Acton - Hamilton

NPDES Program:

Stormwater Management Retrofit Design

VISTA DESIGN INC.
Landscape Architects, Land Planning Consultants, Engineers, and Surveyors

Charles County Government
Charles County Maryland

What is the NPDES?

- National Pollutant Discharge Elimination System (NPDES)
- Authorized by the 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

NPDES in Charles County

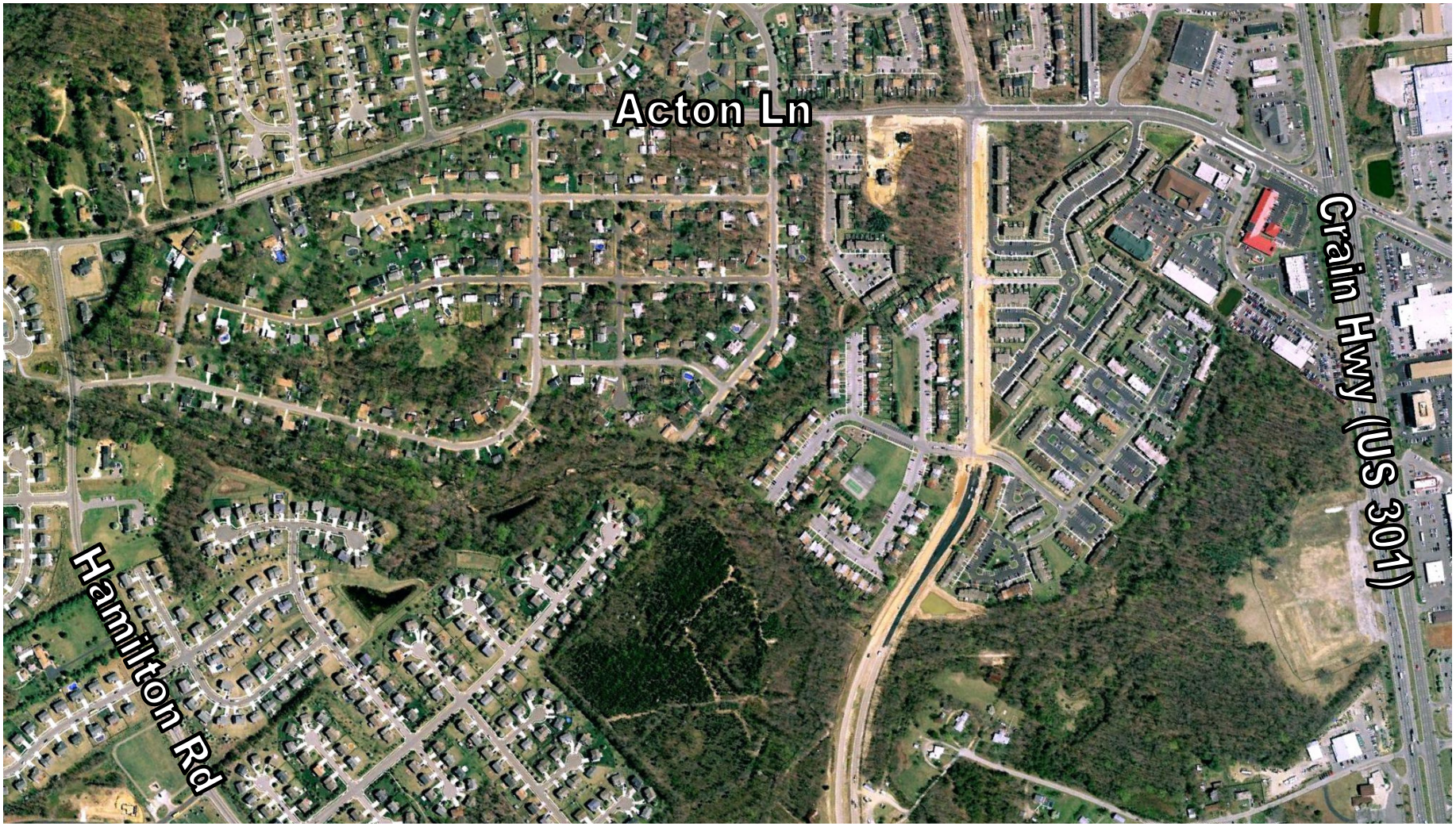
- To satisfy Section II.F. requirements, in 2004, Charles County commissioned a watershed restoration study
  - Seven watersheds identified as being developed without water quality controls, including Acton-Hamilton, which had the 3rd largest amount of untreated impervious area
- In 2008, Charles County 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

Why Retrofit Existing Watersheds?

- Stormwater runoff is generated when precipitation from rain or snow melt flows over land surfaces and does not percolate into the ground
- As runoff flows over land, it accumulates debris, chemicals, sediment, or other pollutants that could adversely affect water quality
  - Oil
  - Excess fertilizer
- If runoff is not treated to remove accumulated sediments, streams become degraded and aquatic life suffers

Why Retrofit Existing Watersheds?

- By retrofitting untreated watersheds, downstream water quality is improved
- Acton-Hamilton areas drain to the Mattawoman Creek, then to the Potomac River, then to the Chesapeake Bay
  - All are currently degraded ecosystems



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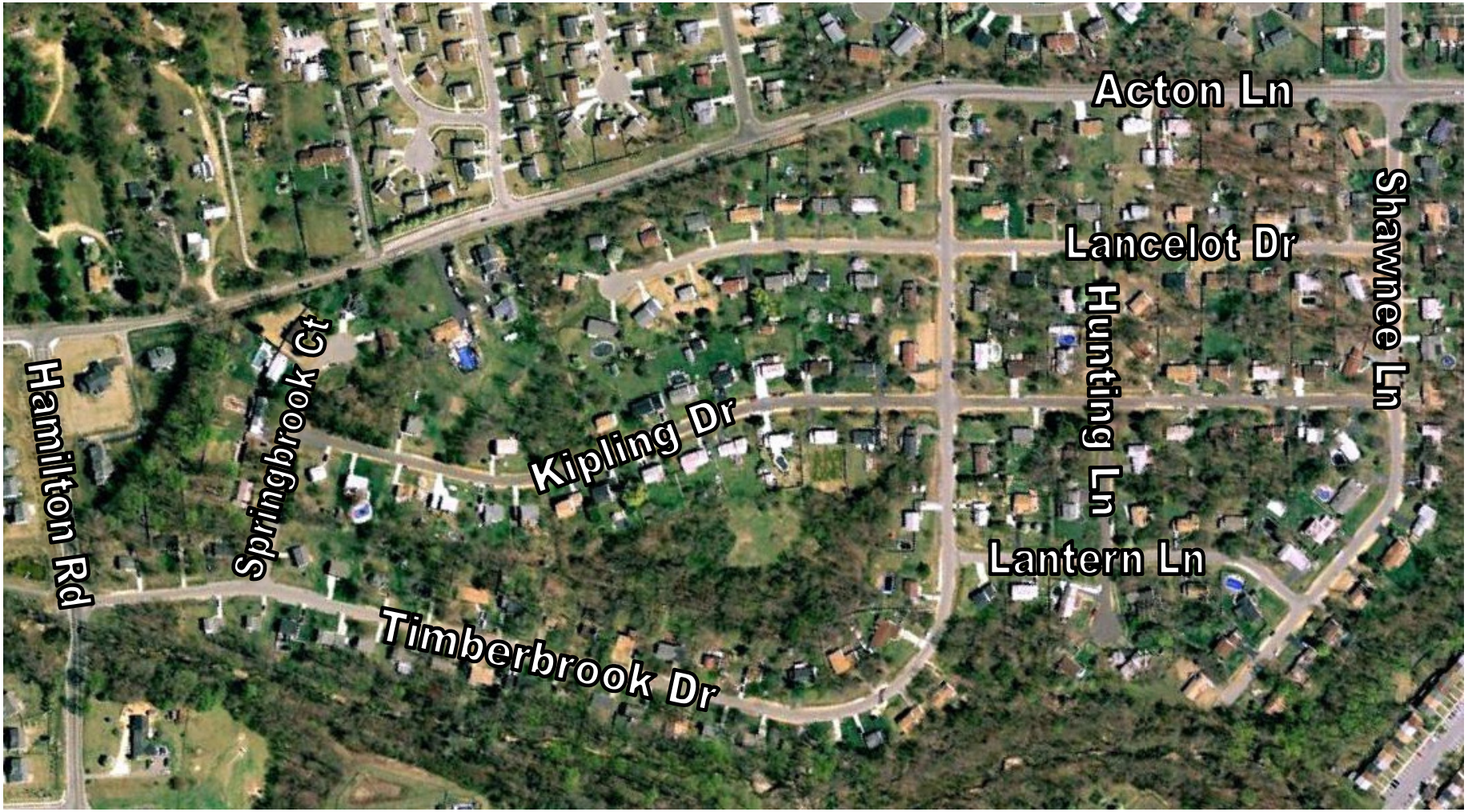
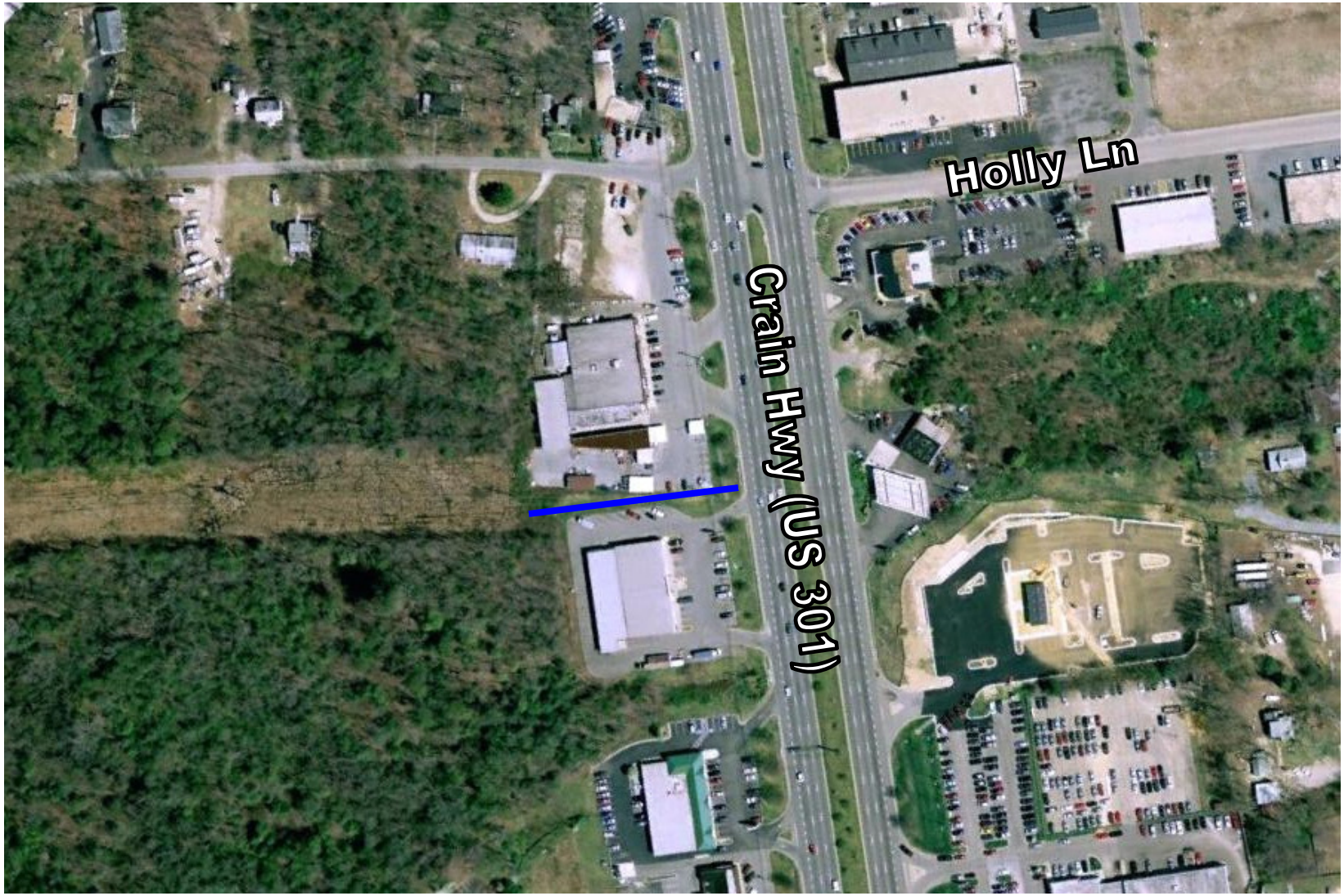


- Current drainage by open swale road side drainage
- Dry swales selected as water quality technique

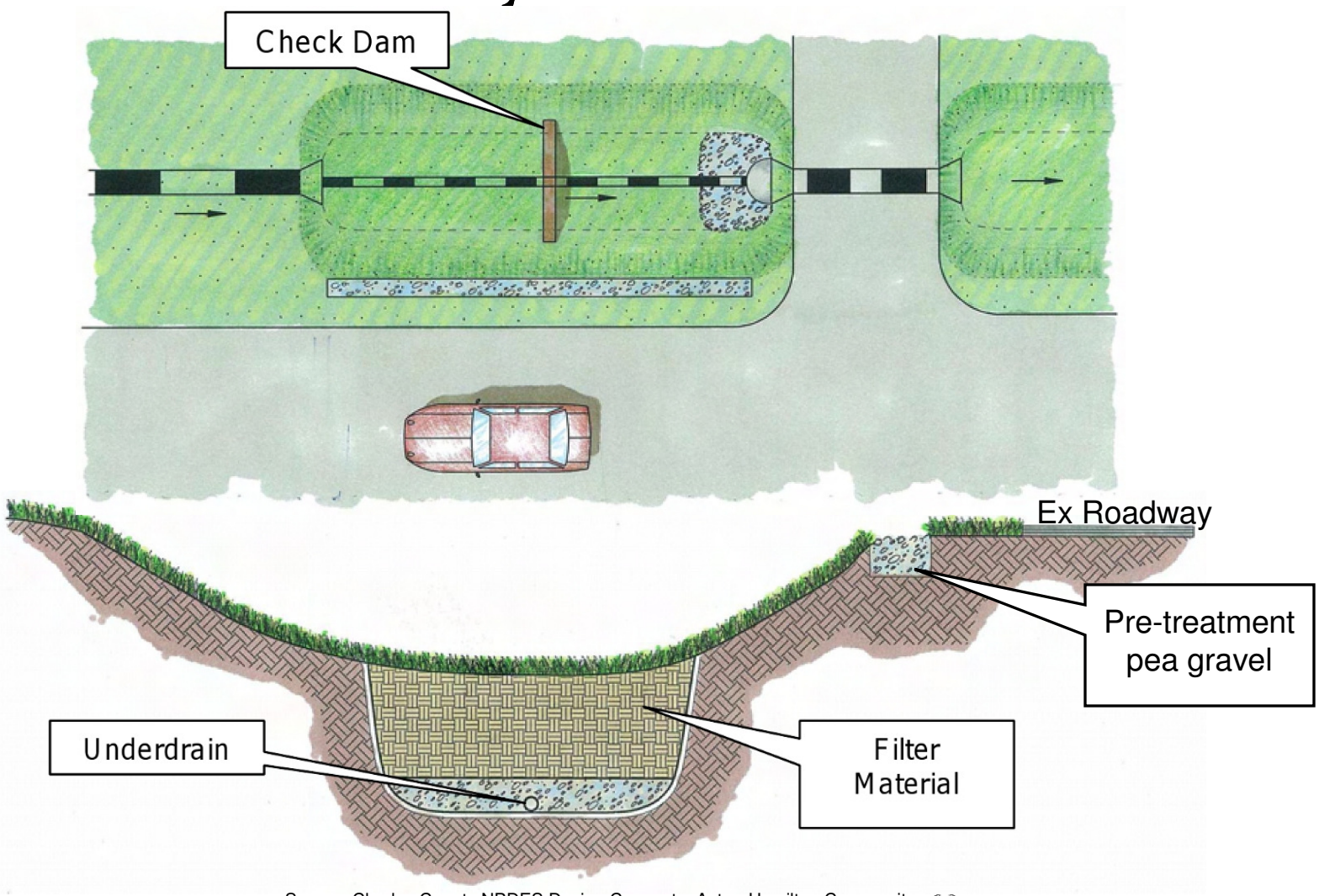


- Dry swales also selected here – Denoted by

Dry Swales

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

Dry Swales



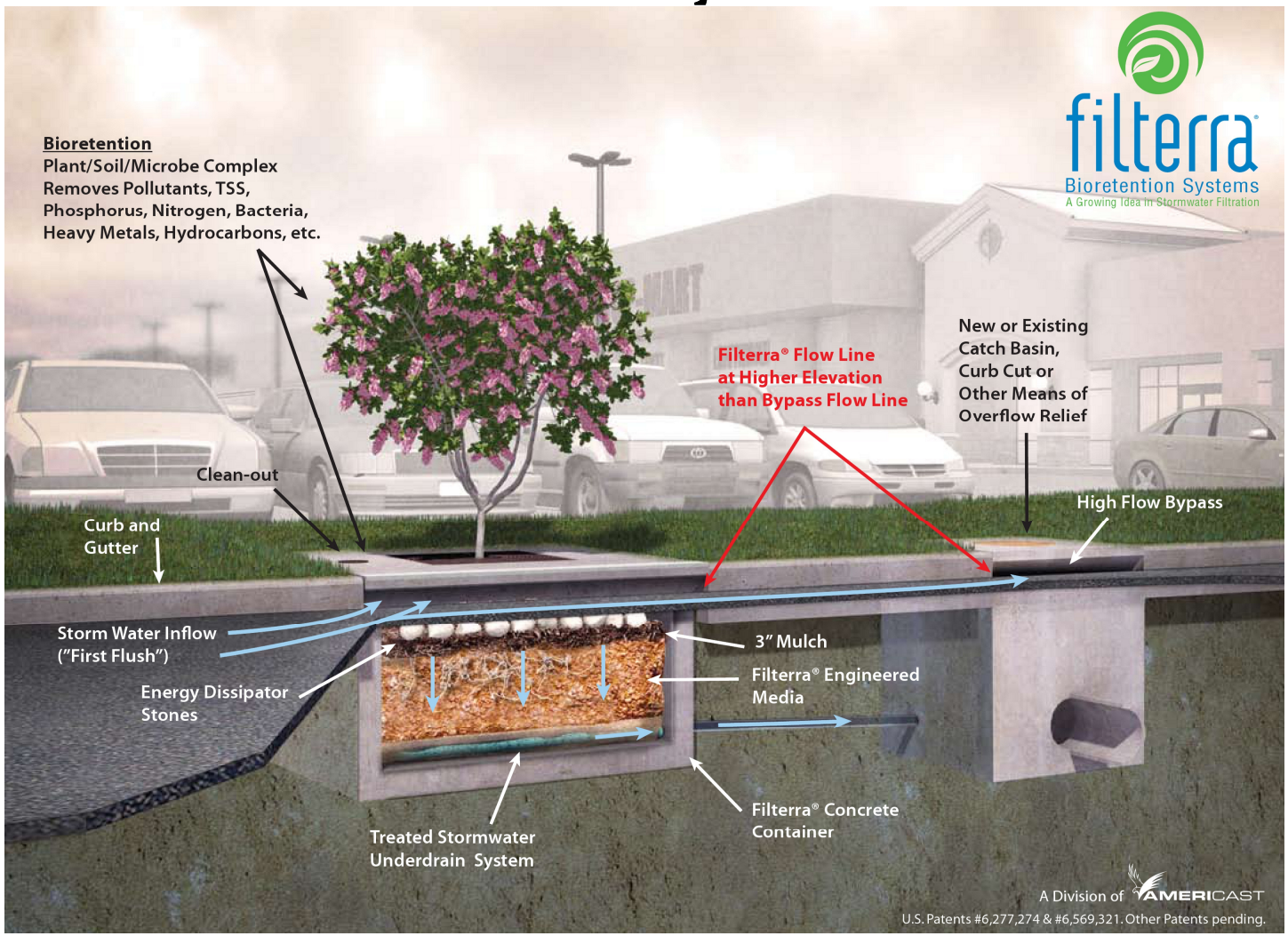
Source: Charles County NPDES Design Concepts, Acton-Hamilton Community
KCI Technologies, Inc., Dec. 2008

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

Filterra Systems

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

Filterra Systems

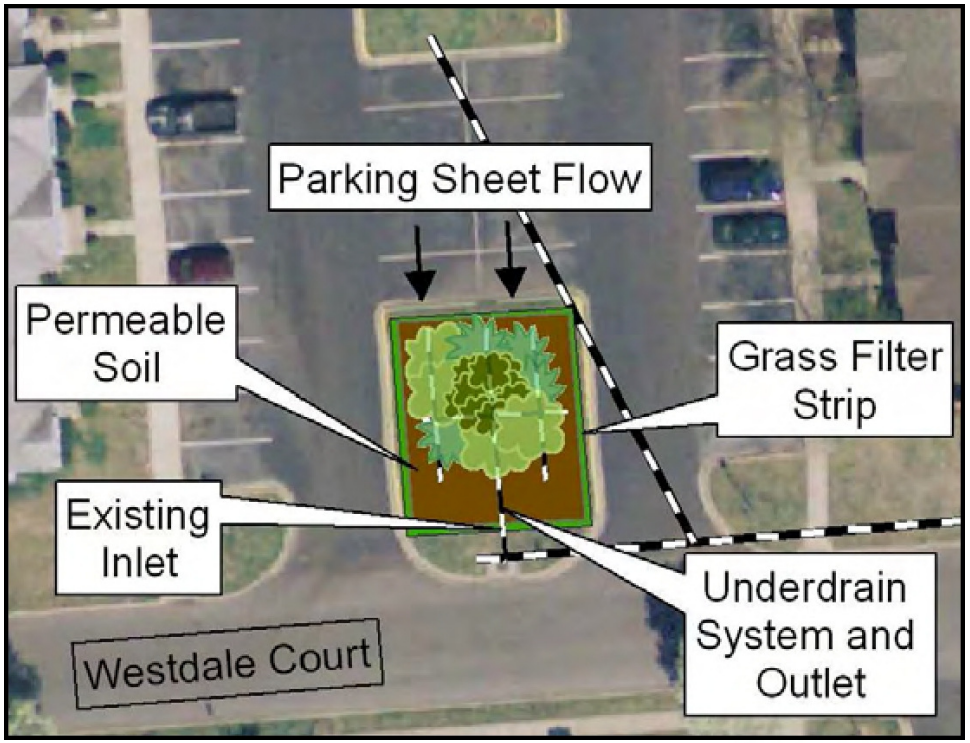


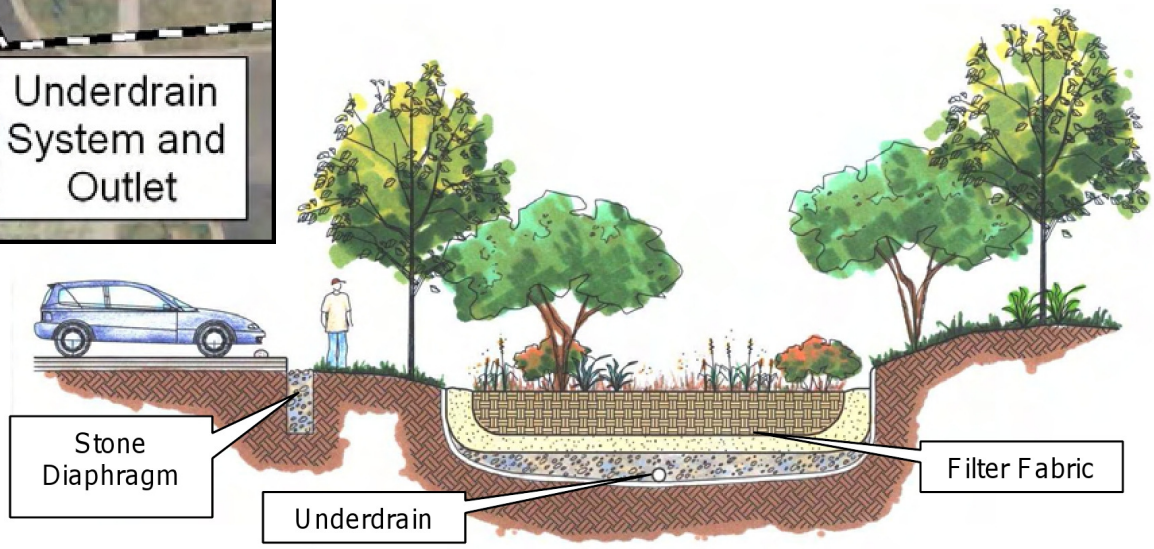
Source: Filterra Bioretention Systems Product Schematic
http://www.filterra.com/pdf/FilterraSchematic.pdf

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

- Bio-retention system also used here – Denoted by

- Dry pond conversion to shallow wetlands – Denoted by

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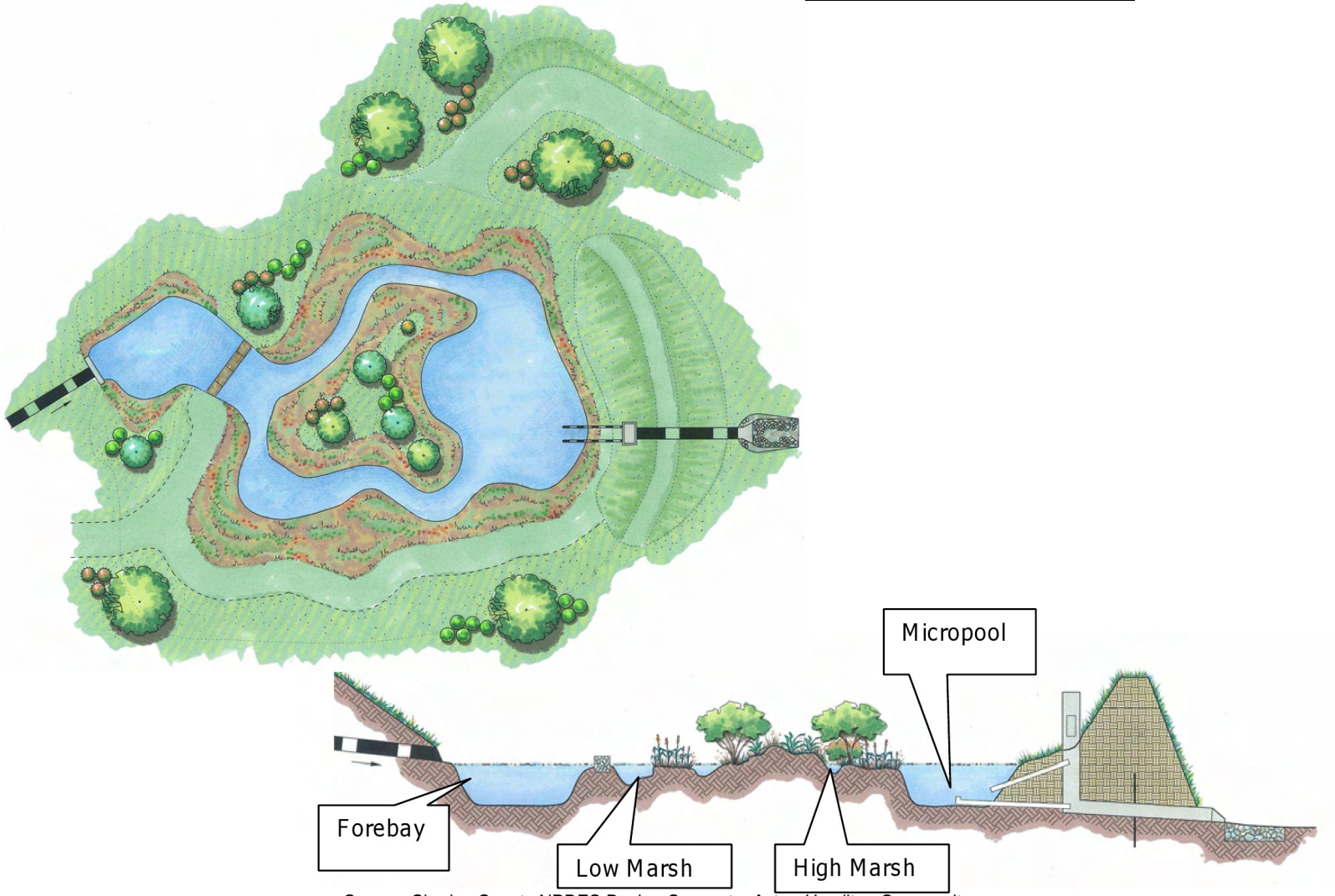
Created Shallow Wetlands

- 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