced with rain gardens and berms that are planted in a native palette. The majority of the park’s existing open space is maintained

6. PUMP STATION + GREY INFRASTRUCTURE
Stormwater is pumped from Willow Lake into improved grey infrastructure with increased capacity for flood prevention

7. GREEN INFRASTRUCTURE
Planted with native plantings, providing micro habitat zones and natural beauty

PROTECT
CULTIVATE
ENERGIZE
INITIAL IDEAS

CONNECTING THE BUILDING BLOCKS
GARRETT AVERY & LULU LOQUIDIS, AECOM
BUILDING THE HYBRID
FIXED & FLEXIBLE

Fixed: Alt 1
- Protection height at 7’ elevation
- Alignment functions as a complete system
- Footprint remains the same with integrated public realm strategies

Flexible: Alt 2
- Stormwater strategies function together as one complete system and individually as an single improvement
- Concepts can be broken into smaller projects based on system performance
- Costs vary by system configuration
BUILDING THE HYBRID
CHANNEL FOCUS CONCEPT

Maximize ecological and conveyance capacity along channels and public realm integration along structural protection corridors.
BUILDING THE HYBRID
CHANNEL FOCUS CONCEPT

FEATURES INCLUDED

**Alternative 1:**
1. Hackensack Alignment
2. Surge Barrier @ Berry’s Creek

**Alternative 2:**
1. All Main Street Green Features
2. DePeyster Creek Open Space
3. Upper Losen Slote
4. Avanti Park
5. East Riser Ditch Extension
6. Caesar Place
7. Green Infrastructure Street Improvements
8. West Riser Extension
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: CHANNELS

ACCESS + MAINTENANCE PATH
ECOLOGICAL EDGE
INTERIOR CHANNEL
EXISTING CHANNEL
IMPROVED CONVEYANCE
HYBRID BUILDING BLOCKS // CHANNELS

ILLUSTRATIVE VIEW: EXISTING CHANNEL CONDITION

CURRENT
HYBRID BUILDING BLOCKS // CHANNELS
ILLUSTRATIVE VIEW: PROPOSE CHANNEL IMPROVEMENTS

PROPOSED
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: EQUIPMENT
HYBRID BUILDING BLOCKS // EQUIPMENT

ILLUSTRATIVE VIEW: TYPICAL STREET CONDITION
BUILDING THE HYBRID
COMMUNITY FOCUS CONCEPT

Focus benefits in the community cores with integrated access to the Hackensack River edge improvements.
FEATURES INCLUDED

**Alternative 1:**
1. Hackensack Alignment
2. Surge Barrier @ Berry’s Creek

**Alternative 2:**
1. All Main Street Green Features
2. All Main Street Grey Features
3. All Losen Slote
4. DePeyster Creek Open Space
5. Modified East Riser & Caesar Place Park
6. West Riser to Vincent Street
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: GREEN INFRASTRUCTURE
HYBRID BUILDING BLOCKS // GREEN INFRASTRUCTURE

ILLUSTRATIVE VIEW: EXISTING SCHOOLS
HYBRID BUILDING BLOCKS // GREEN INFRASTRUCTURE
ILLUSTRATIVE VIEW: IMPLEMENTATION AT MUNICIPAL & SCHOOL BUILDINGS
HYBRID BUILDING BLOCKS // STORMWATER STRATEGIES: INFRASTRUCTURE
HYBRID BUILDING BLOCKS // INFRASTRUCTURE

ILLUSTRATIVE VIEW: EXISTING DEPEYSTER CREEK CONDITION

CURRENT
HYBRID BUILDING BLOCKS // INFRASTRUCTURE

ILLUSTRATIVE VIEW: PROPOSED IMPROVEMENTS AT DEPEYSTER CREEK
BUILDING THE HYBRID

COMPLETE SYSTEM CONCEPT

Incorporating all features, creating a network of flood reduction and stormwater management with connected green infrastructure, habitat improvements, and public parks.
BUILDING THE HYBRID
COMPLETE SYSTEM CONCEPT

FEATURES INCLUDED

**Alternative 1:**
1. Hackensack Alignment
2. Surge Barrier @ Berry's Creek

**Alternative 2:**
1. All Main Street Green Features
2. All Main Street Grey Features
3. Upper Losen Slote
4. DePeyster Creek Open Space
5. Fresh Water Wetland
6. Avanti Park
7. East Rise Extension
8. Caesar Place Park
9. Green Infrastructure Street Improvements
10. Complete West Riser
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: WETLAND CREATION

PROTECT
CULTIVATE
ENERGIZE
HYBRID BUILDING BLOCKS // WETLANDS
ILLUSTRATIVE VIEW: EXISTING RIVER FRONT CONDITION
HYBRID BUILDING BLOCKS // WETLANDS

ILLUSTRATIVE VIEW: PROPOSED CREATION AT FLUVIAL PARK
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: PUBLIC REALM
HYBRID BUILDING BLOCKS // PUBLIC REALM
ILLUSTRATIVE VIEW: PROPOSED PARK
NEXT STEPS

CHRISTOPHER BENOSKY, AECOM
NEXT STEPS

NJDEP / AECOM: UPCOMING ACTIVITIES

• Prepare Meeting Summary for CAG #10
• Continue developing and screening:
  • Hybrid Concepts, Alternatives, and Costs
• CAG #11 in September 2017
  • Alternative 1 – Structural Flood Reduction
  • Alternative 2 – Stormwater Drainage Improvements
  • Alternative 3 – Hybrid Alternative
NEXT STEPS

CAG: CALL TO ACTION

• Submit comments from CAG #10 meeting by July 11, 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)
NEXT STEPS

Critical Information

Project Website
www.rbd-meadowlands.nj.gov

Project Email
rbd-meadowlands@dep.nj.gov

Question & Answer
THANK YOU