

Flood Damage Reduction Project for the Huntington Community

Fairfax County, Virginia

January 15, 2008

Purpose of Meeting

- **Provide the latest information on the flood damage reduction alternatives**
- **Involve the Huntington residents and receive important and valuable feedback**
- **We want to know resident's issues and concerns so we can include them in the process**

Agenda

- **Introductions**
- **Presentation by the U.S. Army Corps of Engineers (Corps)**
 - Completed tasks
 - Preliminary alternatives and evaluation
 - Alternatives selected for further investigation
 - Next Steps
- **Question and answer session**

Flood Limits

- June 2006 flood elevations ranged from 12.8 to 13.9 ft (shown in blue)
- 100-year flood elevations from a 2007 Corps study range from 14.3 to 15.4 ft (shown by orange line)



Project Goals, Objectives and Opportunities

- **Goal**
 - Provide adequate flood damage reduction measures that are technically feasible and financially prudent for the safety of the Huntington Community
- **Objectives**
 - Incorporate needs/desires of the Huntington Community for flood damage reduction as much as possible
 - Examine a full suite of alternatives
 - Minimize risk to the community
 - Minimize environmental impacts

Project Goals, Objectives and Opportunities (cont.)

- **Opportunities**
 - Wetland creation using dredged material (if dredging is implemented)
 - Recreational features

Project Tasks Completed Since April Meeting

- **Finalized the preliminary concept plans for all alternatives**
 - Estimated project costs
 - County asked the Corps to conduct a preliminary economic analysis to determine if a project might meet the federal economic justification requirements
- **Met with County representatives for direction on which alternatives to further examine**
- **Conducted concept-level design and analysis of remaining alternatives**
 - Delineated wetlands
 - Conducted sediment sampling
 - Performed sediment transport analysis
 - Dug test pits
 - Conducted interior drainage analysis

Economic Analysis

- **Purpose of conducting the federal economic analysis is to determine the costs and economic benefits to the nation for each alternative**
- **Only certain items can be included in calculating the Benefit to Cost Ratio (BCR) that is used by the Corps, such as:**
 - Expected future damages to structures and contents, vehicles, infrastructure
 - Reduction in the need for emergency services, reduction in clean-up and relocation costs
- **Planned future development can be included in the BCR, however, it would have minimal impact on it**

Economic Analysis (Cont.)

- **Only Corps projects with a BCR greater than 1.0 meet the economic justification requirements, and due to limited federal funding, only projects with the highest BCR's are being funded**
- **For Corps projects, other social and environmental factors may be considered but are not included in the BCR**
- **None of the alternatives evaluated meet the Corps' economic justification criteria**

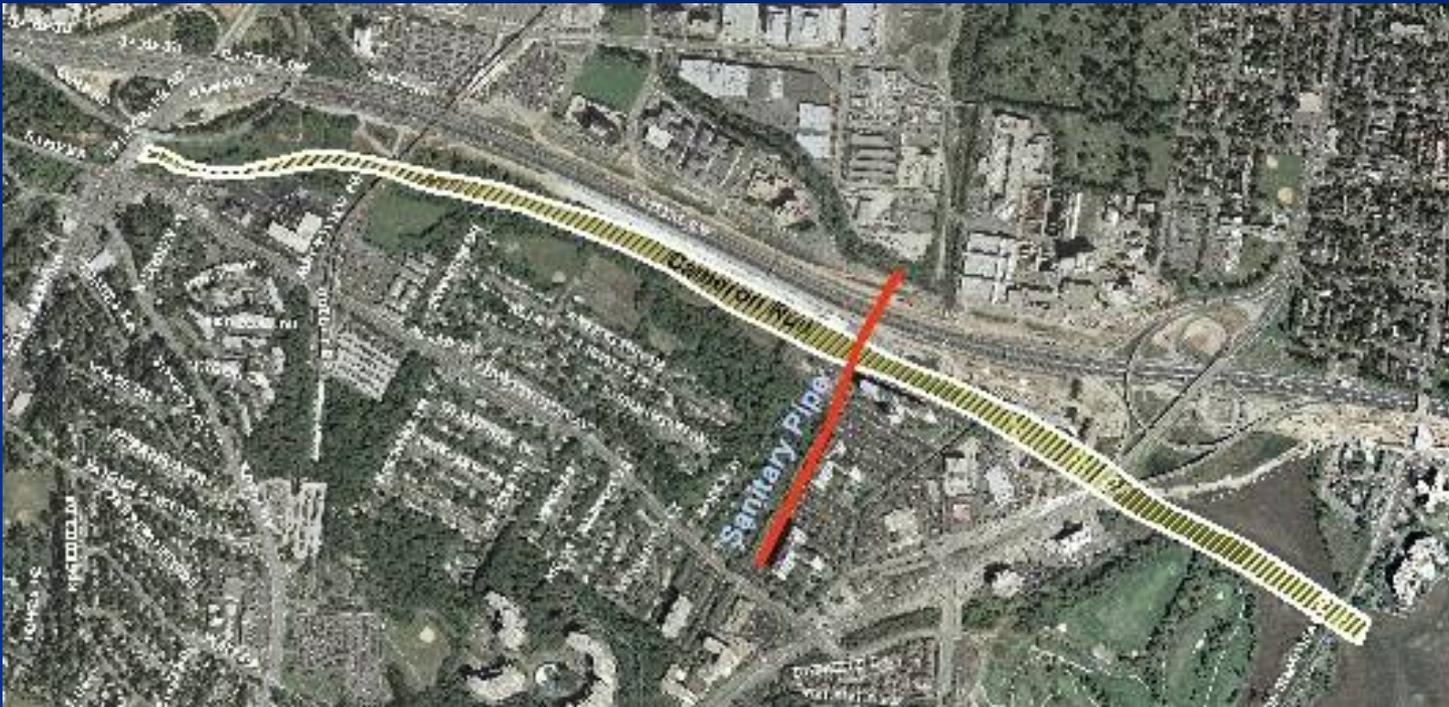
Levee



- **Assumes top of levee at 100-year elevation**
 - Estimated Project Cost: \$15.6M
 - Benefit to Cost Ratio (BCR): 0.61

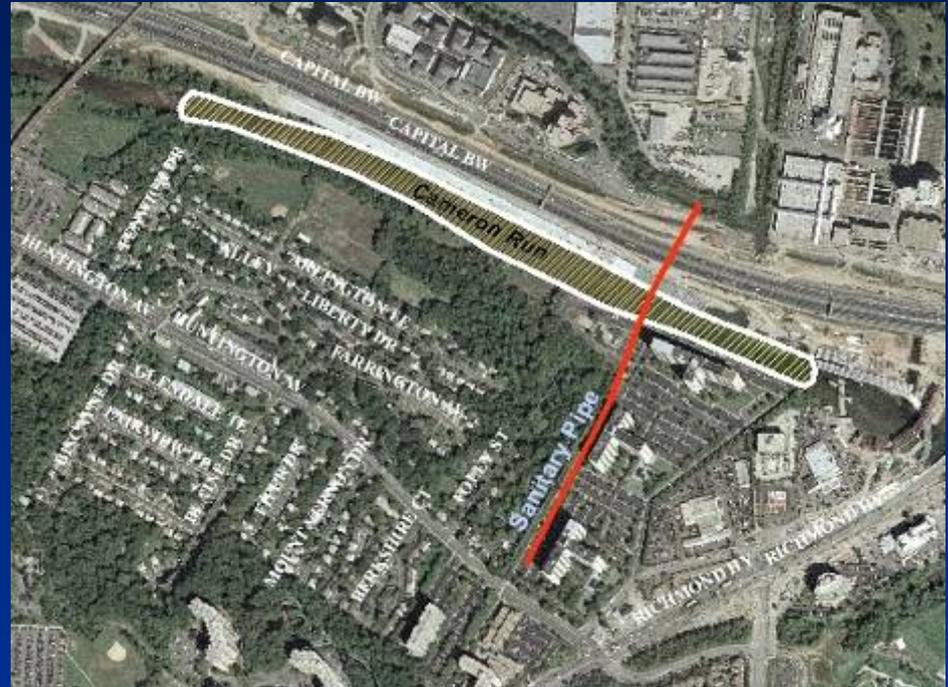
Dredging

- **Longer dredge - from Telegraph Rd to Potomac River**
 - Would only reduce flood levels by a maximum of 1.5 ft
 - Estimated Project Cost: \$21.9M (includes relocation of siphon for \$7M)
 - Benefit to Cost Ratio (BCR): 0.22



Dredging (cont.)

- **Shorter dredge - from upstream end of Huntington to upstream end of U.S. Route 1 (would only reduce flood levels by a maximum of 1.0 ft)**
 - Estimated Project Cost: \$14.3M (includes relocation of siphon for \$7M)
 - Benefit to Cost Ratio (BCR): 0.23



Levee and Dredging Combination

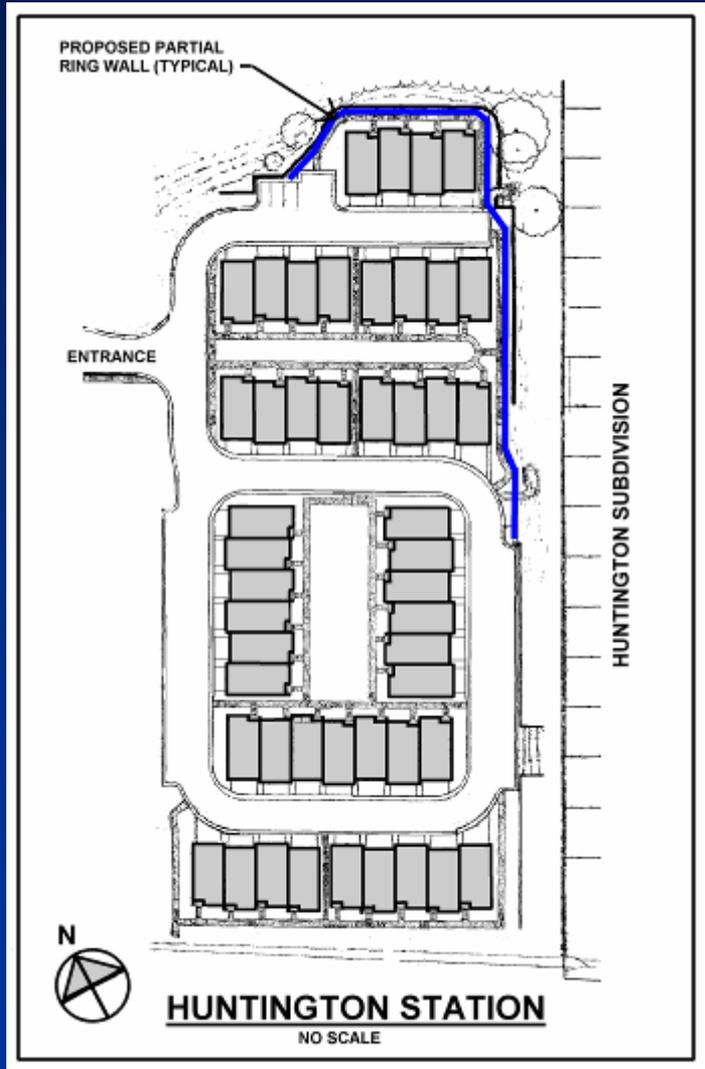
- Assumes top of levee at 100-year elevation and **shorter dredge**
 - Estimated Project Cost: \$29.9M
 - Benefit to Cost Ratio (BCR): 0.31

Floodproofing

- **Huntington Duplexes**
 - Fill basement and add addition
 - Estimated Project Cost: \$13.6M
 - Benefit to Cost Ratio (BCR): 0.57
 - Fill basement, add addition, and elevate
 - Estimated Project Cost: \$23.4M
 - Benefit to Cost Ratio (BCR): 0.43



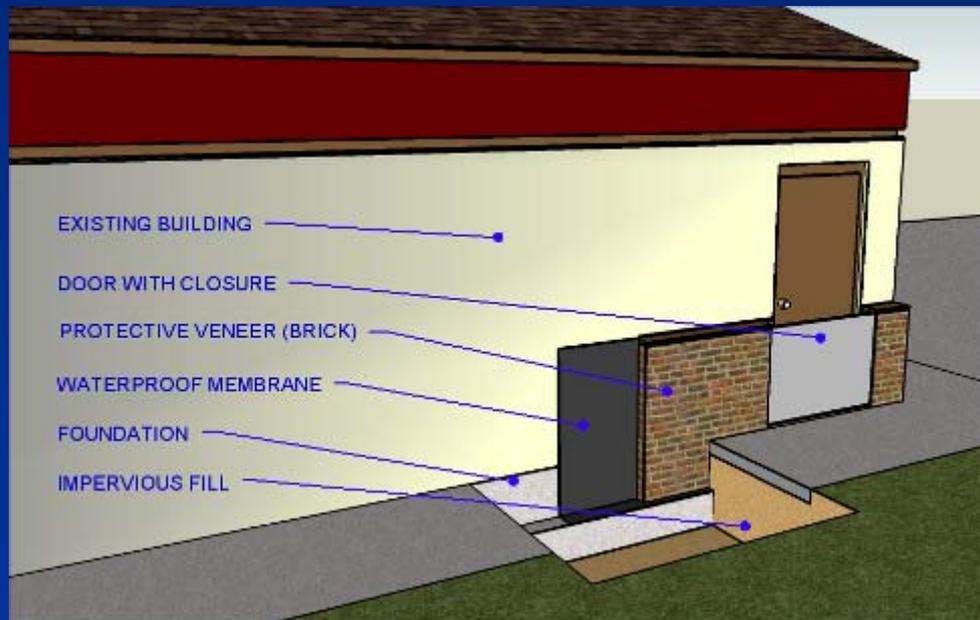
Floodproofing (cont.)



- **Huntington Station Townhouses**
 - Partial Ring Wall
 - Estimated Project Cost: \$276,000
 - Benefit to Cost Ratio (BCR): 0.44

Floodproofing (cont.)

- **Huntington Community Center**
 - Veneer Wall
 - Estimated Project Cost: \$172,000
 - Benefit to Cost Ratio (BCR): 0.38



Buyouts

- **Assumed voluntary buyout of all houses in the 100-year floodplain and restoring land back to natural floodplain**
 - Estimated Total Project Cost: \$96M
 - Benefit to Cost Ratio (BCR): 0.15

Selection of Alternatives to Pursue Further

- **County and Corps met to determine which alternatives to examine further. County's decision based on the following factors:**
 - Public input during and after April meeting
 - Likelihood that solution would address problem
 - Cost
- **Decision to move forward with the **Levee** and **Levee/Dredging Combination** Alternatives**

Levee Concept Plans

- **Three different heights of protection were chosen for further examination:**
 - **Plan a** – elevation 15.6 feet at Fenwick; equivalent to the 100-yr water surface elevation
 - **Plan b** – elevation 17.6 feet at Fenwick; equivalent to the 50-year water surface elevation plus 2.4' at d/s end and 3.4' at u/s end for risk and uncertainty
 - **Plan c** – elevation 19.6 feet at Fenwick; equivalent to the 100-yr water surface elevation plus 3' at d/s end and 4' at u/s end for risk and uncertainty

Levee Concept Plan



Levee Concept Plan

- **For highest levee plan, roughly 12-15 ft high and 65 ft wide plus 15' easement on either side**
- **At least one access ramp for maintenance and emergency equipment**
- **Pump station approximately 40' x 70' with 3 pumps**
- **Raise the bottom of Fenwick Drive to allow for drainage culverts installed underground**

Levee Concept Plan

- **Levee location modified to avoid impacts to wetlands, which were delineated in the Summer of '07**
- **Considerable amount of tree/brush removal**
- **Estimated two years to construct with numerous trucks and equipment in operation**

Levee Concept Plan

Interior Ponding without Pump Station

- Would require a pump station for interior drainage or significant ponding would result (100-yr event's shown in blue)



Levee Concept Plan

Interior Ponding with Pump Station

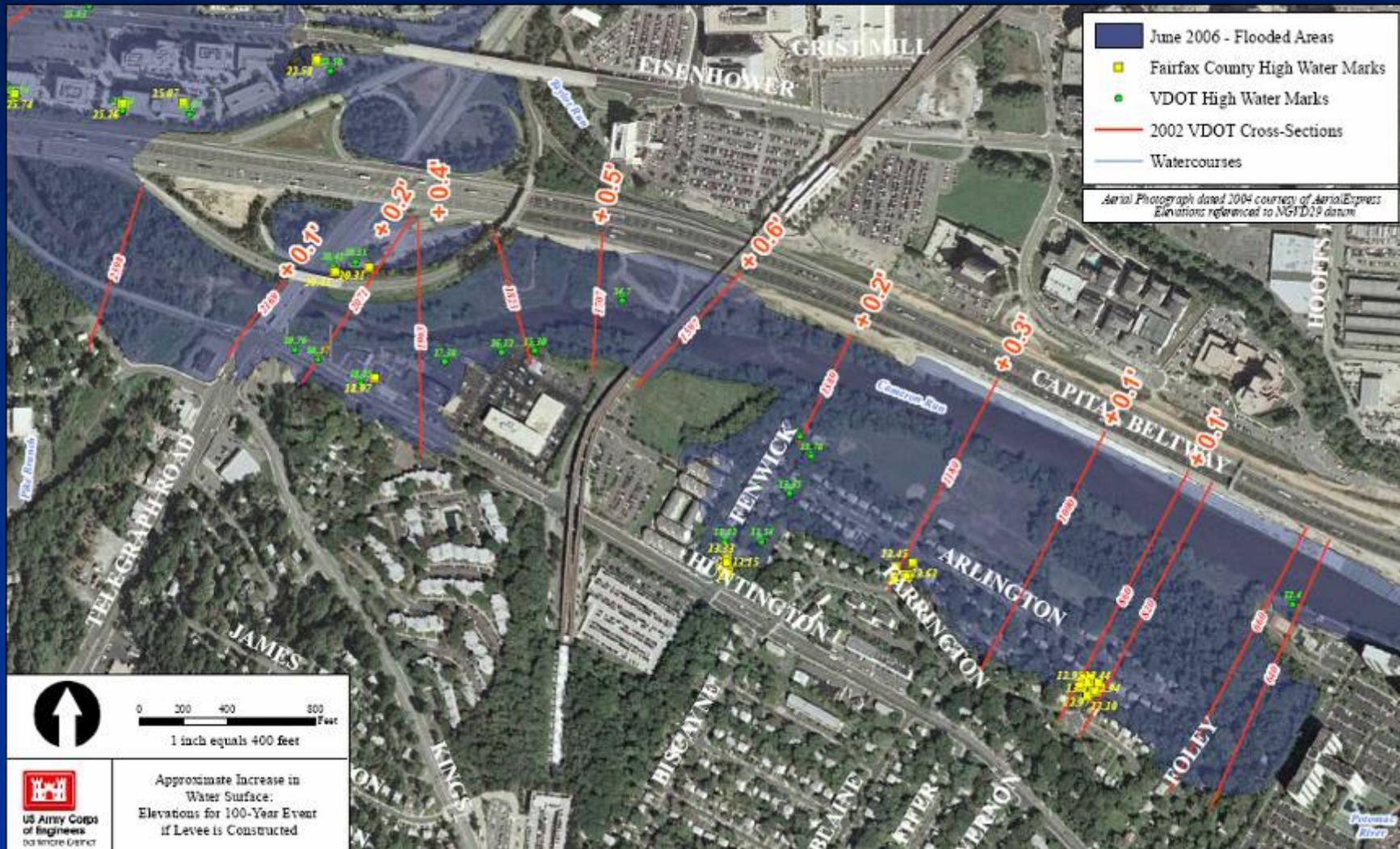
- Ponding would still occur, but would be below the lowest openings for all homes (shown in blue below for 100-yr event)
- Roadways would still flood; sewer backflow preventers may be needed for each house



Levee Concept Plan Impact to Flood Levels

- **Levee would increase flood levels by 0.1 to 0.6 feet for 100-year flood event adjacent to and just upstream of Huntington**
 - Higher flood levels would impact two structures that would already flood during the 100-yr event
 - 0.6 feet increase at Mid-Town High Rise Condos; new 100-yr flood elevation would be below first floor elevation but above the loading dock
 - 0.4 feet increase at auto care building that flooded in June 2006
 - 0.1 feet at Telegraph Road

Levee Impact to Flood Levels



Levee/Dredging Combination Concept Plan

- **Dredging extent modified (shorter length than previously evaluated) for the following reasons:**
 - Dredging alone would not provide adequate protection to the Huntington community
 - Only a levee would provide adequate protection; therefore, the dredging focused on amount needed to offset increased flooding impacts caused by the levee
 - Avoid \$7M cost for relocation of sanitary siphon

Levee/Dredging Concept Plan



Levee Dredging Combination (cont.)

- **Sediment samples were taken from lower reach of Cameron Run - mainly medium to fine-grained sands**
- **Sediment transport analysis was completed**
- **Sediment removal was estimated**
 - 2.5 feet depth needed to offset 0.6 foot levee increase
 - Overdredge – dredge 5 feet deep and let fill in to 2.5 feet
 - Estimate will take about 5 years to fill back in to 2.5 foot depth

Levee Dredging Combination (cont.)

- 2-3 access ramps for maintenance dredging
- Dry time (approximately 3 days)
- ~8,000 trucks for initial dredging and 4,000 for maintenance dredging
- Approximately 6 months for initial dredging and 3 months for maintenance
- Time of Year Restriction - cannot dredge from July 15 – February 30th each year to protect herring during spawning season
- Upland disposal site was assumed for cost purposes (may investigate placement at Dyke Marsh if NPS proceeds with a wetland restoration project)



Project Costs and Economic Analysis

- **Analysis included calculating the Probability of Non-Exceedence**
 - This is the probability that the levee will not be overtopped during the 100-year flood event (based on uncertainty of 100-yr flood elevation)

Project Costs and Economic Analysis (cont.)

- **Levee Concept Plans**
 - **Plan 2a** – elevation 15.6 feet at Fenwick
 - Total Project Cost: \$16.3M
 - Benefit to Cost Ratio (BCR): 0.35
 - Probability of Non-Exceedence: 49%
 - **Plan 2b** – elevation 17.6 feet at Fenwick
 - Total Project Cost: \$17.6M
 - Benefit to Cost Ratio (BCR): 0.42
 - Probability of Non-Exceedence: 79%
 - **Plan 2c** – elevation 19.6 feet at Fenwick
 - Total Project Cost: \$19.1M
 - Benefit to Cost Ratio (BCR): 0.5
 - Probability of Non-Exceedence: 98%

Project Costs and Economic Analysis (cont.)

- **Levee with Dredging Concept Plans**
 - **Plan 1a** – elevation 15.6 feet at Fenwick
 - Total Project Cost: \$21.5M
 - Benefit to Cost Ratio (BCR): 0.22
 - Probability of Non-Exceedence: 54%
 - **Plan 1b** – elevation 17.6 feet at Fenwick
 - Total Project Cost: \$22.8M
 - Benefit to Cost Ratio (BCR): 0.26
 - Probability of Non-Exceedence: 80%
 - **Plan 1c** – elevation 19.6 feet at Fenwick
 - Total Project Cost: \$24.2M
 - Benefit to Cost Ratio (BCR): 0.31
 - Probability of Non-Exceedence: 98%

Next Steps

- **Review comments received during and following this meeting (Comment Card)**
- **County selects plan from six final alternatives**
- **County develops implementation plan**
- **Corps develops 65% design**
 - Coordination with Park Authority
 - Detailed design – soil borings, utility re-routing, interior ponding issues, etc.
- **Keep residents informed of the project**

Points of Contact

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County Website

<http://www.fairfaxcounty.gov/dpwes/stormwater/floodreport.htm>

Questions?