CB56-2018: Tiber Branch Watershed and Plumtree Branch Watershed Safety Act

PUBLIC MEETING PRESENTATION

Revised May 21, 2019

HOWARD COUNTY GOVERNMENT, DEPARTMENTS OF PUBLIC WORKS AND PLANNING AND ZONING

Overview

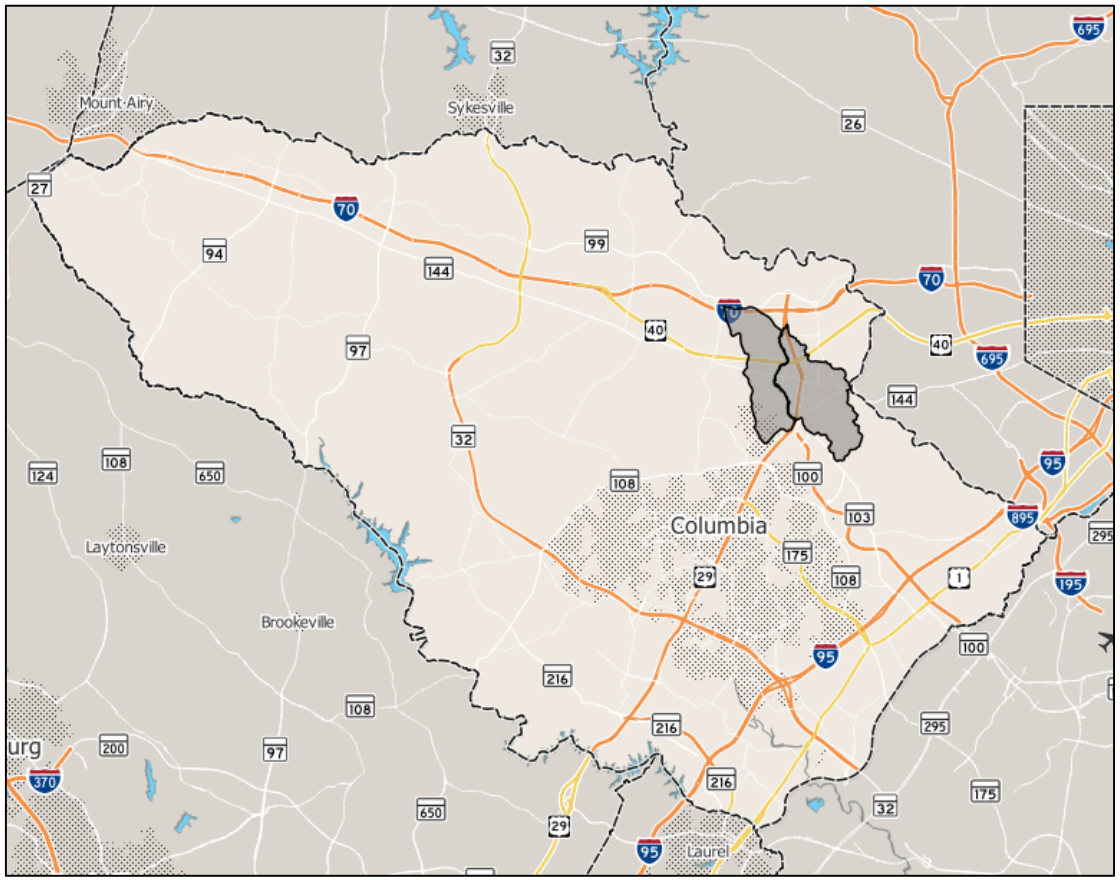
CB56-2018 AREAS OF INQUIRY

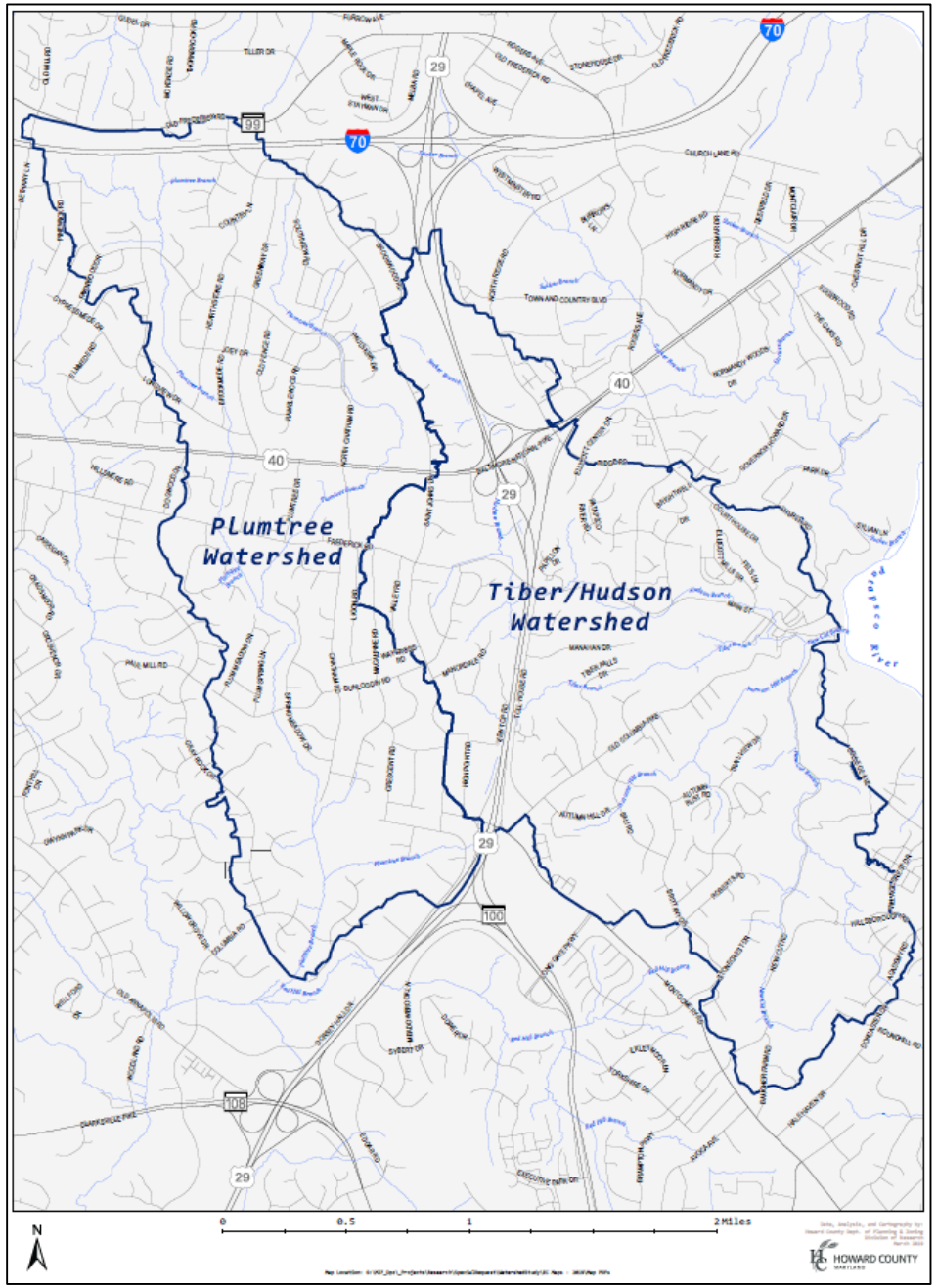
CB56-2018 Requests DPW-DPZ to:

- Study “the extent to which existing, planned, and future land use, storm water management, drainage infrastructure, and flood mitigation for property that drains in whole or in part to the Tiber Branch Watershed or the Plumtree Branch Watershed, and any other relevant factor, may contribute to flooding in each Watershed…” and

- Submit “recommendations about changes in law and procedures that may help protect the Watershed from the effects of future flood events.”

Tiber Branch and Plumtree Branch Watersheds





DPW-DPZ Goal:

- DPW-DPZ has interpreted the bill to imply the need for strategies that address the high-intensity, short-duration storm event

  (i.e. July 30, 2016 and May 27, 2018)

- To clarify, the primary goal of these strategies is not to enhance water quality nor address low-intensity storm events

CB56-2018 Tasks:

- Eight specific areas of inquiry are stated in CB-56, paraphrased as follows:

1. *Analysis of the 5/27/2018 flood based on 7/30/2016 models and reports (DPW)*
2. *Designs/plans for stormwater storage facilities combined with stormwater conveyance infrastructure improvements, and drainage infrastructure and flood mitigation (DPW)*
3. *Analysis of the flooding impact of existing or proposed development or redevelopment (DPW-DPZ)*
4. *Proposed changes to stormwater management regulations (DPZ)*

CB56-2018 Tasks:

5. *Analysis of public and private options for retrofitting existing public and private property (DPW)*
6. *Analysis of potential general plan and density and open space zoning regulations with respect to future development and redevelopment of property (DPZ)*
7. *Analysis of creating a special benefits district or other funding mechanism to finance stormwater and drainage infrastructure, and flood mitigation, and retrofitting improvements (DPZ)*

CB56-2018 Tasks:

8. *Any other matter that may assist the County in identifying and clarifying the various complex factors contributing to and in establishing a comprehensive plan for managing and controlling such factors to the maximum extent practicable to protect public safety, health and welfare in the Watersheds*

Task 1

ANALYSIS OF THE 5/27/2018 FLOOD BASED ON 7/30/2016 MODELS AND REPORTS

Background

What does the flood model do?

- Determines quantity of water through the reaches
  - Amount, depth, velocity of water

What is a “Hydrograph”?

- Demonstrates the peak flow over time of a storm event
- Distribution of flow intensity
- Peak flow in cubic feet per second (cfs)
- The area under the curve is the total storm volume in cubic feet or often expressed in “acre-feet”

Background

How much is an acre-foot (ac-ft)?

- 1 foot of water over a 1 acre area
  - (43,560 cubic feet)

For example…in Plumtree Branch Watershed

- Dick's Sporting Goods
  - Chatham Station Shopping Center
- Approximately 1 acre in size
- 1 foot of water over Dick's = 1 acre-foot

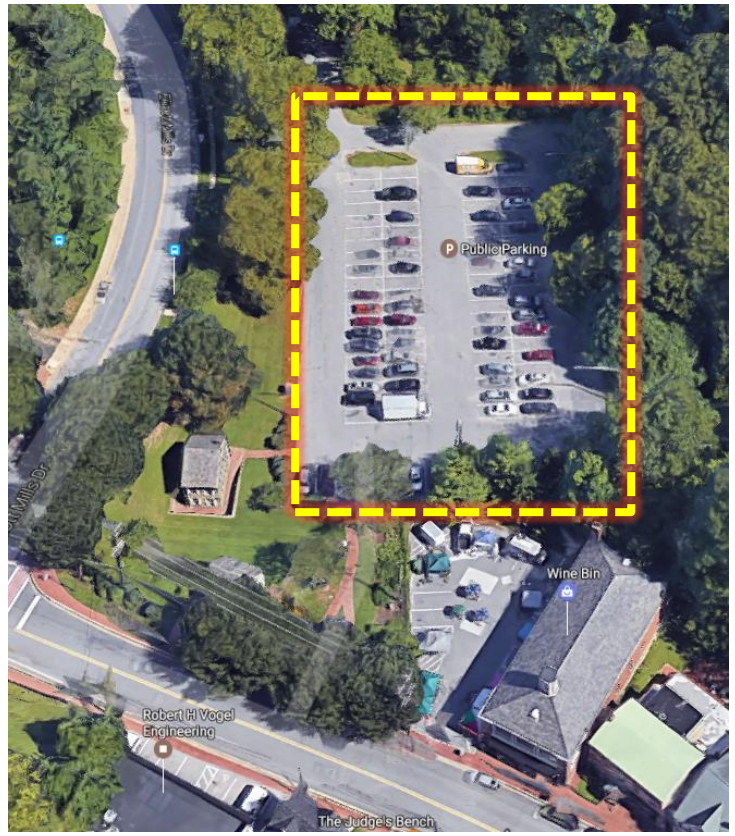
Background

How much is an acre-foot (ac-ft)?

- 1 foot of water over a 1 acre area
  - (43,560 cubic feet)

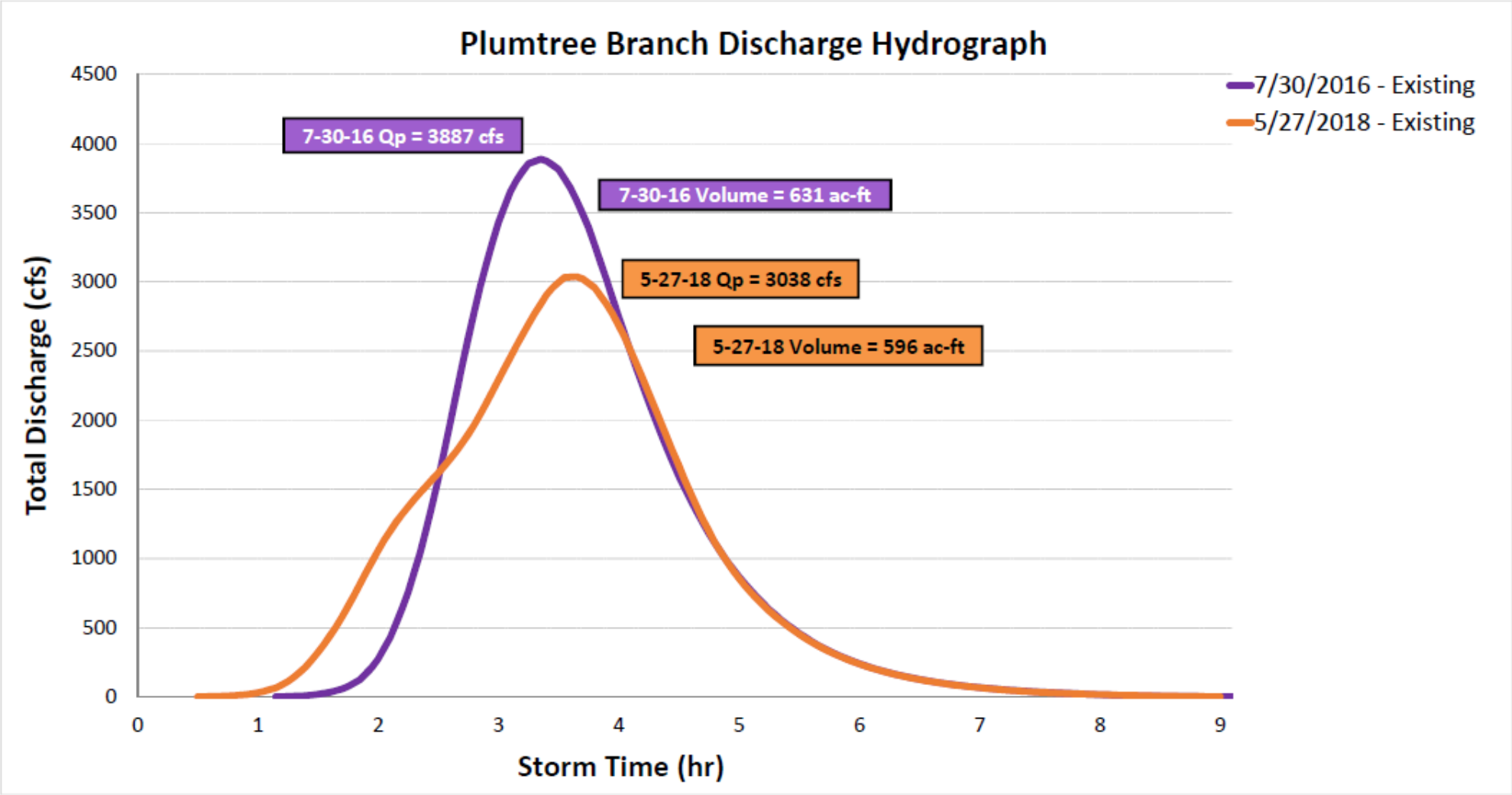
For example…in Tiber Branch Watershed

- Parking Lot F
  - Behind the Wine Bin near Ellicott Mills Drive
- Approximately 1 acre in size
- 1 foot of water over Lot F = 1 acre-foot



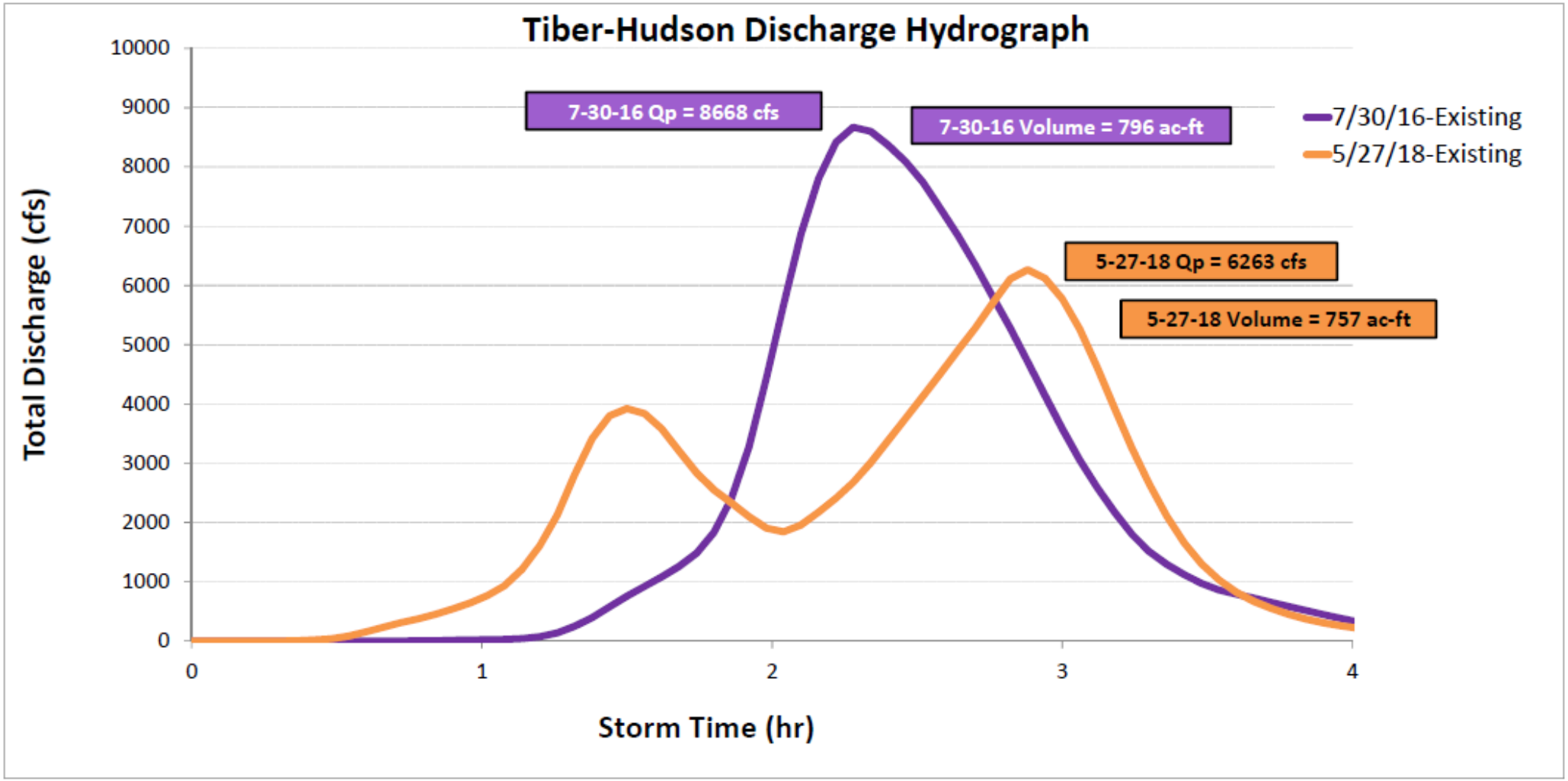
Plumtree Branch Modeling Results

July 30, 2016 event: 6.6” in 3.55 hours - May 27, 2018 event: 6.4” in 3.0 hours



Tiber Branch Modeling Results

July 30, 2016 event: 6.6” in 3.55 hours - May 27, 2018 event: 6.4” in 3.0 hours



Task 2

DESIGNS/PLANS FOR STORMWATER STORAGE FACILITIES COMBINED WITH STORMWATER CONVEYANCE INFRASTRUCTURE IMPROVEMENTS, AND DRAINAGE INFRASTRUCTURE AND FLOOD MITIGATION

Ongoing Designs and Plans: Stormwater Storage Facilities

- Plumtree Branch
  - None currently planned – limited opportunity
- Tiber Branch
  - Final Design
    - D-1159 Quaker Mill Pond
    - D-1165 Pond H-7
    - D-1159 Autumn Manor Pond
  - Preliminary Design
    - D-1165 Pond T-1
  - FY20 Construction
    - C-0337 Quaker Mill Pond Construction
    - C-0337 Pond H-7 Construction

Ongoing Designs and Plans: Stormwater Conveyance Improvements

- Plumtree Branch
  - Final Design
    - D-1175 Greenway Drive 2 Drainage Improvement – 65% Design
  - Preliminary Design
    - D-1175 Michaels Way Drainage Improvement Project
    - D-1175 Valley Mede Culvert Replacements
    - D-1175 Paulskirk Drive Drainage Improvements
    - D-1175 North Chatham Culvert and Channel Design
  - FY20 Design
    - D-1175 Greenway/Hearthstone/Brookmede Drainage Improvement Project
    - Additional projects derived from ongoing studies, pending funding

Ongoing Designs and Plans: Stormwater Conveyance Improvements

- Tiber Branch
  - Final Design
    - D-1165 Rogers Avenue Drainage Improvements
    - D-1165 8600 Main Street Culvert Improvements
  - Preliminary Design
    - D-1165 Church/Emory/Old Columbia Pike Drainage Improvements
  - FY20 Design
    - C-0337 Maryland Avenue Culverts
    - C-0337 8520 Main Street Culvert Improvements
    - C-0337 8780 Main Street Culvert Improvements

Ongoing Designs and Plans: Flood Mitigation

- EC Safe and Sound Flood Mitigation Assistance Pilot Program
  - 40 applications received by 3/29/2019
  - Review committee included DPW, DPZ and Department of Inspections, Licenses and Permits (DILP)
  - Awards letters mailed out on 4/26/2019
  - Final award amounts dependent on work being completed and owners providing additional information on costs

Task 3

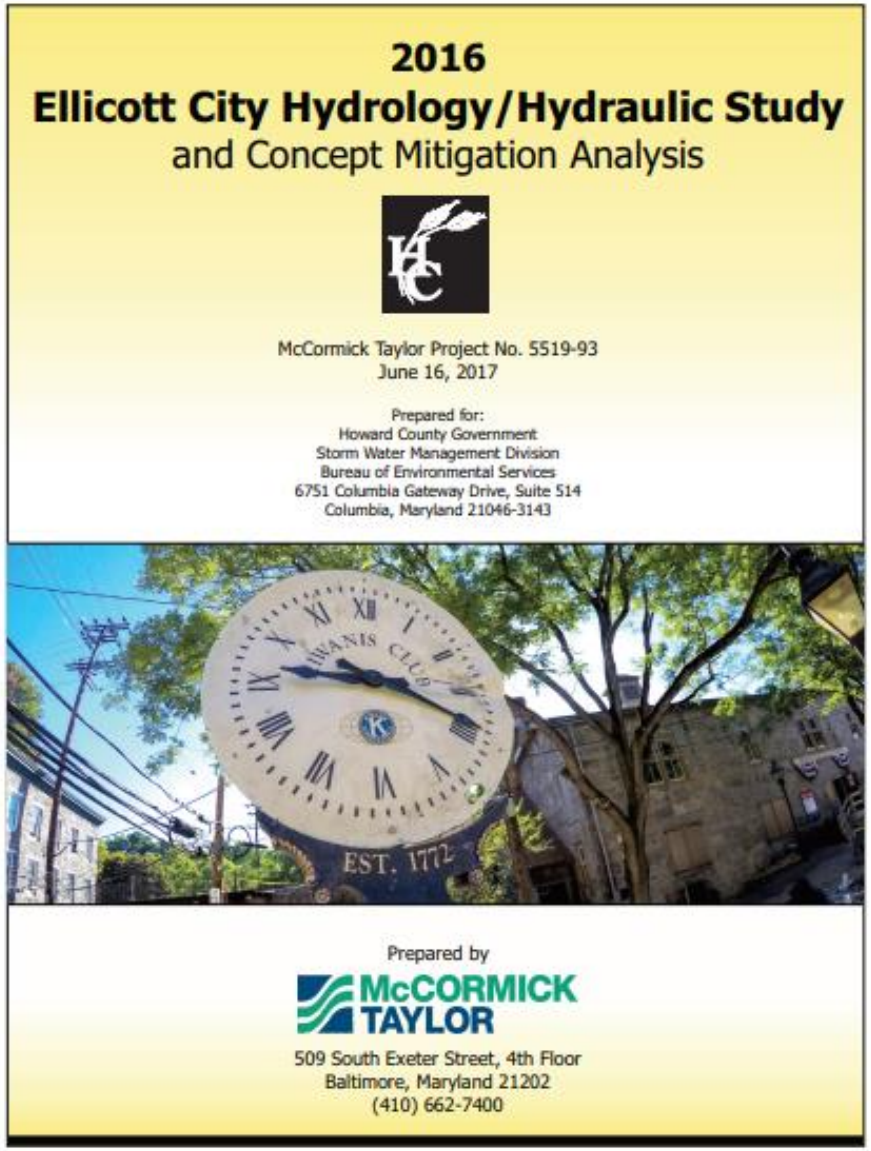
ANALYSIS OF THE FLOODING IMPACT OF EXISTING OR PROPOSED DEVELOPMENT OR REDEVELOPMENT

Existing Development

- Stormwater management requirements have changed over time in response to changing state and county regulations
- Existing developments were built in different eras, and therefore manage stormwater differently

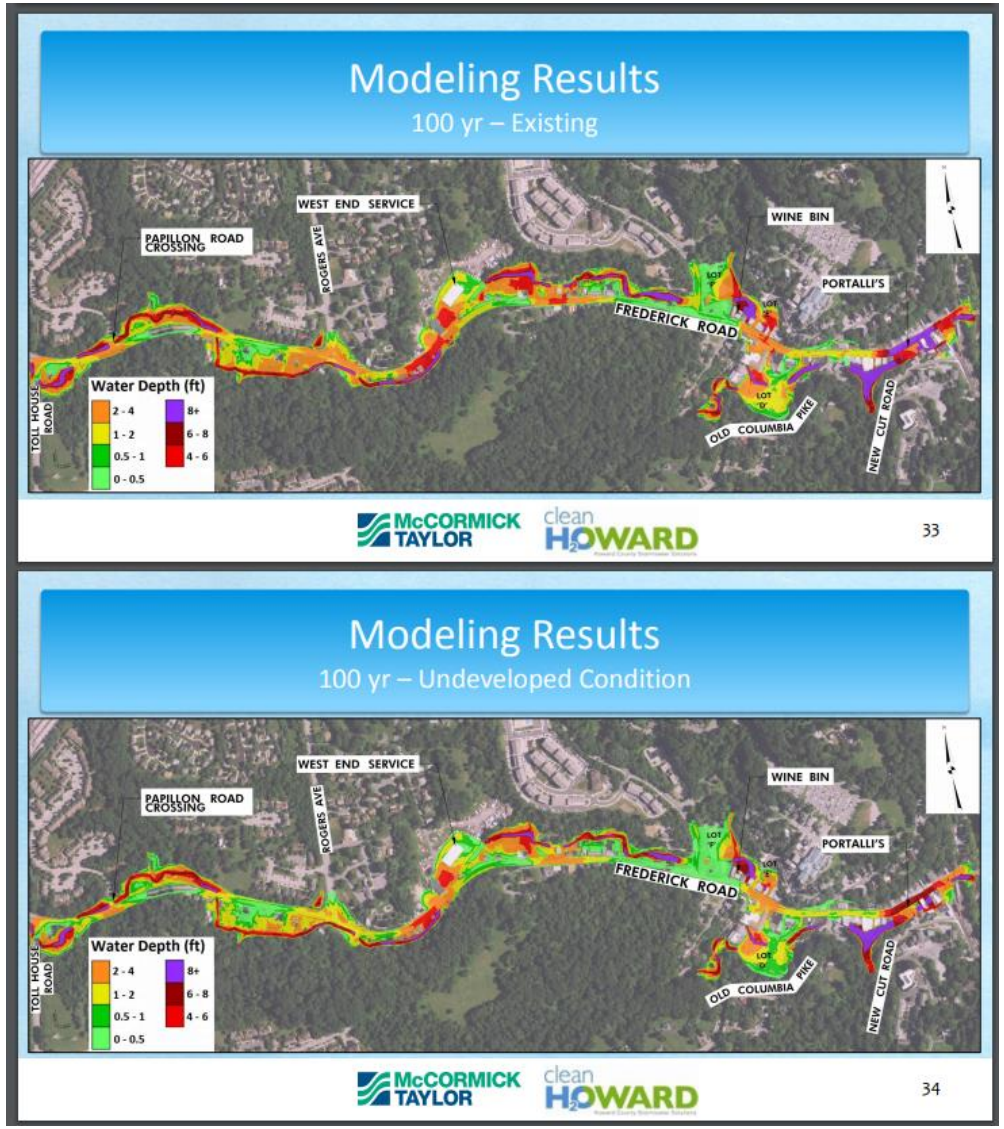
Findings from Prior and Ongoing Studies

- Ellicott City Hydrology & Hydraulic Study (McCormick Taylor, 2017)
  - Modeled an 'undeveloped' scenario where Main Street remained intact (with its lack of a natural floodplain and buildings over streams) but the remainder of the Tiber-Hudson watershed was wooded



Findings from Prior and Ongoing Studies

- Ellicott City Hydrology & Hydraulic Study (McCormick Taylor, 2017)
  - Under the 'undeveloped' scenario, peak flows would be reduced compared to existing conditions.
  - Yet, flooding would still occur in Ellicott City – for example, in a 100-year storm event, the modeled water surface elevation along lower Main Street would be 6-8 feet in the 'undeveloped' scenario vs. 8+ feet under existing conditions.



Findings from Prior and Ongoing Studies

- Ellicott City Hydrology & Hydraulic Study (McCormick Taylor, 2017)
  - The 'undeveloped' scenario was compared to the existing conditions scenario in different storm events.
  - As storm events become larger, the existing and undeveloped discharges become closer.

Table 2.9 – Undeveloped "Woods in Good Condition" Discharges compared to the Existing Conditions Discharges

	Return Period (yr)	Existing Conditions Discharge (cfs)	Woods In Good Condition Discharge (cfs)	% Difference (cfs)
Hudson Branch	10-yr	1203	629	-48%
	25-yr	1768	1064	-40%
	50-yr	2313	1507	-35%
	100-yr	2907	2075	-29%
Tiber Branch	10-yr	497	290	-42%
	25-yr	734	467	-36%
	50-yr	905	638	-30%
	100-yr	1078	842	-22%
New Cut Branch	10-yr	1640	1048	-36%
	25-yr	2330	1657	-29%
	50-yr	2988	2255	-25%
	100-yr	3581	2964	-17%

McCORMICK TAYLOR

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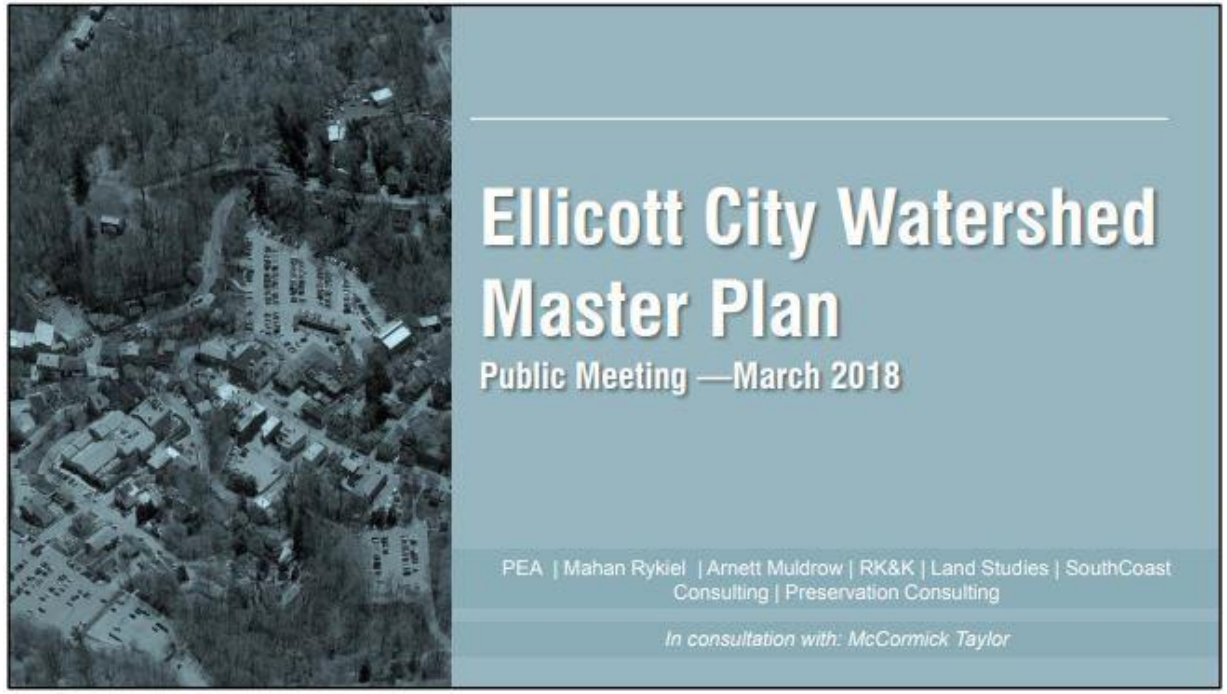
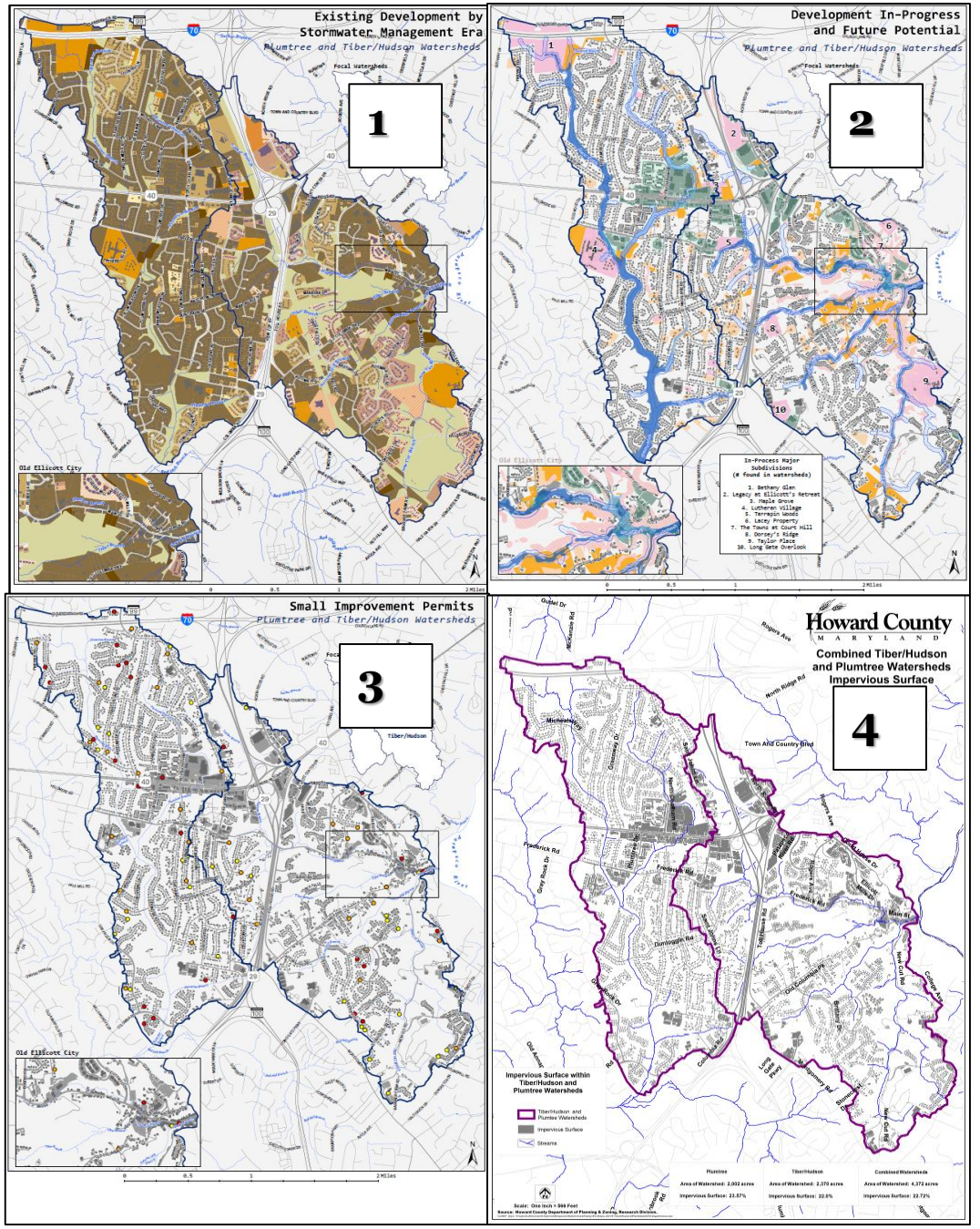
Findings from Prior and Ongoing Studies

- Ellicott City Master Plan – Concepts Presentation (Mahan Rykiel, 2018)
  - Development in the watershed is not the sole or primary source of flooding in historic Ellicott City.
    - Watershed characteristics of shallow granite bedrock and steep terrain minimize effects of land use on runoff during heavy storm events.
    - Historic core established over confluence of multiple streams (in a steep setting with shallow bedrock).
  - Impact of development depends upon the stormwater management requirements at the time of construction.



Mapping Analysis

- DPZ analyzed
  1. Existing development by stormwater management era
  2. Development in-progress and land with future potential
  3. Trends in small-scale impervious improvements
  4. Impervious surface



Findings from the Mapping Analysis

- Out of **developed** lands (excluding right of ways and open space), majority of each watershed built prior to any SWM requirements (<1984)

Acres of Watershed by SWM Era – Developed Lands Only				
SWM Era	Plumtree		Tiber/Hudson	
	Developed Acreage	% of Total Developed Acreage	Developed Acreage	% of Total Developed Acreage
1984 and Earlier (No SWM)	1,143	81%	726	54%
1985 to 2002 (2- and 10-year)	223	16%	391	29%
2002 to 2010 (Large bioretention)	28	2%	148	11%
2010 and Later (ESD)	21	1%	82	6%
Total Developed Watershed Acres*	**1,415**		**1,347**	

**Excludes developments in-progress, completely undeveloped lands (no existing improvements), open space/parks/easements (undated), and right of ways (undated)*

Findings from the Mapping Analysis

- Beginning in the 1990s, Tiber-Hudson developments have been subject to a special requirement:

Tiber-Hudson Special Requirement – Developed Lands Only		
	Developed Acreage	% of Total Developed Acreage
1990 to Present (10- and 100-year)	465	35%
Total Developed Watershed Acres*	**1,347**	

**Excludes developments in-progress, completely undeveloped lands (no existing improvements), open space/parks/easements (undated), and right of ways (undated)*

Findings from the Mapping Analysis

- Out of **the entire watershed** acreage:
  - Open space = 7% in Plumtree vs. 21% in Tiber-Hudson
  - Right of ways = 14% in Plumtree vs. 16% in Tiber-Hudson

Watershed Acreage by Category				
Category	Plumtree		Tiber/Hudson	
	Acreage	% of Total	Acreage	% of Total
Developed lands	1,415	71%	1,347	57%
Undeveloped lands (no existing improvements)	38	2%	29	1%
In-Progress lands	128	6%	119	5%
Open Space, Parks and Easements	145	7%	505	21%
Right of Ways	276	14%	370	16%
Total Watershed Acres	**2,002**		**2,370**	
Tiber/Hudson 1990 to Present (100-year)			*465*	*20%*

Findings from the Mapping Analysis

- Proportionately, **developable land** is limited in both watersheds:
  - Plumtree acreage*:
    - 6% in-progress (128 acres);
    - 3% undeveloped or land with subdivision capacity (62 acres)
  - Tiber-Hudson acreage*:
    - 5% in-progress (119 acres);
    - 5% undeveloped or land with subdivision capacity (123 acres)

  **Acreage does not net out unbuildable lands such as steep slopes, floodplains, stream buffers*

- Plumtree is more developed than Tiber-Hudson
  - Impervious cover = 23.57% in Plumtree vs. 22% in Tiber-Hudson
  - Open space acreage = 7% in Plumtree vs. 21% in Tiber-Hudson

Key Takeaways from Task 3

- Impact of existing development depends upon SWM requirements at time of construction
- Though Plumtree is relatively more developed, flood impacts are worse in Tiber-Hudson than Plumtree
  - Geologic conditions – shallow bedrock, steep slopes and confluence of multiple tributaries – combined with location of buildings within floodplain (directly above or adjacent to streams) contribute to flood impacts in Ellicott City
  - Geologic conditions minimize the effects of land use on runoff during **high-intensity, short-duration** flash flood events
- Ellicott City would still experience significant flooding even if the remainder of the Tiber-Hudson watershed were wooded
- Impact of planned or future development will depend upon new SWM requirements enacted – and changes are recommended in Task 4

Task 4

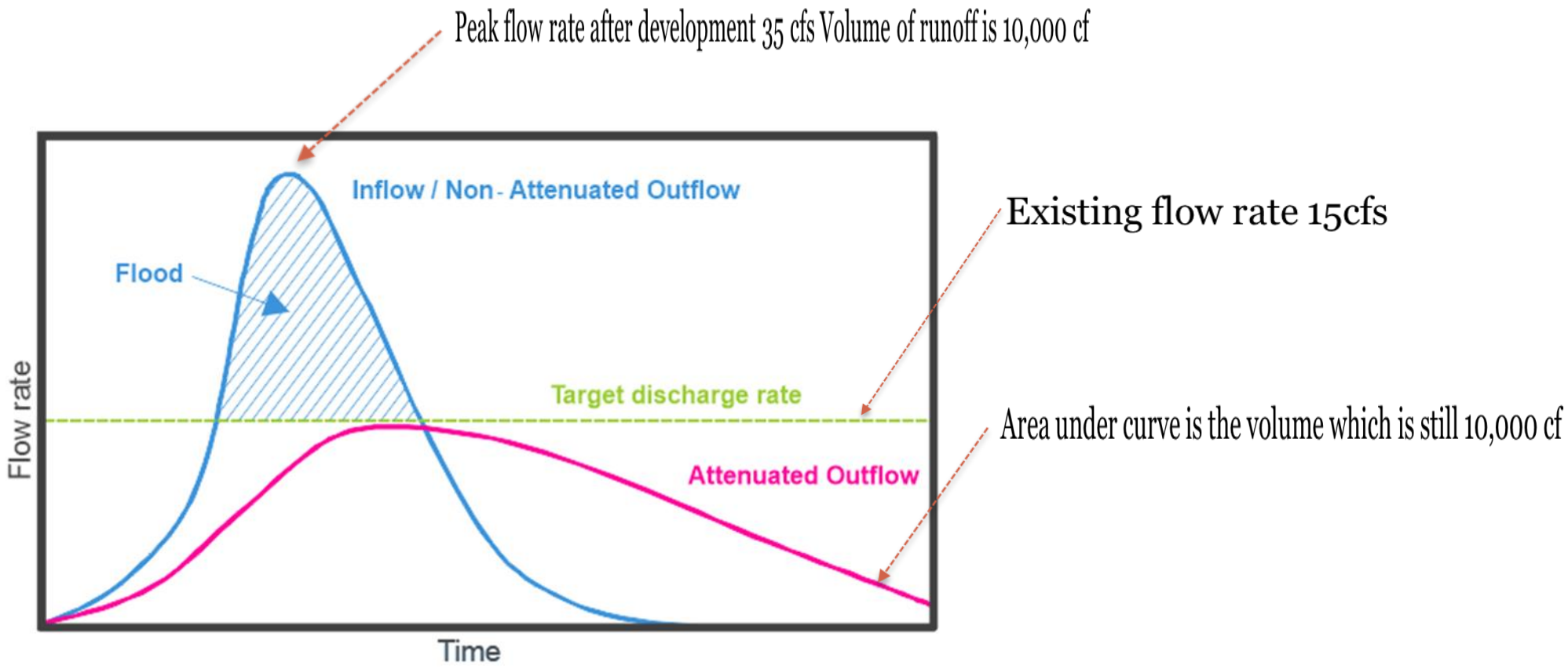
RECOMMENDED CHANGES TO STORMWATER MANAGEMENT REGULATIONS

Management Goals

- Stormwater management genesis in Maryland
- In 1972 Hurricane Agnes dropped over 7” of rain on Maryland over multiple days
- Consideration for quantity management began. Requirements delegated by the State. Storm events considered as events lasting 24-hours

Pond Function

- Attenuation of Peak flows back to a planned flow rate.



Pond Management Summary

- Ponds are designed to reduce peak discharge from a design storm to match a predeveloped peak flow
- Ponds can match peak flows from multiple design storms
- Ponds do not reduce the volume of runoff. Ponds delay and slow down release of the runoff

Example: “If a pond manages the 100-year event, the developed, peak discharge rate will be equal to the discharge rate before development occurred.”

Defining a Storm "Event"

- Storm events are measured as a statistical probability of rainfall in inches over a period of time. Time can vary between 5 minute events to multiple day events. Current State design standard are for 24-hour events:

- Current county wide requirement is Environmental Site Design (ESD)- Attenuation of the developed peak discharge rate for the statistical 1-year storm (2.64" rainfall over 24-hour) to equal the same discharge rate as if the site was in a wooded condition. Components of management include a recharge volume to recharge the groundwater, water quality volume for the first 1" of runoff, and attenuating the remainder of the statistical 1-year event, a quantity volume.

1-year = 2.64" over 24 hours (1 chance in 1, or 100%)*
10-year = 4.91" over 24 hours (1 chance in 10, or 10%)*
100-year = 8.51" over 24 hours (1 chance in 100, or 1%)*

*Probability of occurrence in any given year

Current Peak Management Requirements For New and Redevelopment

- **Tiber Watershed** – ESD (Environmental Site Design) management of the 1-year, 10-year event, and 100-year event

- **Plumtree** - ESD (Environmental Site Design) management of the 1-year event

Redevelopment: management for the first inch of runoff for 50% of proposed disturbed area.

Types of Development

- Legislation will include all types of potential development within the two watersheds:
  - Major Subdivision
  - Minor Subdivision of four lots or less
  - Single Lot Site Development Plans including infill development
  - Non-Residential
  - Redevelopment (most sites have no management)
  - Improvements less than 5,000 sf not part of Subdivision process

Recommended Changes to Requirements

- Expand the current management program to incorporate the short duration/high intensity storm “Flash Flood” and the long duration flood event within both Tiber Branch and the Plumtree.

- Both storms of 2016 and 2018 had similar characteristics of high intensity and a short duration “Flash Flood”
  - July 30, 2016 event with 6.6” in 3.55 hours
  - May 27, 2018 event with 6.4” in 3.0 hours

Recommended Changes to Requirements

- With the remaining land left to be developed or redeveloped, propose managing a high intensity/short duration event in both watersheds.
  - 6.6” in 3.55 hours (July 30, 2016 event)
    - Equivalent probability exceeds the NOAA Atlas 1,000-year event for Ellicott City
  - Add the 10 and 100 year, 24-hour event to the Plumtree watershed.
  - All storm events would utilize standard, reproducible storm models
- Redevelopment projects would manage all mentioned design storms for the proposed development area
- Revise drainage conveyance requirements for new development to convey the higher intensity events to management facilities

Evaluating Management Hierarchy

Based on the type of development, limitations may exist that prevent the larger management requirements. These limitations may include the size of the project, topography, soil types, bedrock, and groundwater. For these reasons, implementation of the larger storm management should be based on a prioritization to obtain the most management possible, while allowing for other options to accomplish full management for the development within the watershed.

Ordered prioritization of management options:

1. Provide full management onsite.
2. Provide onsite management to the "maximum extent practicable", with balance of management provided offsite within the same watershed.
3. Provide onsite management to the "maximum extent practicable", pay fee in lieu to a Public Works flood mitigation project for balance of management.
4. Provide management to the "maximum extent practicable", pay a fee into an established stormwater bank for the balance of the required management.

Task 5

ANALYSIS OF PUBLIC AND PRIVATE OPTIONS FOR RETROFITTING EXISTING PUBLIC AND PRIVATE PROPERTY

Stormwater Management Retrofit Studies

- **From Task 3:** the majority of each watershed was developed prior to any SWM (prior to 1984) = 57% Plumtree; 31% Tiber-Hudson

- **Plumtree Branch Watershed and Tiber Branch Watershed Stormwater Management Retrofit Studies**
  - Evaluations of:
    - Existing stormwater infrastructure
      - (inlets, pipes, manholes, outlets, swales)
    - Opportunities for improved stormwater infrastructure and management
    - Opportunities for water quality improvement

Stormwater Management Retrofit Studies

- Homeowner Surveys
  - Postcards were mailed to all addresses in the watersheds, informing them of the studies and directing them to the Howard County DPW Stormwater Management Division website
  - 24-question survey available on website
    - Plumtree Branch Watershed – 94 responses
    - Tiber Branch Watershed – 35 responses
    - Drainage issue type, location, source and frequency
      - Frequent ponded water <6" mostly coming from private property
      - Issues predate the extremely wet period between May and October 2018
    - Opinions on ideal drainage conditions on their property and their idea of aesthetic and functional stormwater management practices – preferences for:
      - No visible ponding, stormwater flowing straight to street or stream, rain gardens over other types of SWM features

Stormwater Management Retrofit Studies

- Detailed field survey completed December 2018-March 2019
  - Review of complaint and problem locations from SWMD database & online surveys
  - Analysis of inlets, outlets, manholes, pipes, swales
    - 6,515 stormwater infrastructure assets evaluated
      - 3,562 assets already existing in GIS inventory
      - 2,953 new assets added (45%)
        - 38% of Plumtree's assets are new
        - 51% of Tiber's assets are new
      - Maintenance or repair items identified
        - Coordination with Bureau of Highways (BOH) ongoing

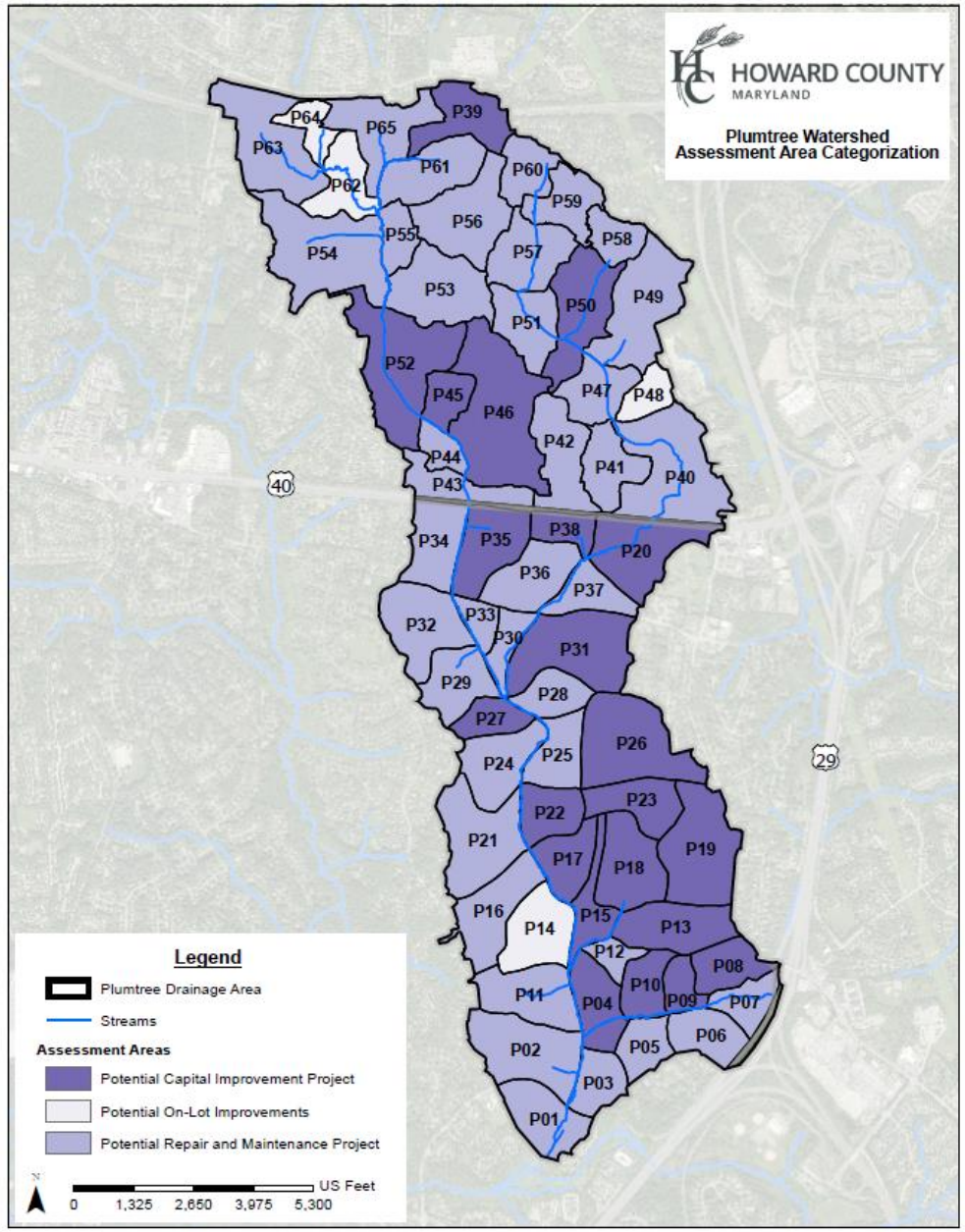
Stormwater Management Retrofit Studies

- Watersheds were divided into assessment areas for improved stormwater infrastructure and management and water quality opportunities
  - Plumtree Branch - 65 areas identified
  - Tiber Branch - 67 areas identified
- Assessment areas were categorized based on issues identified
  - Potential Capital Improvement Projects
  - Potential Repair and Maintenance Projects
  - Potential On-Lot Improvements

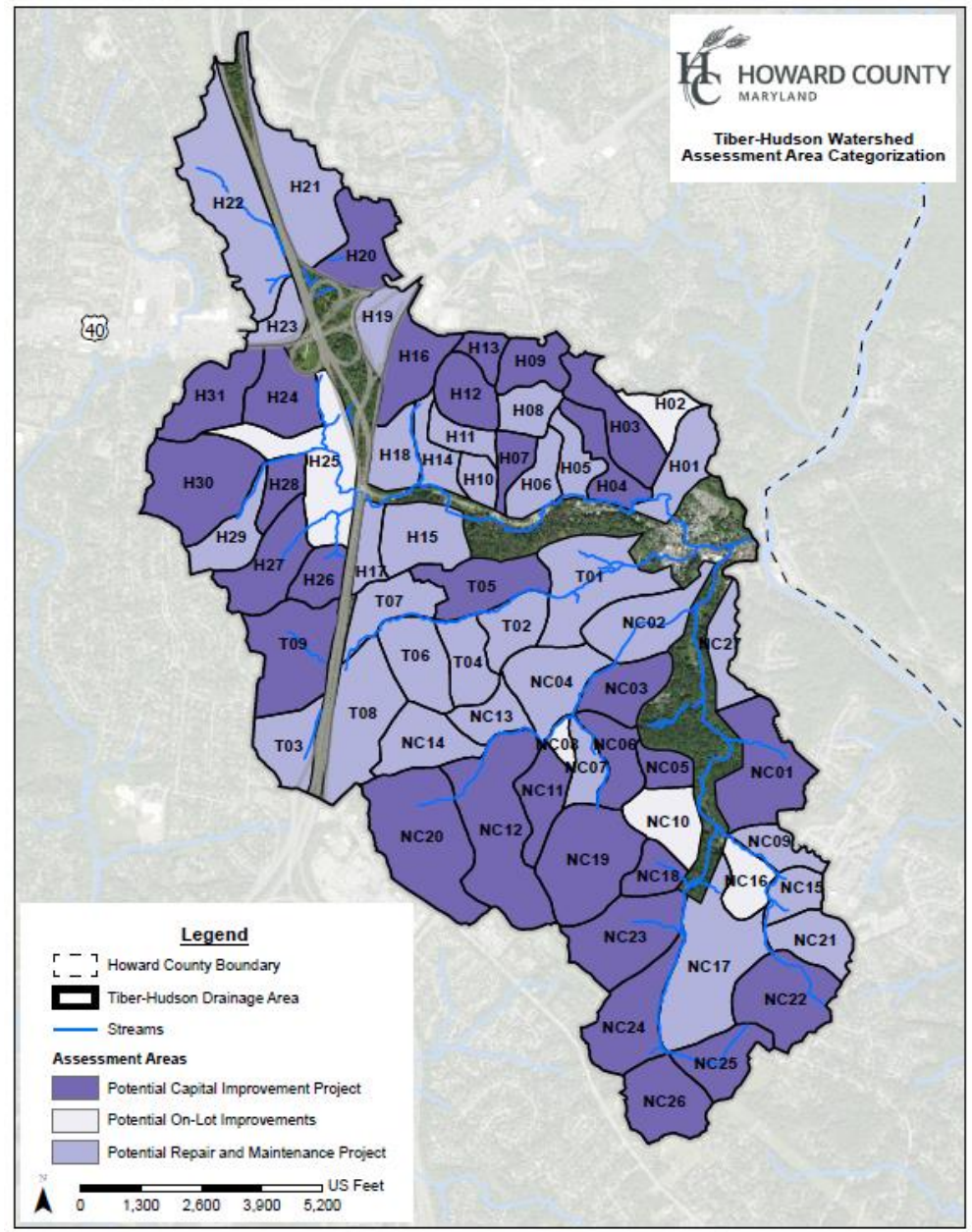
Stormwater Management Retrofit Studies

Categories for water quality opportunities and improved stormwater infrastructure and management		
Category	Plumtree	Tiber/Hudson
Potential Capital Improvement Projects *(projects including additional SWM storage)*	22 *(1)*	30 *(7)*
Potential Repair and Maintenance Projects	39	32
Potential On-Lot Improvements	4	5
Totals	**65**	**67**

Plumtree Branch



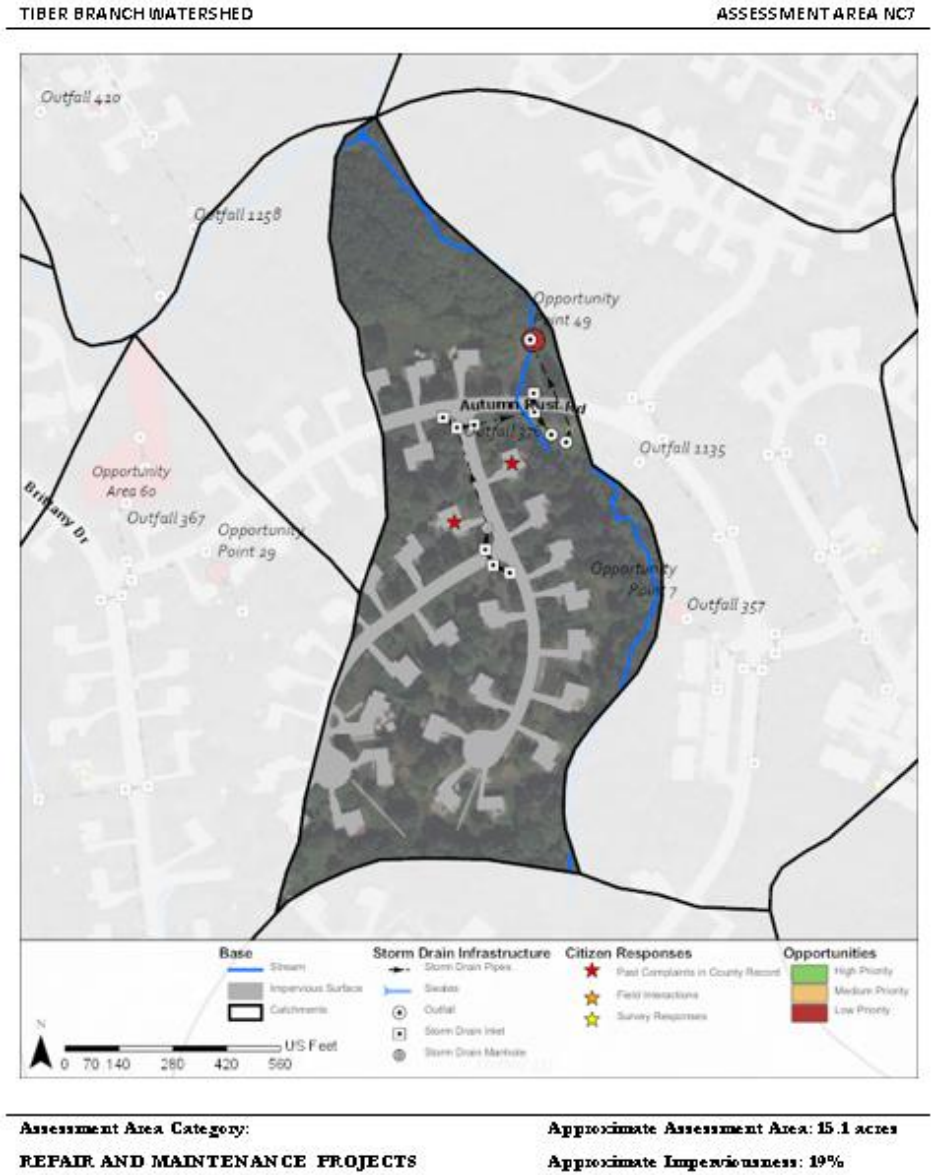
Tiber Branch



Example Potential Capital Improvement Project

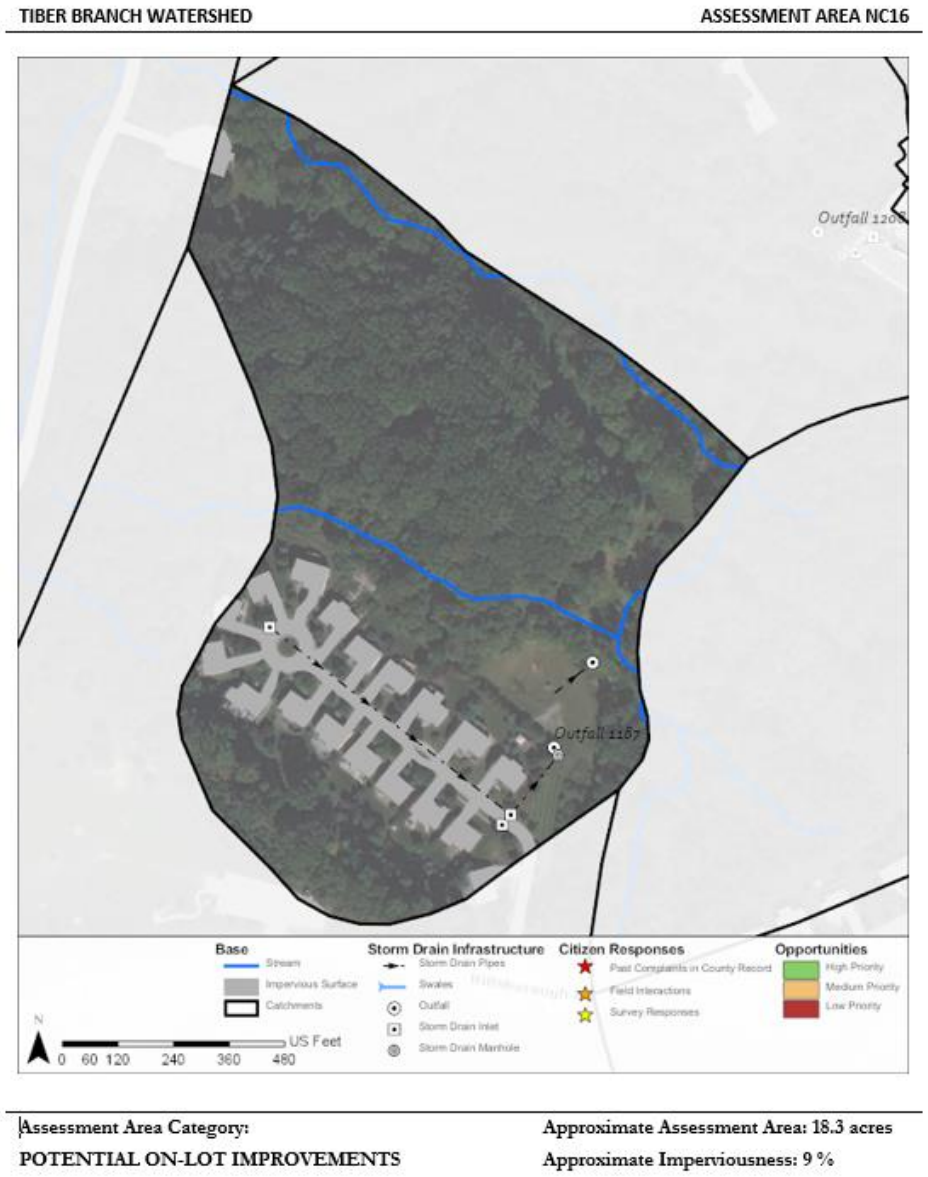
- Improve conveyance to prevent roadway flooding
  - add new storm drain system
  - improve existing inlets and storm drains

Example Potential Repair and Maintenance Project



- Perform maintenance to prevent roadway flooding
  - repair damaged inlet and outlet
  - remove leaves and debris from storm drain system

Example Potential On-Lot Improvement



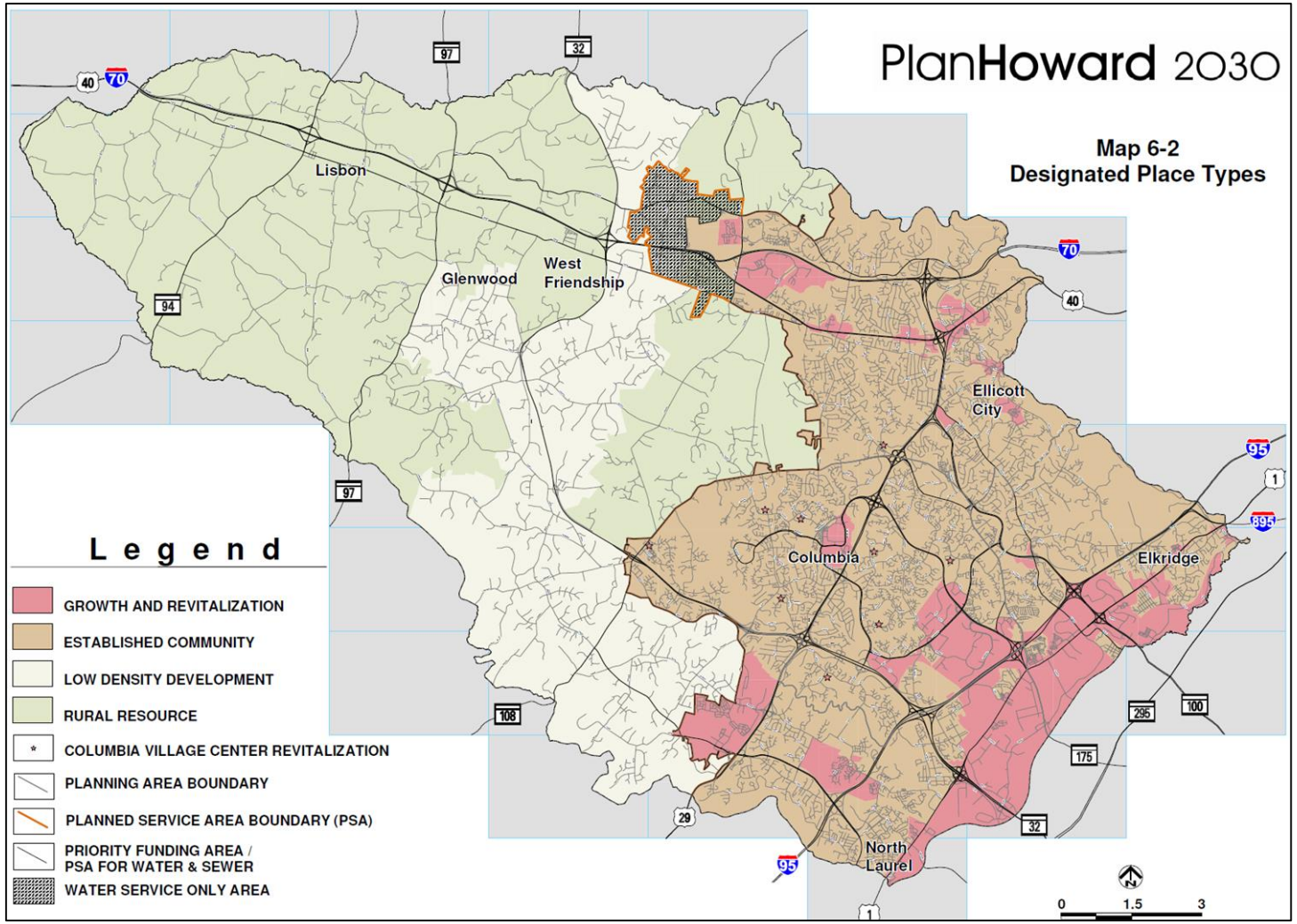
- Homeowners can install rain gardens or landscaped features and drains to improve drainage on their properties

Task 6

ANALYSIS OF POTENTIAL CHANGES TO GENERAL PLAN, DENSITY, AND OPEN SPACE ZONING

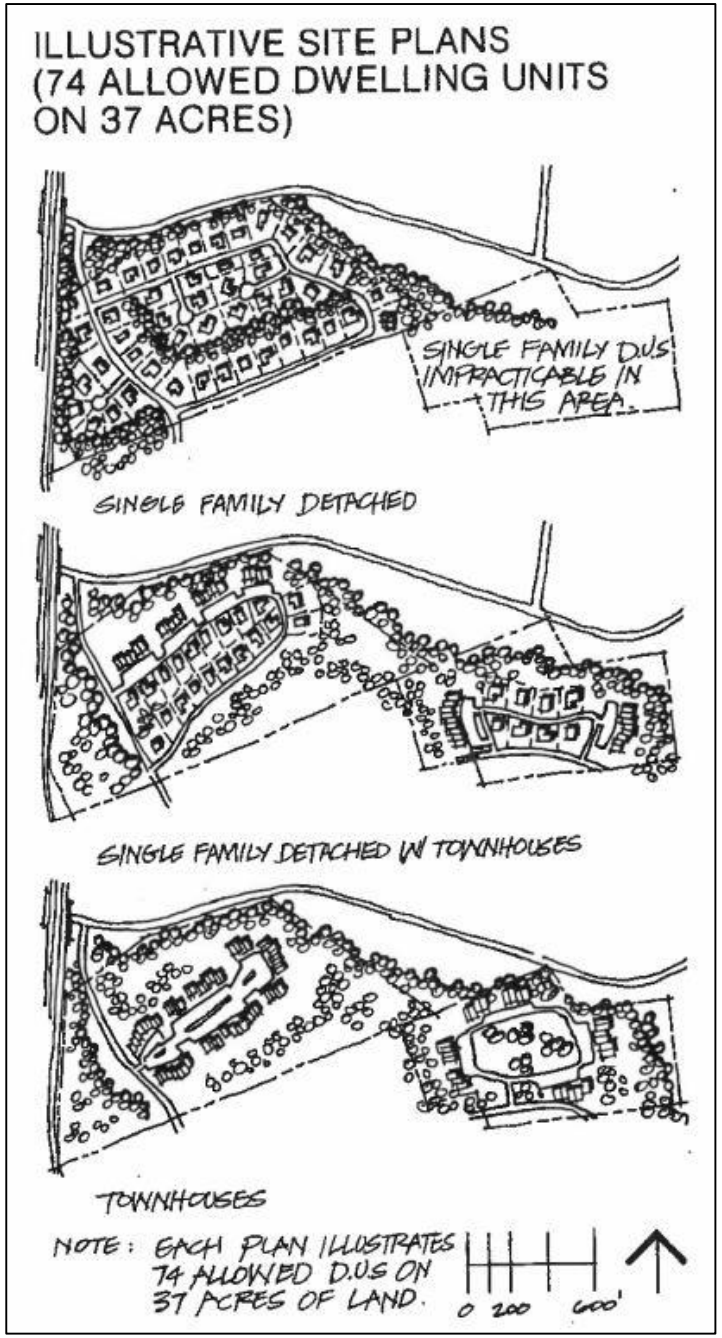
General Plan (2012)

- PlanHoward 2030 created designated place types – including growth and revitalization areas, and established communities
- Existing plan does not preclude changes to stormwater requirements proposed to address high-intensity short-duration storms



Density and Water Resources

- Howard County has a conservation development zone:
  - Residential – Environmental Development (R-ED) traces origins to post-Agnes planning
  - 1977 “New Life for an Old Town” summary planning report for Ellicott City described a land management program where conservation development could consume less land while achieving same density

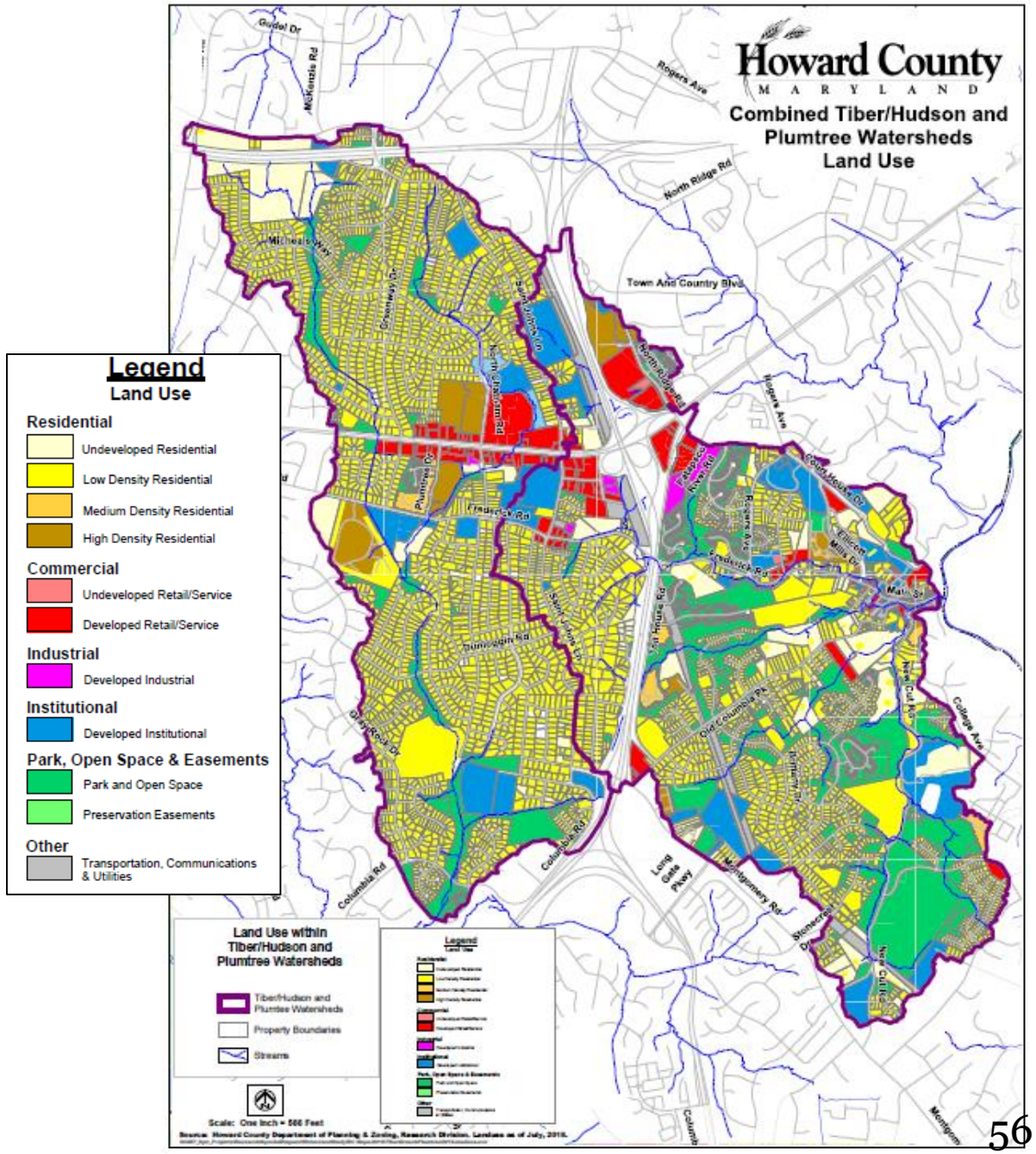


Density and Water Resources

- R-ED Purpose Statement:
  - The R-ED District is established to accommodate residential development at a density of two dwelling units per net acre in areas with a **high proportion of sensitive environmental** and/or historic resources.
  - Protection of environmental and historic resources is to be achieved by **minimizing the amount of site disturbance** and directing development to the most appropriate areas of the site, **away from sensitive resources**.
  - To accomplish this, the regulations allow **site planning flexibility** and require that development proposals be evaluated in terms of their effectiveness in minimizing alteration of existing topography, vegetation and the landscape setting of historic structures

Land Use

- Plumtree:
  - Low-density residential is the dominant land use
- Tiber-Hudson:
  - Low-density residential is the dominant land use; park and open space more prevalent than in Plumtree (linked in part to R-ED zone)



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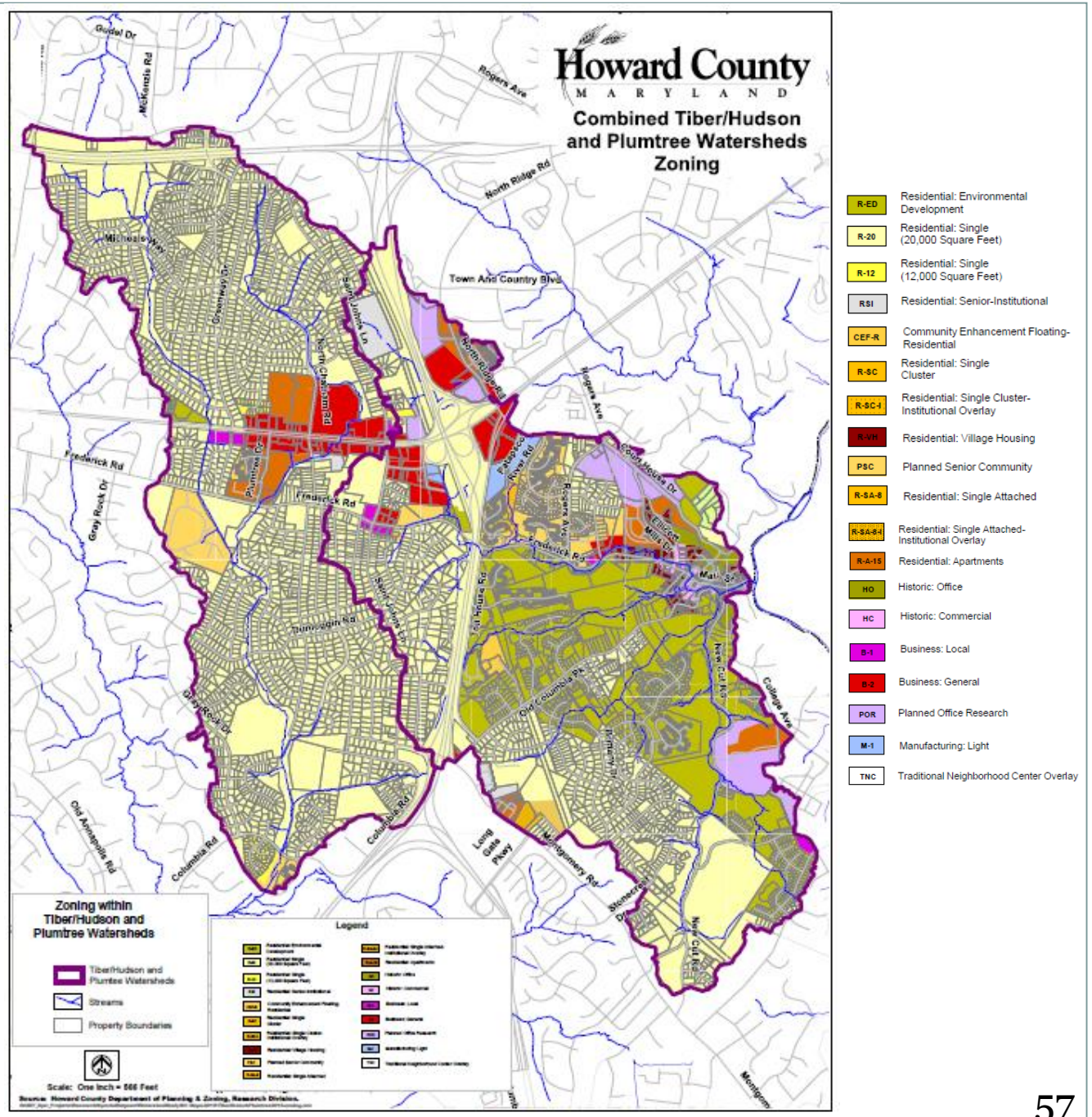
Zoning

- Plumtree:
  - R-20 is the dominant zone (single-family detached on 20,000 square-foot lots)
- Tiber-Hudson:
  - R-ED and R-20 are the dominant zones
  - R-ED accommodates single-family detached and attached at 2 dwelling units per net acre



Open Space Zoning

- R-ED zone requires 50 percent minimum open space
- R-20 zone requires 6 percent minimum open space when all lots are 20,000 square feet or greater
  - When optional smaller minimum lot sizes are applied in the R-20 zone, higher open space percentages are required

Zoning District		Minimum Open Space
RC, RR:	Agricultural Preservation Subdivisions	None
	Cluster, DEO or CEO Subdivisions	None
	Non-Cluster Subdivisions	Fee-in-lieu
R-ED		50 percent
R-20:*	All lots 20,000 square feet or greater	6 percent
	Developments using optional lot size:**	
	Min. Lot size 18,000 square feet	10 percent
	Min. Lot size 16,000 square feet	20 percent
	Min. Lot size 14,000 square feet	30 percent
	Min. Lot size 12,000 square feet	40 percent
R-12:*	All lots 12,000 square feet or greater	8 percent
	Developments using optional lot size:*	
	Min. Lot size 10,800 square feet	10 percent
	Min. Lot size 9,600 square feet	20 percent
	Min. Lot size 8,400 square feet	30 percent
	Min. Lot size 7,200 square feet	40 percent
R-SC		25 percent
R-SA-8		25 percent
R-A-15		25 percent
RMH		25 percent
PEC, NT, MXD, PGCC, PSC: As provided in Zoning Regulations		

Zoning and Water Resources

- Howard County's current regulations and practices include:
  - Floodplain regulations – no development in 100-year floodplain
  - Steep slope regulations – no development when slopes are 25 percent or greater and over 20,000 square feet of contiguous area
  - Stream buffer regulations – in residential districts, no development within 75 feet (Tiber) of Use I streams or within 100 feet of Use III and IV streams (Plumtree); in non-residential districts, no development within 50 feet of streams
  - Field verification of environmental features
  - CB 80-16 – Prohibits the issuance of waivers to these regulations for properties in Tiber Branch Watershed

Land Use and Zoning Takeaways

- County uses many best practices in zoning and subdivision regulations
- No recommended changes to density or open space zoning
- The proposed changes to stormwater management would:
  - Be implemented through the Storm Drainage Design Manual
  - Apply to all designated place types
  - Apply across all zoning codes
  - Not change requirements for open space

Task 7

ANALYSIS OF CREATING A SPECIAL ASSESSMENT DISTRICT OR OTHER FUNDING MECHANISM

Special Assessment District Analysis

- The existing watershed protection fee provides a point of reference for understanding how a special assessment district might work
- If a new special assessment fee were created using the same rate structure as the existing watershed fee (and in addition to this fee), it could generate ~$298,000 annually in Plumtree and ~$256,000 annually in Tiber-Hudson (based on current fees collected)

Existing Rate Structure – Watershed Protection Fee (annual)	
$15	Townhomes and condominiums
$45	Single family homes on lots of one-quarter acre or less
$90	Single family homes on lots of one-quarter acre or more
$15 per 500 square feet of impervious area on a parcel	Non-residential/commercial properties

Special Benefits District - Considerations

- May require State-enabling legislation
- Could be used as dedicated revenue for ongoing stormwater-related maintenance programs
- Consideration for current Ellicott City CDC exploration committee

Task 8

"Any other matter that may assist the County in identifying and clarifying the various complex factors contributing to and in establishing a comprehensive plan for managing and controlling such factors to the maximum extent practicable to protect public safety, health, and welfare in the Watersheds"

Other Matters

- Private Drainage Easements
  - Establish a program to document all easements in the County's GIS
  - Establish a program to acquire private drainage easements and take over long-term maintenance and operation of storm drain infrastructure
- Capital Project Funding
  - Establish a new Capital Project in FY21 for Dunloggin/Lower Plumtree Branch Watershed drainage improvement projects
  - Continue funding Tiber Branch projects through existing capital projects

Other Matters

- County Floodplain Preservation and Open Space
  - Continue to pursue the purchase of parcels within floodplains to create floodplain preservation areas and County Open Space

- Education
  - Expand on the County's public outreach efforts to educate the public on flash flooding, floodplains, hydric soils, stormwater conveyance and stormwater management

Thank you!

Questions?

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