CITIZEN ADVISORY GROUP (CAG) MEETING #5

ECOLOGY AND DRAINAGE BASIN OPPORTUNITY AREAS

October 24, 2016

FLOOD PROTECTION PROJECT
Boroughs of Little Ferry, Moonachie, Carlstadt, and Teterboro, and the Township of South Hackensack in Bergen County, New Jersey

PREPARED BY AECOM
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1.0 List of Acronyms and Glossary

List of Acronyms

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>BCR</td>
<td>Benefit/Cost Ratio</td>
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<tr>
<td>CAG</td>
<td>Citizen Advisory Group</td>
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<td>CDBG-DR</td>
<td>Community Development Block Grant – Disaster Recovery</td>
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<td>EFH</td>
<td>Essential Fish Habitat</td>
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<td>EIS</td>
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<td>RBD</td>
<td>Rebuild by Design</td>
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<td>RBDM</td>
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Glossary

**Bioretention** - is the process in which contaminants and sedimentation are removed from storm water runoff. Storm water is collected in treatment areas which often include landscape vegetation.

**Bioswale** - a vegetated landscape swale that removes silt and pollution from surface runoff water, usually with gently sloped sides.

**Easement** - the right to use and/or enter onto the property of another without possessing it.

**Encumbrance** - an encumbrance is property which may be owned by one entity but other entities may have a right to or legal liability on the property.

**Filter strip** - a flat vegetated area that removes pollutants from storm water as the storm water moves across as sheet flow. Filter strips are between 25 and 100 feet long.

**Fluvial Park** - a public park with various ecosystems, especially related to wetlands and river ecosystems, with varying elevations and habitats. During a flood event the park can handle water inundation.

**Permeable Paving** - a type of paving that allows rainwater to filter through the surface into a water catchment base, often created with interlocking paver tiles or a porous material surface.

**Public Realm** - publicly owned streets, pathways, right of ways, parks, publicly accessible open spaces and any public and civic building and facilities.

**Rain Garden** - a planted depression in a garden that absorbs rainwater runoff from impervious areas such as roofs, driveways, walkways, parking lots, and lawn areas.

**Runnel** - a designed and landscaped channel that directs and assists the flow of rainwater.

**Widening Ditch** - (3) Main ways to improve the ditches; daylighting and increasing habitat and vegetation, extending the ditch to connect to riparian corridor, and filling the ditch with aggregate, but expanding habitat above.
2.0 Agenda

Welcome

Presentation

Opening Remarks (15 Minutes)

   Agenda (Linda Fisher, NJDEP)

   Project Status Update and Project Process (Chris Benosky, AECOM)

What We Learned from CAG #4 (10 Minutes)

   General Comments, Alternatives, & Site-Specific Feedback (Susan Bemis, AECOM)

Project Area Ecology (40 Minutes)

   Project Area Ecology (John Rollino, AECOM)

Drainage Basin Opportunity Areas (20 Minutes)

   Storm Water Improvements within Sub-basins, Drainage Zone Areas (Michael Vecchio, HDR)
   What Could These Look Like? (Susan Bemis, AECOM)

Next Steps & Q&A/Closure (15 Minutes)

   Next Steps (Chris Benosky, AECOM)

   Question and Answers
**AGENDA**

- Welcome and Agenda
- Project Status Update & Schedule
- Project Process & Screening Criteria
- What We Learned from CAG #4 Meeting
- Project Area Ecology
- Drainage Basin Opportunity Areas

**PROJECT STATUS UPDATE**

- Developed working draft Concept Screening Criteria
- Updated based on CAG #3 meeting
- Completed and published to the project website
- CAG #4 meeting minutes
- September 2016 Newsletter
- Received additional input from CAG #4 meeting
- Developing the Preliminary Draft EIS
- Conducting field work to support EIS and Feasibility Study
- Further developing the alternative conceptual ideas and locations

**CAG SCHEDULE**

- **CAG #5**
  - Focus on Alternative 2: Storm Water Drainage Improvements
- **CAG #6**
  - Focus on Alternative 1: Structural Flood Reduction
- **CAG #7**
  - Focus on Alternative 3: Hybrid

**SCREENING CRITERIA**

- How do we use the screening criteria to consolidate potential opportunity areas?
  - Identify potential opportunities and develop into concepts
  - Screen concepts using screening criteria
  - Not all opportunities/concepts will pass screening process
WHAT WE LEARNED FROM CAG #4 MEETING
Susan Bemis, AECOM

GENERAL - CAG #4 COMMENTS
Susan Bemis, AECOM

INVEST
- Address frequent flooding from rain fall events.
- Utilize the most immediate and cost efficient option(s) for protection from storm surges.

EXAMINE
- Potential water displacement towards neighboring communities.
- Holistic solution.

MAINTAIN
- Long-term maintenance of proposed project infrastructure is a concern: Who maintains and for how long?

DISCUSS AND CONSIDER
- Opportunities for private land acquisition during the concept development process.

INVEST
- Address frequent flooding from rain fall events.
- Utilize the most immediate and cost efficient option(s) for protection from storm surges.

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- Potential water displacement towards neighboring communities.
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MAINTAIN
- Long-term maintenance of proposed project infrastructure is a concern: Who maintains and for how long?

DISCUSS AND CONSIDER
- Opportunities for private land acquisition during the concept development process.

ALTERNATIVE 1 - CAG #4 COMMENTS
Susan Bemis, AECOM

STRUCTURAL FLOOD REDUCTION

WATERFRONT ACCESS
- Access to the Hackensack River needs to remain a priority.

PROTECTION OF WETLANDS
- Emphasize wetland and biological resources protection + enhancement.

MINIMIZE ENVIRONMENTAL IMPACTS
- Consider minimal footprints.

DEPLOYABLES
- Maintenance and operations of deployables are a concern.

PRIORITIZE FLOOD PROTECTION
- General interest in flood protection incorporated with public benefit, but flood protection is the main objective.

ALTERNATIVE 2 - CAG #4 COMMENTS
Susan Bemis, AECOM

STORM WATER DRAINAGE IMPROVEMENTS

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 enhancement.

ALTERNATIVE 3 - CAG #4 COMMENTS
Susan Bemis, AECOM

HYBRID SOLUTION

NO ADDITIONAL DEVELOPMENT
- Development has displaced natural habitat and systems.
- Improvements should not be used to generate or promote new development.

POLLUTION + CONTAMINATION
- Understand and consider pollution issues associated with Berry’s Creek.
- Consider a tide gate at Paterson Plank Road.

GREEN + GREY INFRASTRUCTURE
- Utilize a combination of both to get the most benefit.

SITE-SPECIFIC - CAG #4 COMMENTS
Susan Bemis, AECOM

TETERBORO AIRPORT
- Opportunity for green infrastructure of Western 3-2 at shoulder of existing environment.

TETERBORO AIRPORT, LOWER SLOTS, YELLOW LANK, LIGHNT UPGRADE Bayside green space.

TETERBORO FORKING, LOWER SLOTS, UPLANDS
- Close to flocking, possible upsizing.
- Consider including in consideration of the site, such as improvements to existing open spaces.

TETERBORO FOREST, LOSEN SLOTE, WILLOW LAKE, VACANT LOTS
- Utilize existing open spaces.
- Consider some improvements such as widening.

TETERBORO AIRPORT, WEST COMMERCIAL AVENUE, BAYSAFE - NEW PUMPS AT WEST HDWY (NORTH OF WEST RISER DITCH)
- Install pumps at South HDWY.

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- Install pumps at South HDWY.
The Project Area contains natural areas surrounded by suburban, industrial, and commercial development. Several of these natural areas have not been intensively studied to date by others.

The ecological studies being conducted by AECOM will be used to support the NEPA analysis, regulatory agency consultations, and associated permitting.

As part of the EIS, the field data collection will be supplemented with previous and ongoing studies (e.g., Fisheries Inventory of the Hackensack River, FAA Wildlife, etc.)

Members of the project team have past experience conducting studies for the NJSEA (formerly HMDC) (e.g., Secaucus High School Site) and/or other multi-year studies (Empire Tract).

Biological resource studies (ongoing) include:
- Habitat mapping and evaluation
- Wetland delineation
- Botanical inventories
- Wildlife studies:
  - Amphibians
  - Benthic invertebrates
  - Fish
  - Herptofauna (Reptiles and Amphibians)
  - Mammals

Categorize habitats, flora, and fauna, and conduct ecological evaluations in support of a NEPA-level analysis.

Identify high-value ecological resources and provide input into planning process in order to minimize impacts to greatest extent possible.

Identify and develop opportunities to increase ecologic value of the Project Area post project construction.

Project Area ~5,800 acres.

~4,000 acres are commercial, industrial, and residential.

~1,800 acres are “natural areas” – parcels with vegetated communities.
Scientists traversed the Project Area on foot and identified “natural areas.”

- Aerial images of the Project Area were used as a background on hand-held tablets.
- Natural areas were sketched in tablets and inputed as a GIS file.
- ~400 habitat polygons and shoreline developments (~1,800 ac).
- Each natural area was given an alpha-numeric code, based on its geographic location.

**Mapped Data Collection**

- Other data collected for each natural area polygon included:
  - Dominant Habitat Type - wetland/upland/waterbody/etc.
  - Cover type – herbaceous, forested, deciduous, etc.
  - Ditch/drainage present/adjacent – Y/N
  - Disturbed – Y/N
  - Dominant species – species identified
  - Habitat Community – floodplain forest, urban woodlot, common reed marsh.

**Ecological Evaluation**

- EPW mathematically scores wetlands on a number of functions (sediment stabilization, wildlife habitat, water quality, etc).
- Through computation, scientists assess “health” of existing wetlands and calculate the “Functions and values” of mitigated wetlands.
- Using site-specific information gathered from studies, habitats are being coded based on ecological value and function.

**Wetlands**

- Section 404 of the Federal Clean Water Act: Wetlands are “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”
- Freshwater Wetlands: The “three parameter approach.” Wetlands under normal conditions have hydric soils; dominance of hydric vegetation; and presence of hydrology.
- Tidal Wetlands: Use elevation data too (e.g., Spring high tide line).

**Soils: Upland and Wetland**

- Upland soils
  - Note brown color, loose friable texture. Soils are dry.

- Wetland soils
  - Note dark black color, mucky appearance, obvious saturation. Changes in soil are a result of anoxic conditions.

- Bog Iron

- Soil cores taken less than 5 feet from each other at a site near Bellman’s Creek.

**Delineated Line**

- During a wetland delineation, scientists note soil characteristics, hydrology, and vegetation. These observations allow for the delineation (i.e., delineated line) between uplands and wetlands.
WILDLIFE STUDIES

• Birds, reptiles/amphibians, fish, benthic invertebrates, and mammal studies occur seasonally (summer completed).
• Additional studies for birds – weekly during summer, fall, and spring. Specialized nesting study in spring.
• Other specialized studies – vernal pools, nocturnal species/activity, game cameras.

John Rollino, AECOM

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BIRDS

• At 10 locations throughout the Project Area, scientists conduct morning and/or evening studies.
• All birds sighted are counted. Activity is noted, as well as direction and distance from scientist.
• Data allows for the creation of a spherical histogram to be overlaid on habitat mapping data to determine site usage.

John Rollino, AECOM

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BIRDS

• To date, over 70 bird species identified.
• Majority of sightings were very common species: European starlings, mourning dove, ring-billed gull.
• Habitats in which birds sighted:
  - 7.07% Open Water
  - 19.87% Structure
  - 21.80% Upland
  - 51.33% Wetland

John Rollino, AECOM

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FISH AND BENTHIC INVERTEBRATES

• Sampled from 9 different locations in the Project Area using fish traps.
• Fish identified to date include: bluegill, pumpkinseed, catfish, carp, goldfish, mummichogs, and mosquitofish.
• Species common to disturbed environments.

John Rollino, AECOM

Sampled from 9 different locations in the Project Area using fish traps. Fish identified to date include: bluegill, pumpkinseed, catfish, carp, goldfish, mummichogs, and mosquitofish. Species common to disturbed environments.

MAMMALS

• Mammals surveyed through game cameras, presence identification (tracks and scat), nocturnal surveys, and (soon) snow tracking.
• Mammal survey locations occur throughout Project Area in a variety of representative habitats.
• Bats studied with night vision scopes, meters, and ultrasonic microphones that capture bat echolocations.
• Game cameras stationed throughout the Project Area in a variety of habitats.

John Rollino, AECOM

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MAMMALS

John Rollino, AECOM

- Big Brown Bat (Eptesicus fuscus)
- Opossum (Didelphis virginiana)
- Cat (Felis silvestris catus)
- Chipmunk, unknown species
- Racoon (Procyon lotor)
- Red Fox (Vulpes vulpes)
- Skunk (Mephitis mephitis)
- Little Brown Bat (Myotis lucifugus)
- Muskrat (Ondatra zibethicus)
- Groundhog (Marmota monax)
- White-tailed Deer (Odocoileus virginianus)
- Grey Squirrel (Sciurus carolinensis)
- Rat (unknown species)
- Muskrat (Ondatra zibethicus)

PRELIMINARY DATA

John Rollino, AECOM

- Using a meter with an ultrasonic microphone, scientists record bat echolocations.
- Analyzing timing, kHz, and other factors, scientists can identify what species are present in an area.

ECOLOGICAL ENHANCEMENT

John Rollino, AECOM

- Using existing data collected to identify potential areas to avoid and enhance.
- Using ecological value calculation methods (e.g., EPW, IVA, etc.) and other metrics, it is possible to quantify impacts and ensure that enhancement would provide a net ecological benefit.

PRELIMINARY CONCLUSIONS

John Rollino, AECOM

- Many Project Area habitats are home to invasive species and other stressors.
- Studies to date have shown aquatic fauna affected by contamination south of Moonachie Ave.
- Many small waterways are polluted and stressed, often due to previous engineering projects and efforts.
- To date, data has shown that developed industrial/commercial areas have limited ecological value to fauna.

PRELIMINARY CONCLUSIONS

John Rollino, AECOM

- The Proposed Project presents a unique opportunity to reduce flooding and simultaneously improve habitat values and functions.
- Improvements could include, but are not limited to:
  - New marshes along the Hackensack
  - Upgrades of streams – daylighting, select plantings, fish habitat improvements.
  - Invasive species removal.

DRAINAGE BASIN OPPORTUNITY AREAS

Michael Vecchio, HDR

- Using a meter with ultrasonic microphone, scientists record bat echolocations.
- Analyzing timing, kHz, and other factors, scientists can identify what species are present in an area.
**PROCESS + SCREENING CRITERIA**

Michael Vecchio, HDR

DEVELOPING CONCEPTS

SITE INVESTIGATION AND RESEARCH

CONCEPT DEVELOPMENT

SCREENING AND FEASIBILITY

- How do we use the screening criteria to consolidate potential opportunity areas?
- Identify potential opportunities and develop into concepts
- Screen concepts using screening criteria
- Not all opportunities/concepts will pass screening process

**STORM WATER IMPROVEMENTS**

Michael Vecchio, HDR

EXISTING STORM WATER ISSUE

STORM WATER SOLUTION

CAPTURE

ABSORB

RELEASE

**STORM WATER DRAINAGE**

Michael Vecchio, HDR

KIT OF PARTS:

MOVING FROM STRATEGY TO OPPORTUNITY

- Zones represent distinct sub-basins within the Project Area.
- Identify storm water management strategies within watersheds and zones:
  - Grey Infrastructure
  - Green Infrastructure

**DRAINAGE SUB-BASINS**

Michael Vecchio, HDR

- How is water moving and being captured within each sub-basin?

**DRAINAGE SUB-BASIN ZONES**

Michael Vecchio, HDR
- West Riser dredging
- West Riser Tide Gate and Pump Station
- Access for O&M
- Green streets

- East Riser dredging
- East Riser Tide Gate
- Pump Station
- East Riser Tide Gate upgrade
- Off-channel storage

- Island Creek Tide Gate upstream of Peach
- Island Creek Tide Gate
- Off-channel storage

- Deppeyster Creek Pump Station upgrade and Willow Lake
- Storm sewer capacity upgrades
- Main Street conveyance
- Backflow protection on Hackensack

- Off-channel storage
- East Riser Tide Gate
- Pump Station
- East Riser Tide Gate upgrade
- Off-channel storage

- Storm sewer capacity upgrades
- Backflow prevention on Main Street conveyance

- Losen Slote outfall backflow prevention
- Losen Slote dredging
- Storm sewer capacity upgrades

- Storm sewer capacity upgrades
- Interior pump stations
- Pump station upstream of Peach Island Creek Tide Gate
- Upgrade of Peach Island Creek Tide Gate

WHAT COULD THESE LOOK LIKE?

Susan Bemis, AECOM
Citizen Advisory Group (CAG) Meeting #5 // October 24, 2016

**OPEN SPACE + HABITAT IMPROVEMENTS**

Susan Bemis, AECOM

**CAESAR PLACE ILLUSTRATIVE EXAMPLE**

- Wetland Creation
- Wetland Enhancement
- Biofouling

**WETLAND CREATION**

Through grading and wetland planting, existing upland is transformed into wetland.

**WETLAND ENHANCEMENT**

With minimal re-grading and native plantings, existing west Riser Ditch and low-quality wetlands are improved to filter and store more storm water.

**KEY MAP**

**OPEN SPACE IMPROVEMENTS**

Susan Bemis, AECOM

**FLUVIAL PARK ILLUSTRATIVE EXAMPLE**

- Permeable Paving
- Biofiltration

**PERMEABLE PAVING**

Gravel paving absorbs storm water.

**BIOSWALES**

Filters 60-90% of suspended solids and prevents water from overflowing sewer systems.

**PERFORATED PIPE**

Drains storm water overflow during larger rain events.

**RAIN GARDENS**

Filters 60-90% of suspended solids and prevents water from overflowing sewer systems.

**NATIVE PLANTS**

Low-maintenance options that contribute to native ecological systems.

**OPEN SPACE**

Absorbs more storm water.

**NEXT STEPS**

Chris Benosky, AECOM

**CURB CUT**

Allows infiltration of road runoff into adjacent bioswales while maintaining the safety of raised curbs.

**OPEN SPACE**

Absorbs more storm water.

**BIOSWALES**

Filters 60-90% of suspended solids and prevents water from overflowing sewer systems.

**DITCH IMPROVEMENTS**

Susan Bemis, AECOM

**EAST RISER ILLUSTRATIVE EXAMPLE**

- Filter Strip
- Detention
- Gravel Trench

**FILTER STRIP**

Native plantings uptake pollutants before entry into water systems.

**STREET IMPROVEMENTS**

Susan Bemis, AECOM

**MAIN STREET ILLUSTRATIVE EXAMPLE**

- Native Plants
- Rain Gardens
- Perforated Pipe
- Permeable Paving

**OPEN SPACE**

Absorbs more storm water.

**STREET IMPROVEMENTS**

Susan Bemis, AECOM

**EMPIRE BLVD ILLUSTRATIVE EXAMPLE**

- Rain Garden
- Native Planting
- Open Space

**NEXT STEPS**

Chris Benosky, AECOM

**NEXT STEPS**

Chris Benosky, AECOM
NEXT STEPS

NJDEP / AECOM
UPCOMING ACTIVITIES
- Prepare Meeting Summary for CAG #5 meeting
- Continue developing:
  - Initial Alternatives and Concepts
  - Preliminary Draft EIS

NEXT STEPS

CAG CALL TO ACTION
- Review and comment on Meeting Summary for CAG #5 meeting.
- Share information from this meeting with friends and neighbors.
- Educate your friends and colleagues on the Project and NEPA process.
- Continue to build interest in the Project.
- Continue obtaining information, ideas, and potential concerns from constituents.
- Ensure the public knows about upcoming information (to be posted on Project website).

NEXT STEPS

CRITICAL INFORMATION
TUESDAY DECEMBER 6TH
CAG MEETING #6
PROJECT WEBSITE
WWW.RBD-MEADOWLANDS.NJ.GOV
PROJECT EMAIL
RBD-MEADOWLANDS@DEP.NJ.GOV
Q&A

THANK YOU!