

# Acton - Hamilton

NPDES Program:

Stormwater Management Retrofit Design

# Project Team

- Melvin C. (Chuck) Beall, Jr, PE – Director, Planning & Growth Mgmt.
- John Stevens – Chief, Capital Services
- Art Swann – Program Manager, Capital Services
- Diane Shelton – Right of Way Agent, Capital Services
- David Sutton – Right of Way Agent, Capital Services
- Michael Snyder – Project Manager, Capital Services
- Karen Wigger – Senior Planner, Capital Services
- Rich Polk, P.E. – Director of Engineering, Vista Design, Inc.
- Steve Engel, R.L.A. – Principal Landscape Architect, Vista Design, Inc.

# What is the NPDES?

- National Pollutant Discharge Elimination System (NPDES)
- Authorized by the federal Clean Water Act of 1972
- Controls water pollution by regulating storm water discharges
- NPDES program is administered by individual states

# NPDES in Charles County

- Charles County Government has been issued a NPDES permit by the State of Maryland
  - Requires County to be responsible for administering effective stormwater management programs
  - Section III.F. requires County to identify and retrofit 10% of untreated impervious areas within the Development District located in the northern portion of the County
    - Untreated – Stormwater runoff from an impervious surface that goes directly into a stream without being filtered by a stormwater management practice

# NPDES in Charles County

- To satisfy Section III.F. requirements, in 2004, Charles County commissioned its first watershed restoration study
  - Seven watersheds identified as being developed without water quality controls, including Acton-Hamilton, which had the 3rd largest amount of untreated impervious area
- In 2008, Charles County commissioned a more detailed study of the Acton-Hamilton area, which included:
  - Review of soils
  - Review of sub-watersheds
  - Review of available sites for mitigation areas

# Retrofitting Watersheds

- Charles County began retrofitting in 2006 to manage stormwater runoff
  - To date, approximately 45 acres of existing impervious surfaces have been retrofitted with stormwater controls
  - Monitoring results show the projects effectively remove pollutants from the stormwater runoff

# Completed Retrofit Projects

- Middleton Elementary School

An unused portion of the school yard became...



An outdoor learning area built around a water quality wetland



# Completed Retrofit Projects

- Brown Elementary School

An abandoned, partially paved area became...

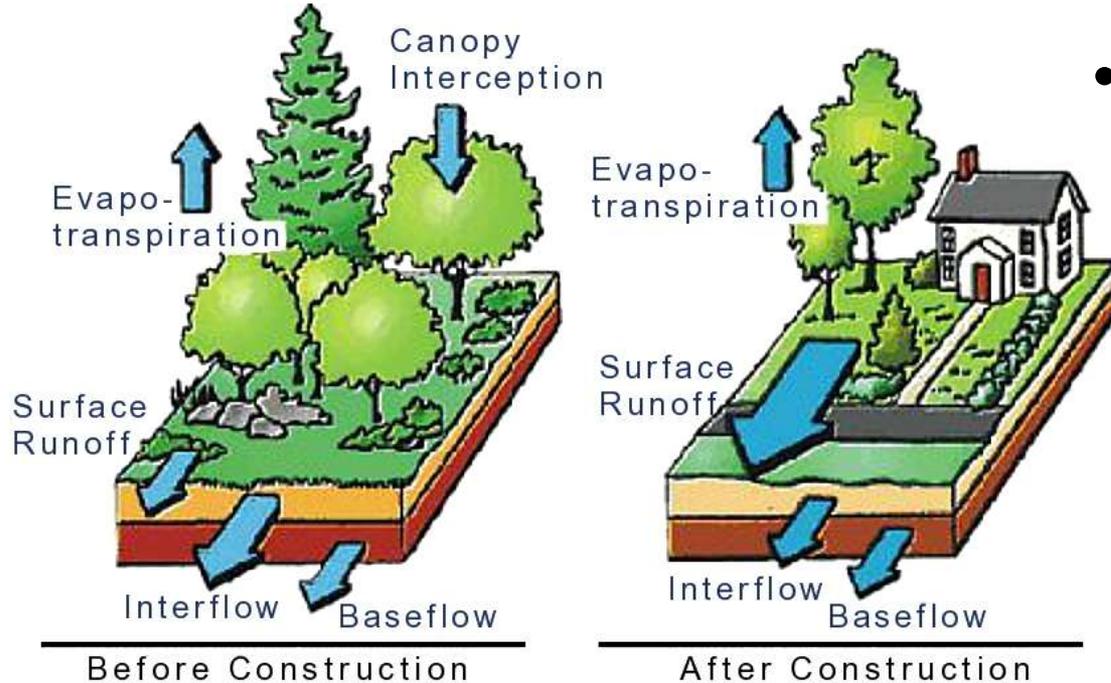


An outdoor learning area built around a water quality wetland



# Why Retrofit Watersheds?

- Stormwater runoff is generated when precipitation from rain or snow melt flows over land surfaces and does not percolate into the ground

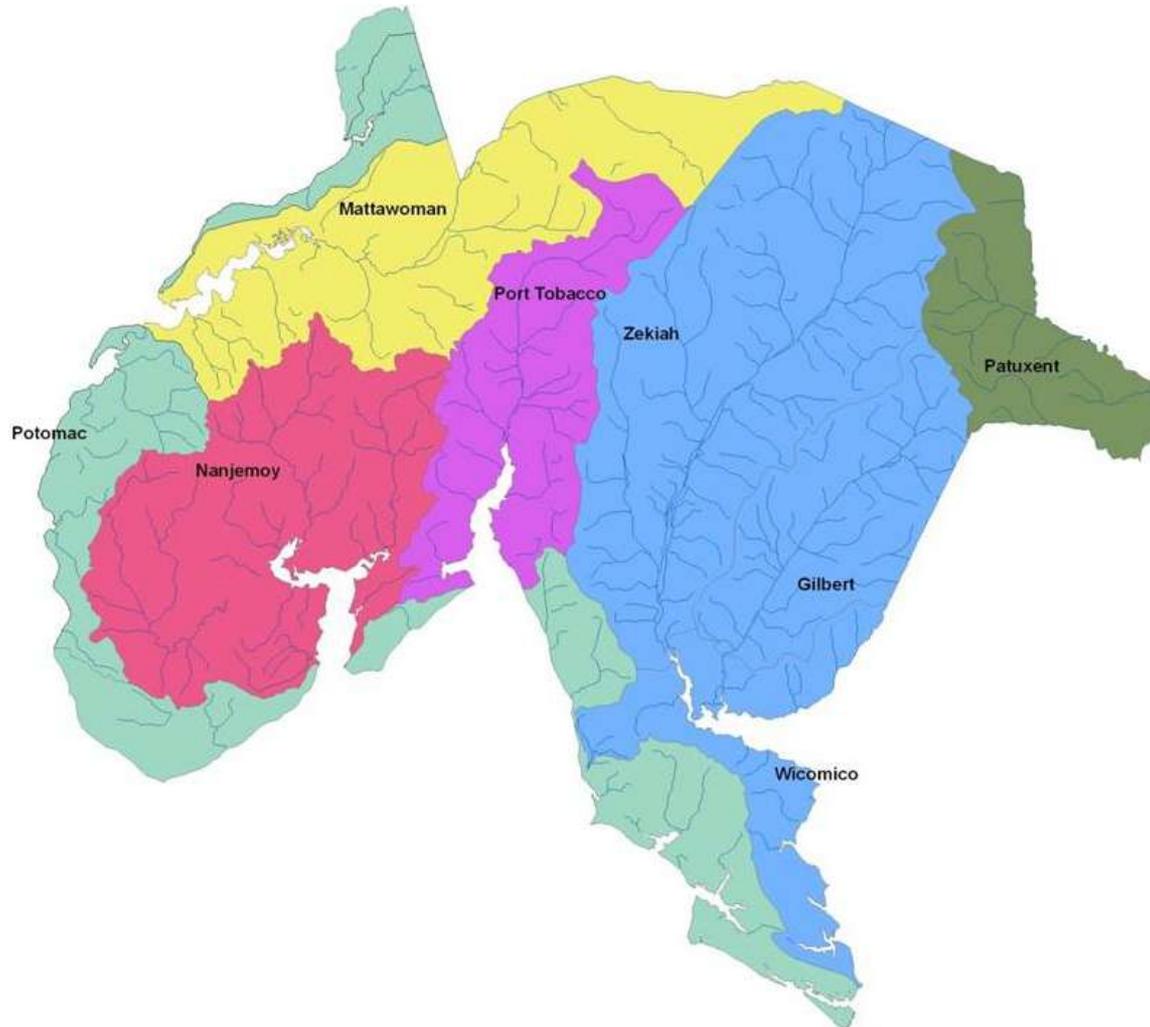


- The situation worsens after impervious surfaces no longer allow rain to soak into the ground

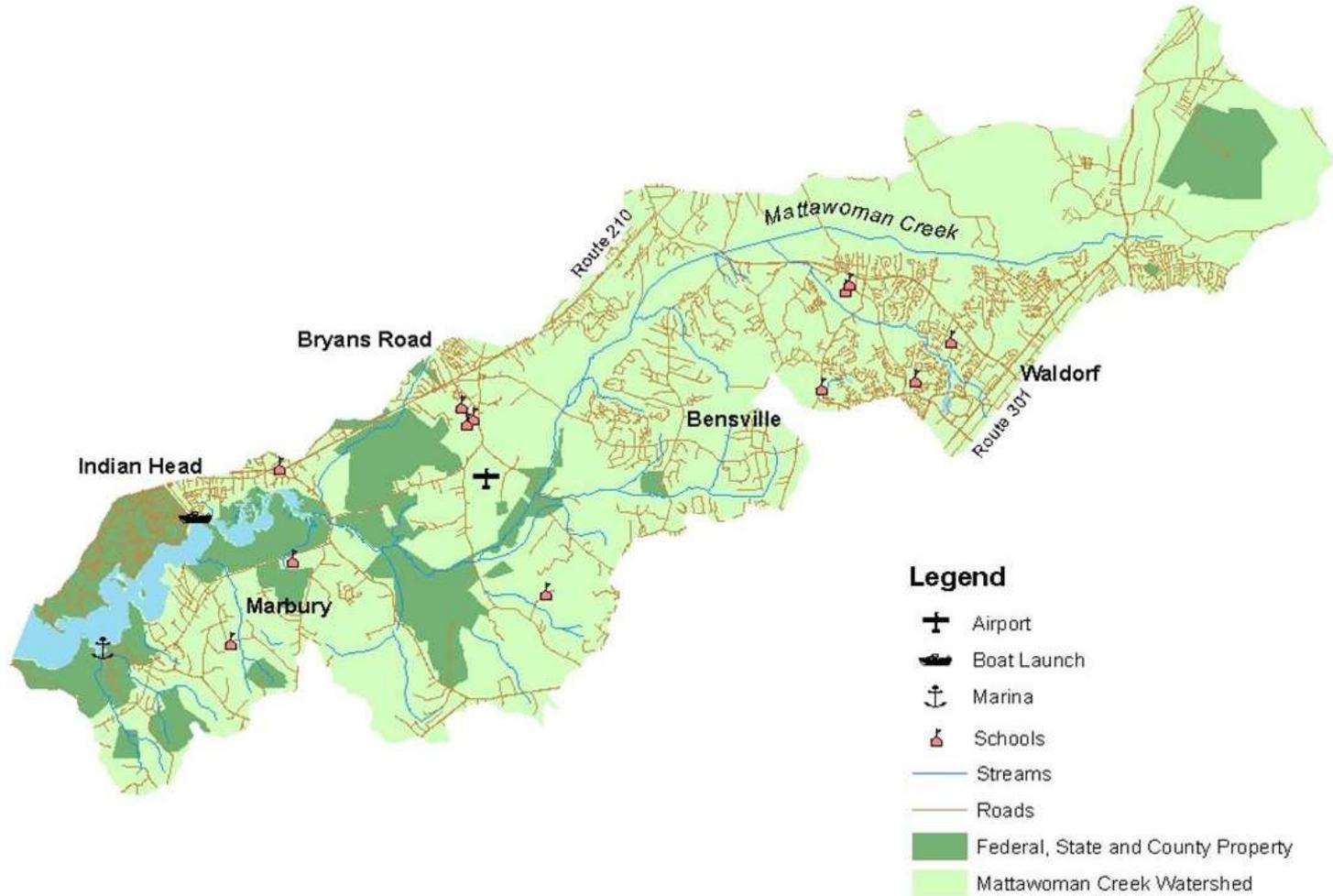
# Why Retrofit Watersheds?

- As runoff flows over land, it accumulates debris, chemicals, sediment, or other pollutants that could adversely affect water quality
- If runoff is not treated to remove accumulated sediments, streams become degraded and aquatic life suffers
- Acton-Hamilton areas drain to the Mattawoman Creek, then to the Potomac River, then to the Chesapeake Bay
  - All are currently degraded ecosystems

# Watersheds in Charles County



# Mattawoman Creek Watershed



# Results of Retrofitting Watersheds

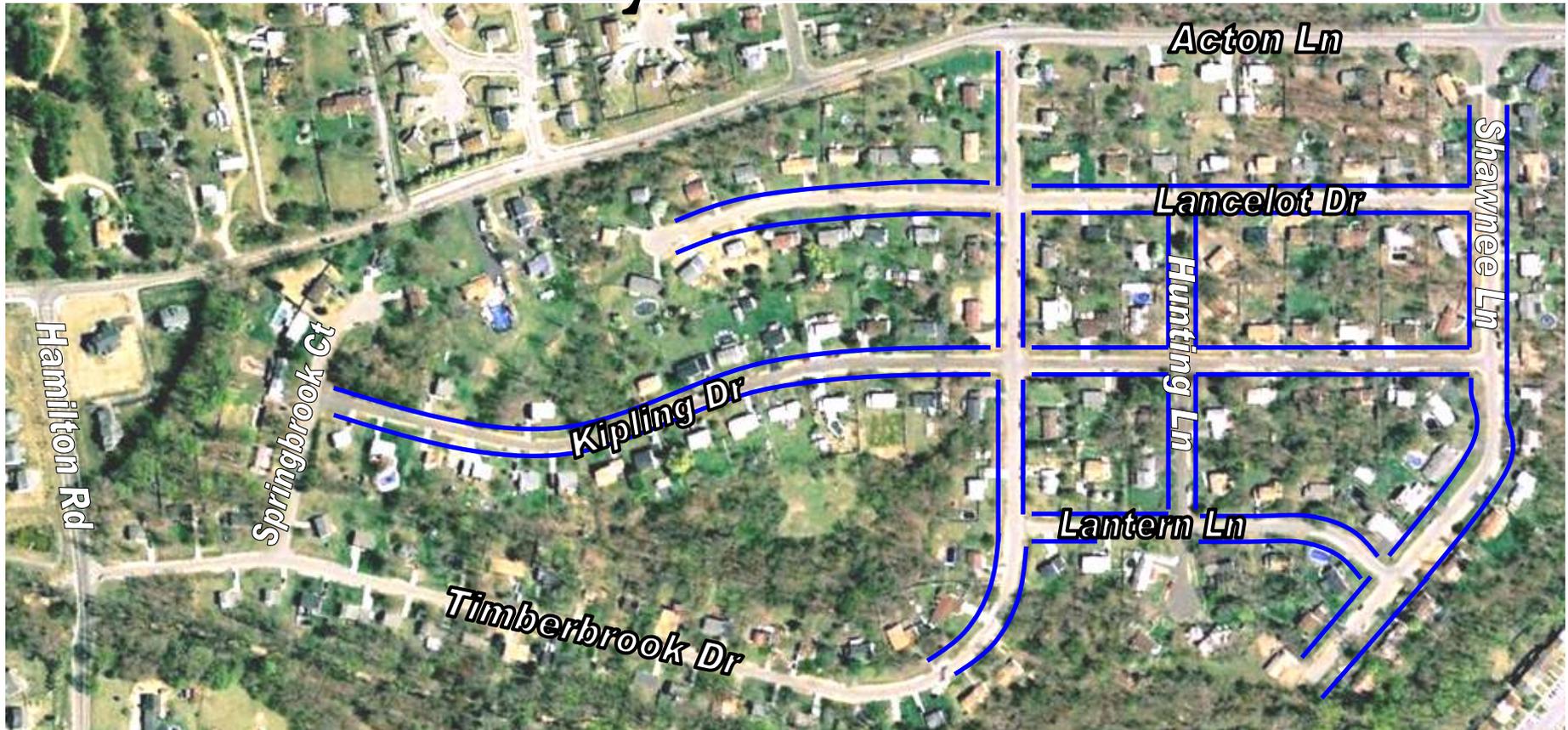
- By retrofitting untreated impervious surfaces, downstream water quality is improved





## Acton – Hamilton Community

# Lynnbrook



- Current drainage by open swale road side drainage
- Dry swales selected as water quality technique
  - Dry swales denoted by 



# Crain Highway Stores



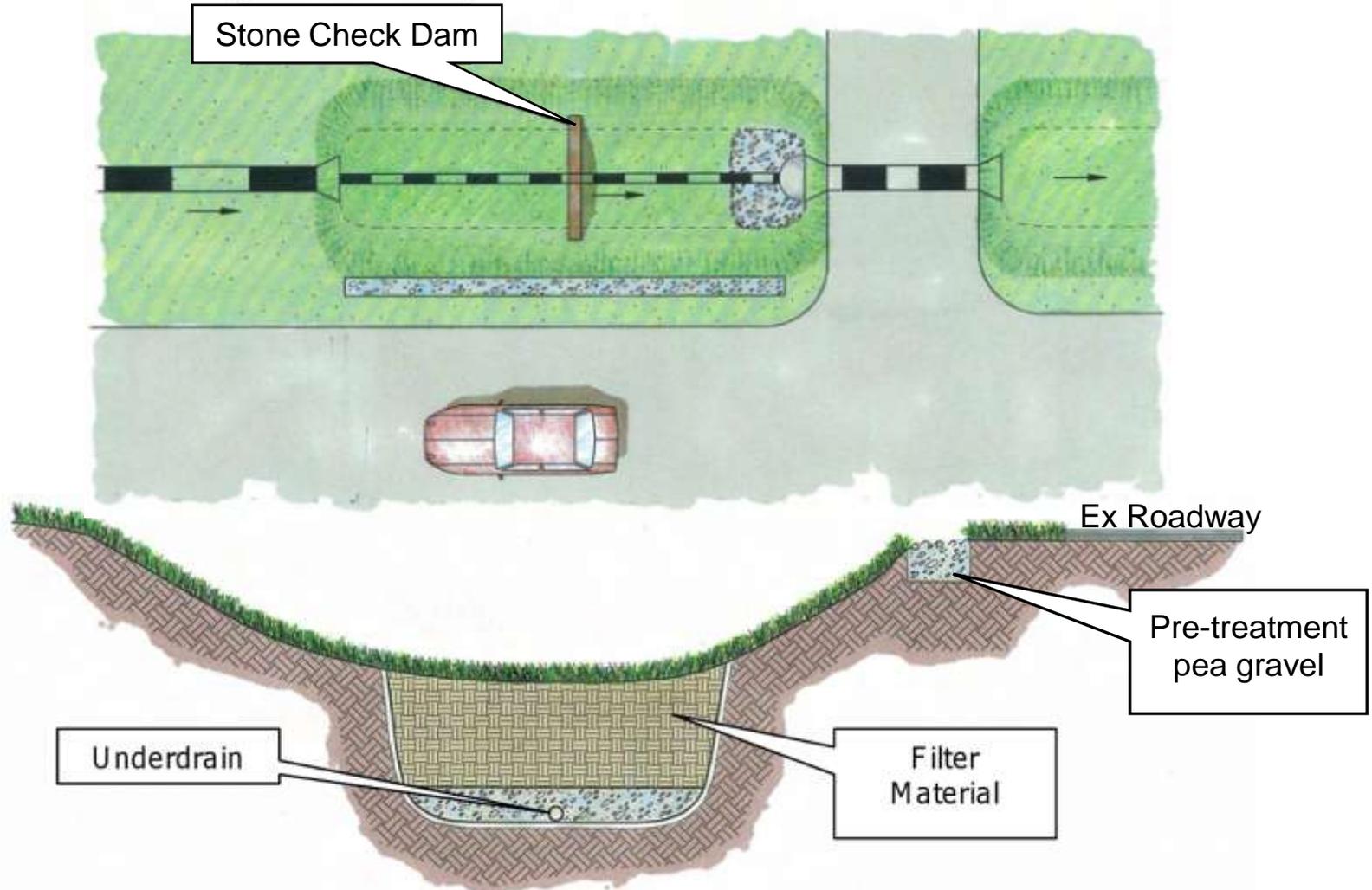
- Dry swales also selected here – Denoted by 



# Dry Swales

- Enhanced, modified roadside swale
- Designed to convey drainage and promote infiltration

# Dry Swales



Source: Charles County NPDES Design Concepts, Acton-Hamilton Community  
KCI Technologies, Inc., Dec. 2008

# Coventry Manor

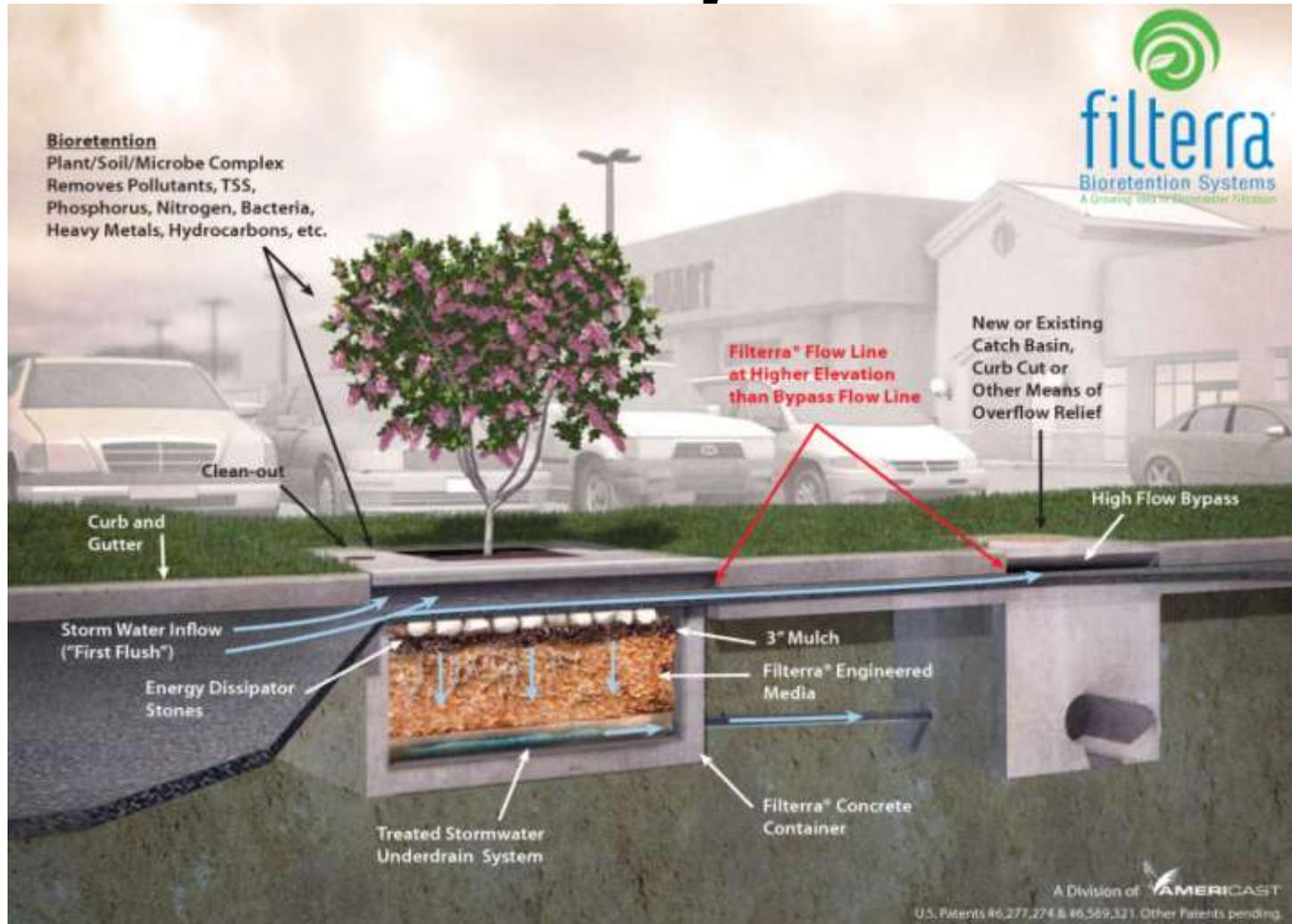


- Closed drainage system – curbs and curb inlets
- Dry swales (2) – Denoted by 
- Bio-retention systems (3) – Denoted by 
- Filterra systems (4) – Denoted by 

# Filtterra Systems

- Captures initial flush of runoff
- Conveys runoff through filter media to remove contaminants
- Discharges to existing storm drains

# Filterra Systems



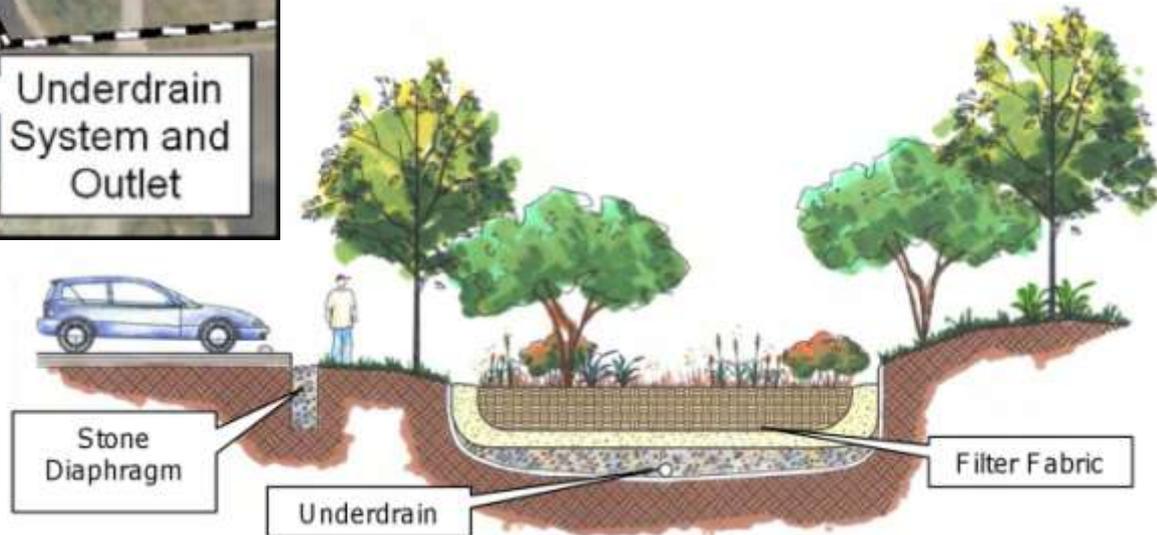
Source: Filterra Bioretention Systems Product Schematic  
<http://www.filterra.com/pdf/FilterraSchematic.pdf>



# Bio-retention System

- Captures initial storm runoff
- Filters runoff through a media layer
- Discharges to existing storm drains

# Bio-retention System



Source: Charles County NPDES Design Concepts, Acton-Hamilton Community  
KCI Technologies, Inc., Dec. 2008



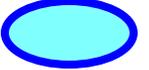
# Business Park Drive



- Bio-retention system also used here – Denoted by 

# Acton Village

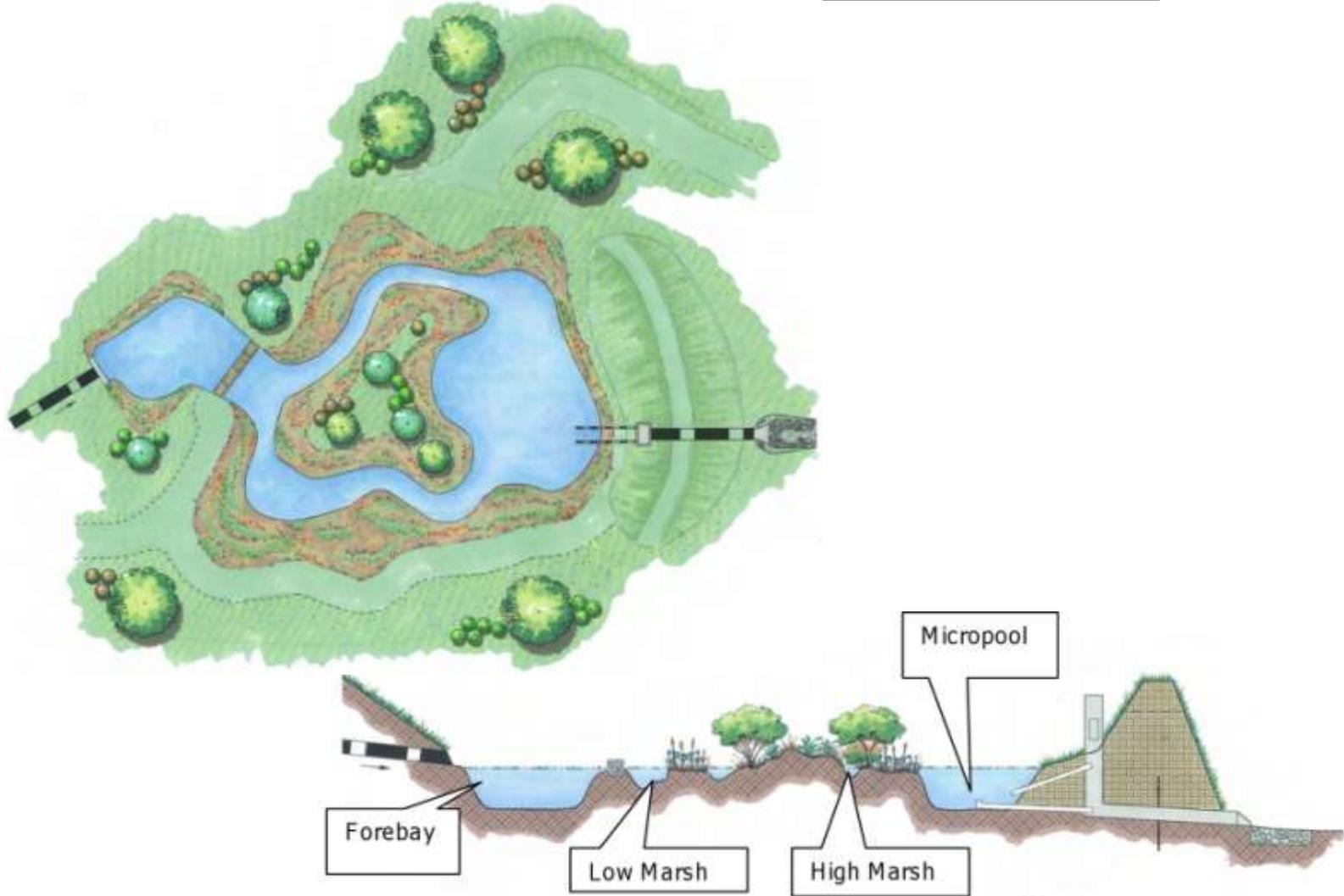


- Dry pond conversion to shallow wetlands – Denoted by 

# Created Shallow Wetlands

- Constructed by lowering pond bottom to below groundwater table
- Includes high and low marsh areas
- Planted with aquatic vegetation
- Allows small sediments to settle out and vegetative uptake of soluble nutrients

# Created Shallow Wetlands



Source: Charles County NPDES Design Concepts, Acton-Hamilton Community  
KCI Technologies, Inc., Dec. 2008



# Conclusion

- Section III.F. of current NPDES permit requires County to identify and retrofit 10% of the untreated impervious areas within the Development District
- Acton-Hamilton community identified as having third largest untreated impervious areas
- Acton-Hamilton drains to Mattawoman Creek, Potomac River, and then to Chesapeake Bay... all are degraded ecosystems
- Water quality techniques chosen to maximize areas treated for minimal cost
- Combined techniques will treat 19.8 acres of impervious surfaces which are currently untreated

# Questions?

- Project team is available to answer questions after the presentation
- Questions may also be submitted in writing
  - E-mail:
    - sheltond@charlescounty.org
    - suttond@charlescounty.org
  - US Mail:
    - Diane Shelton, Capital Services (please also provide  
P.O. Box 2150 copy for David Sutton)  
LaPlata, MD 20646