CSN CLIMATE PROJECT UPDATE

USWG – JANUARY 21, 2020

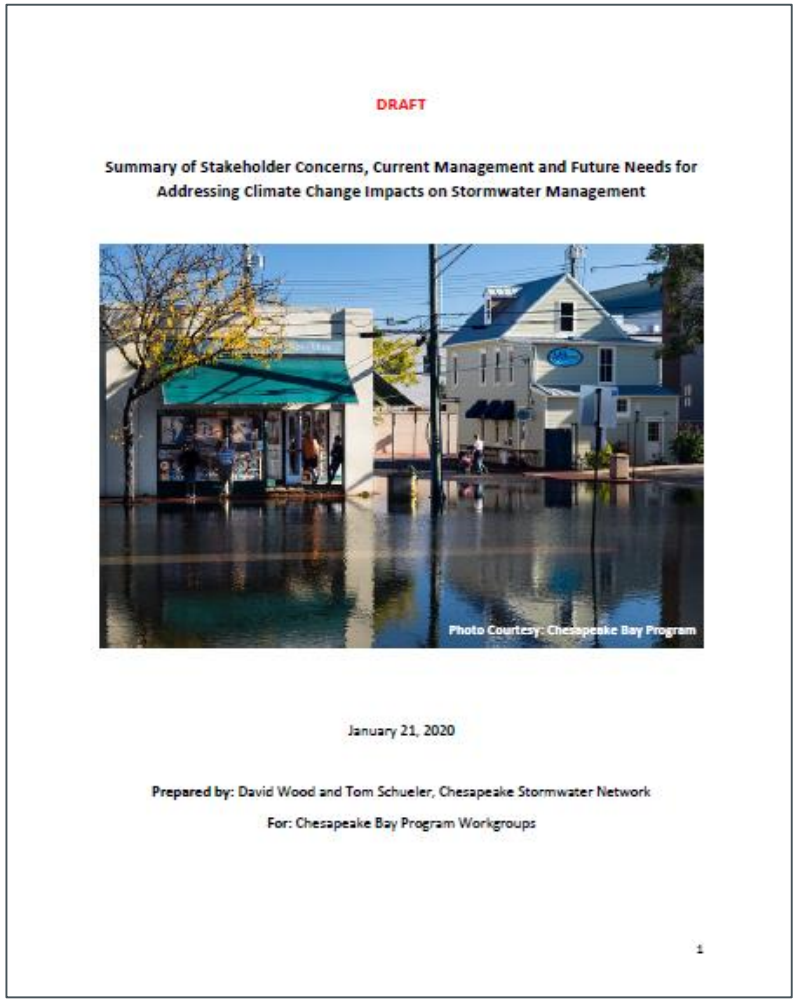
OUTLINE

- Climate Change and Stormwater Survey
- Managing Current and Future Flood Risks in Urban Landscapes
- What's Coming Next

SURVEY RESULTS

DRAFT MEMO

- Summarizes Key Findings
- Overview of Methods and Response Demographics
- Full Survey Results in Appendix B



DRAFT

Summary of Stakeholder Concerns, Current Management and Future Needs for Addressing Climate Change Impacts on Stormwater Management

January 21, 2020

Prepared by: David Wood and Tom Schueler, Chesapeake Stormwater Network

For: Chesapeake Bay Program Workgroups

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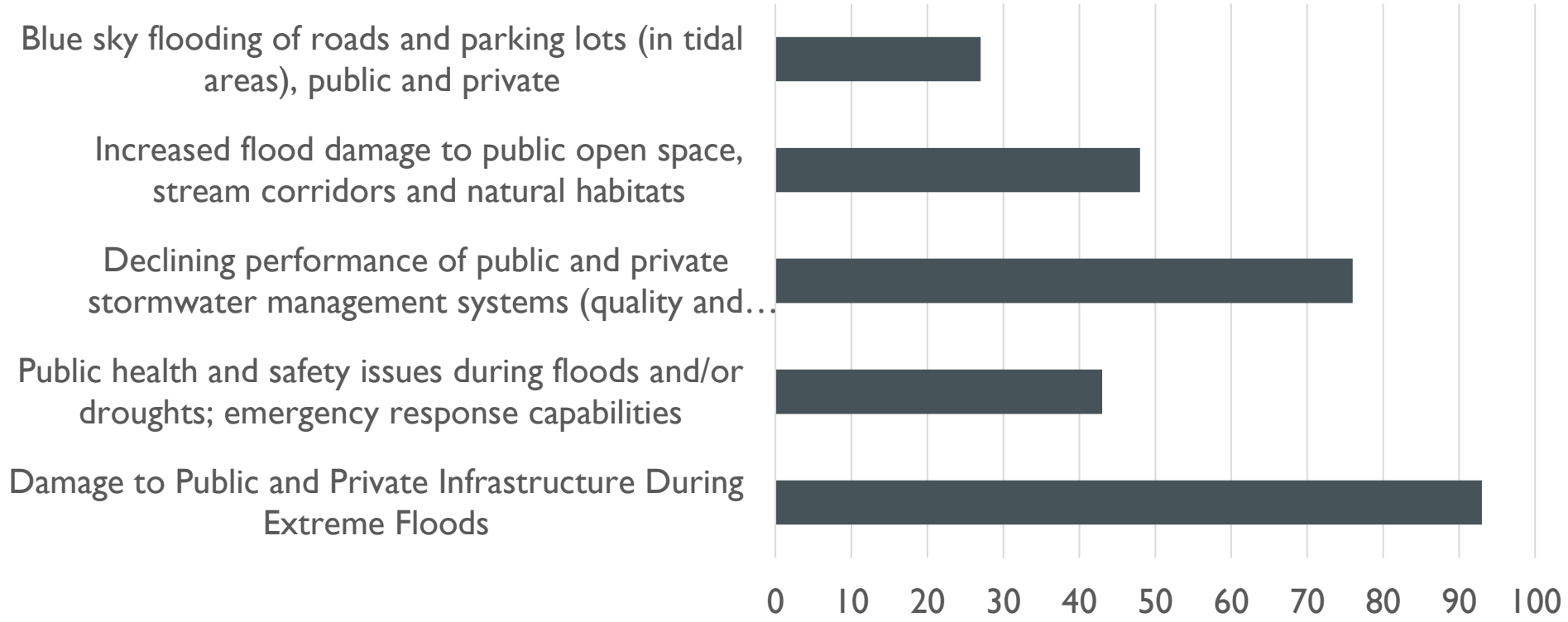
TAKEAWAY 1

- Biggest Concern is damage to public and private infrastructure – particularly roads, bridges and culverts – caused by large storm events



WHAT'S AT RISK?

Public Infrastructure

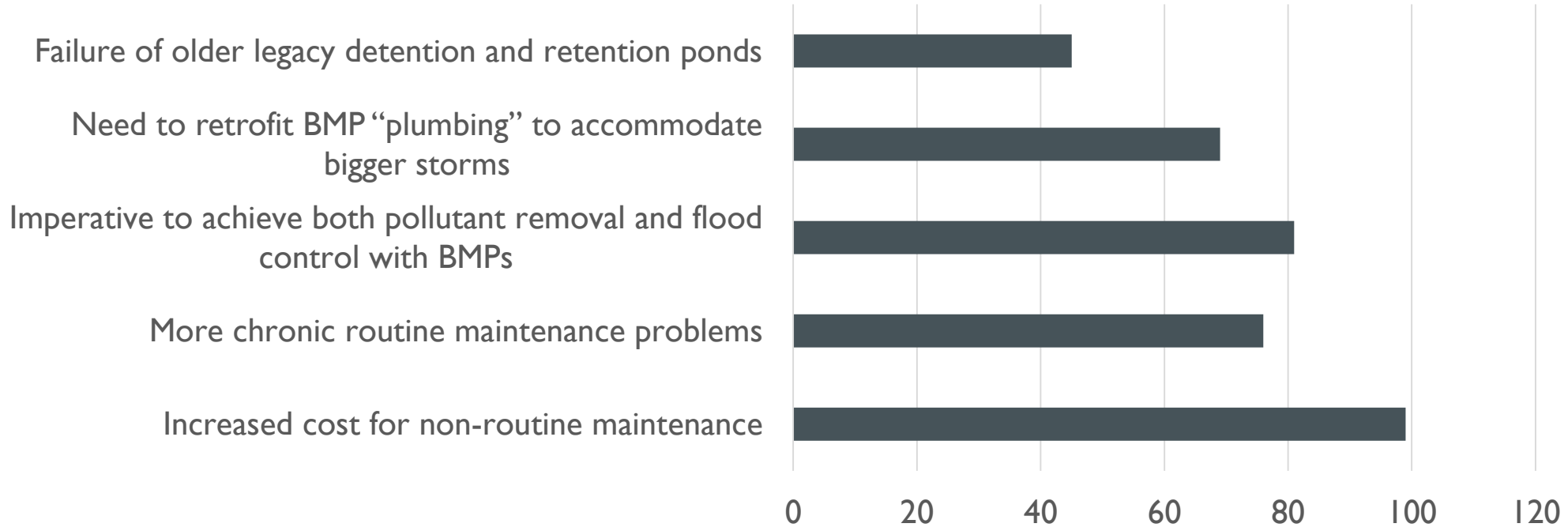
- Sewer pipe network
- Roads, streets and storm drains
- Bridges, culverts and crossings
- Water pipe distribution system
- Dams, embankments and flood control practices
- Public stream restoration projects
- Public stream corridor or waterfront
- Wastewater treatment plants and public works yards (floodplain)

Private Property

- Expansion of 100 year floodplain insurance boundaries
- Residential flood damage
- Shoreline engineering to prevent erosion
- Bank erosion/tree canopy loss
- Failure of privately- owned stormwater systems

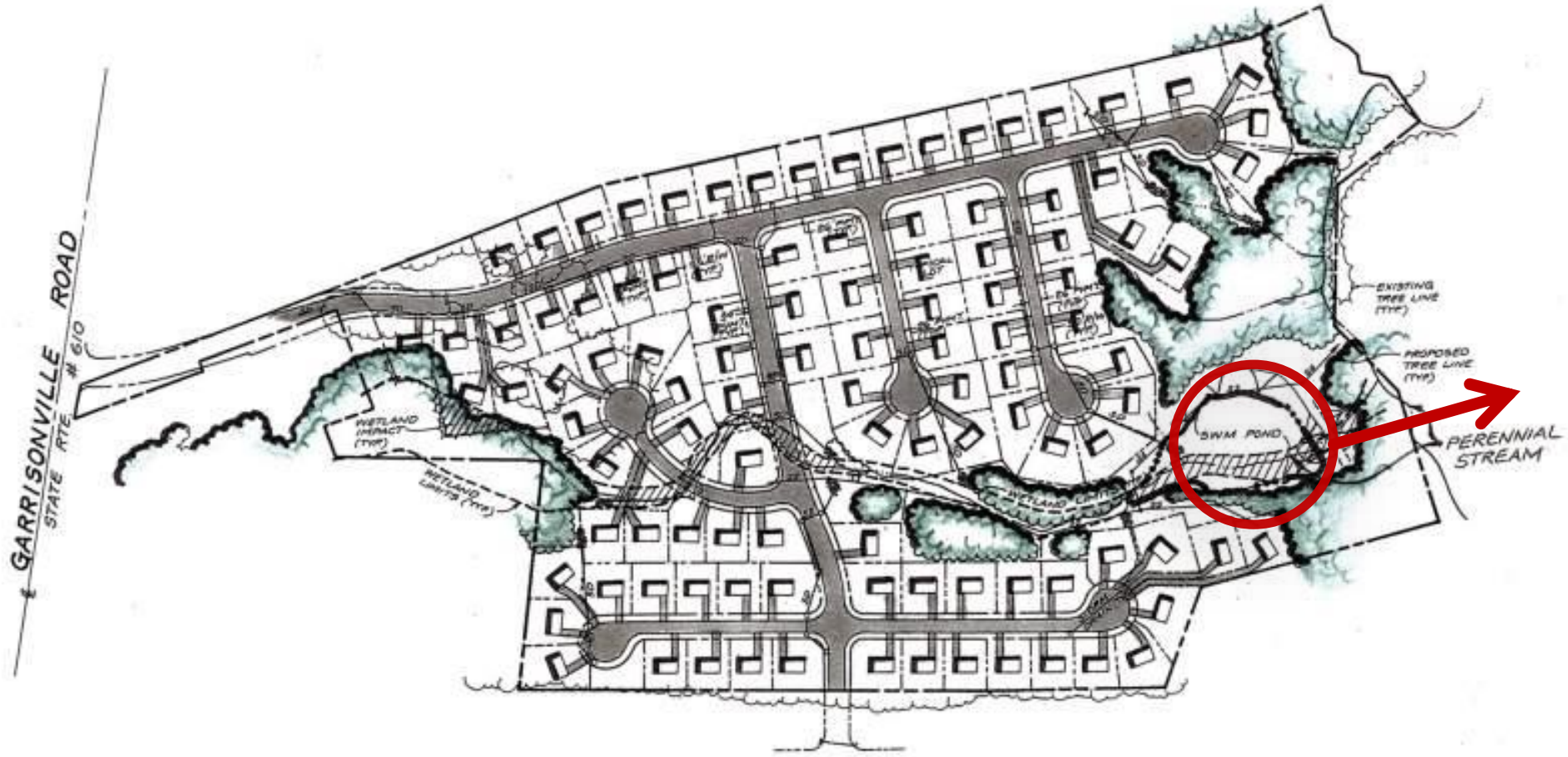
TAKEAWAY 2

- Everyone is concerned with how to pay for the necessary maintenance and upgrades, as well as to plan for future resilience.



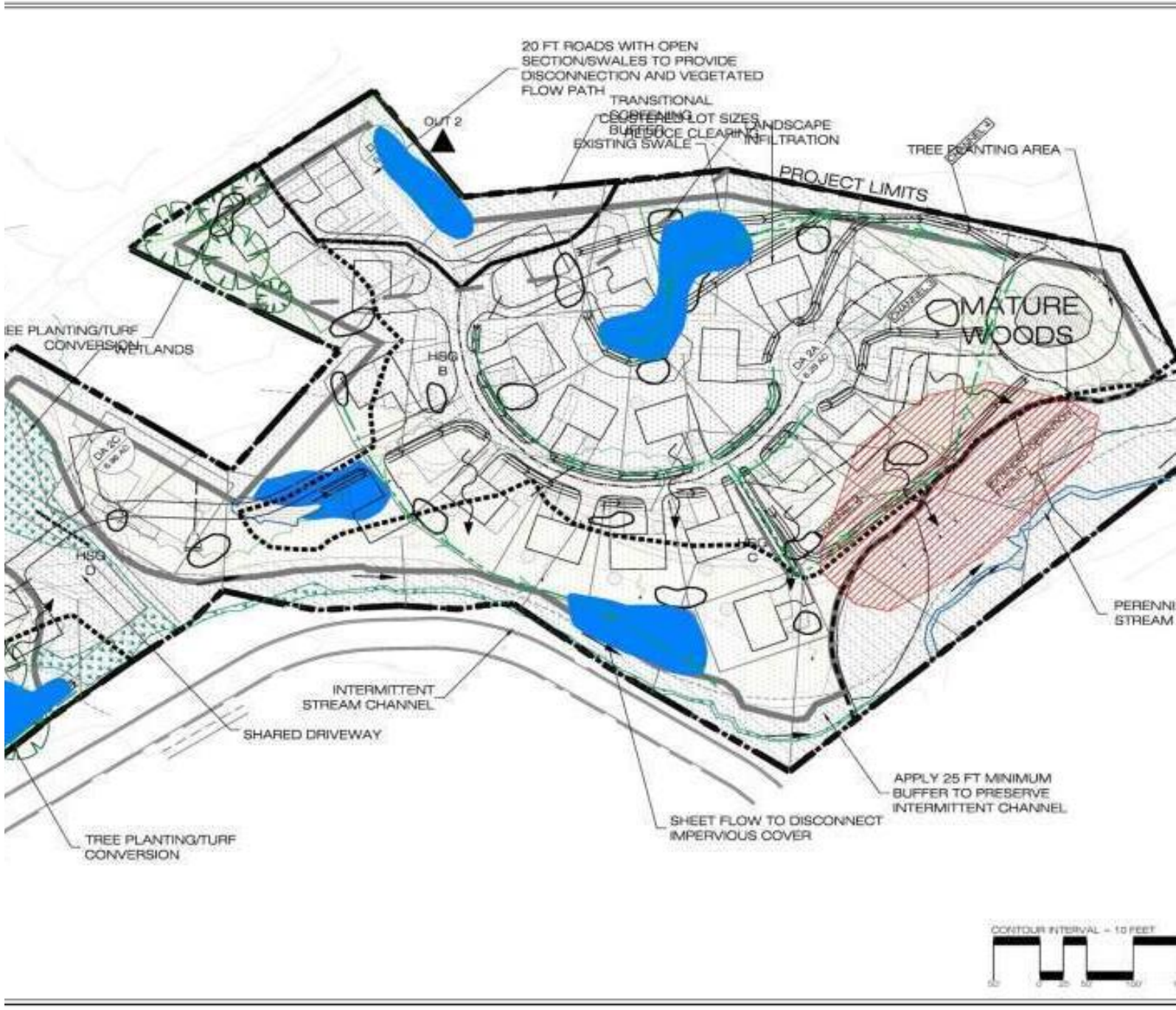
THE OLD BMP INSPECTION MODEL

One big pond:



THE NEW "MANY-BMP" MAINTENANCE MODEL

- 24 disconnections
- 18 swale sections
- 14 rain gardens
- 5 bioretention areas
- 4 tree planting areas
- 6 sheet flow credits

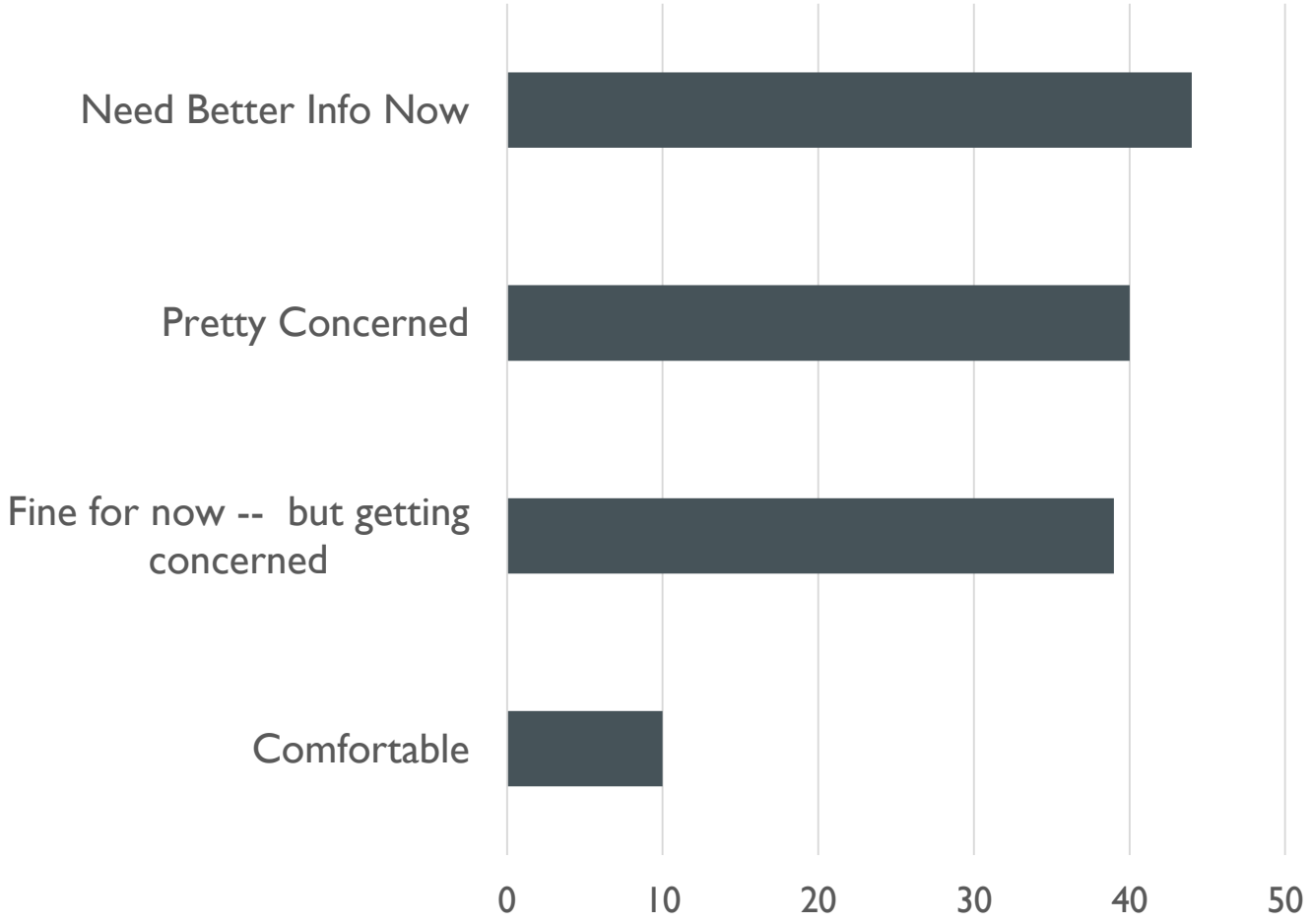


MAINTENANCE

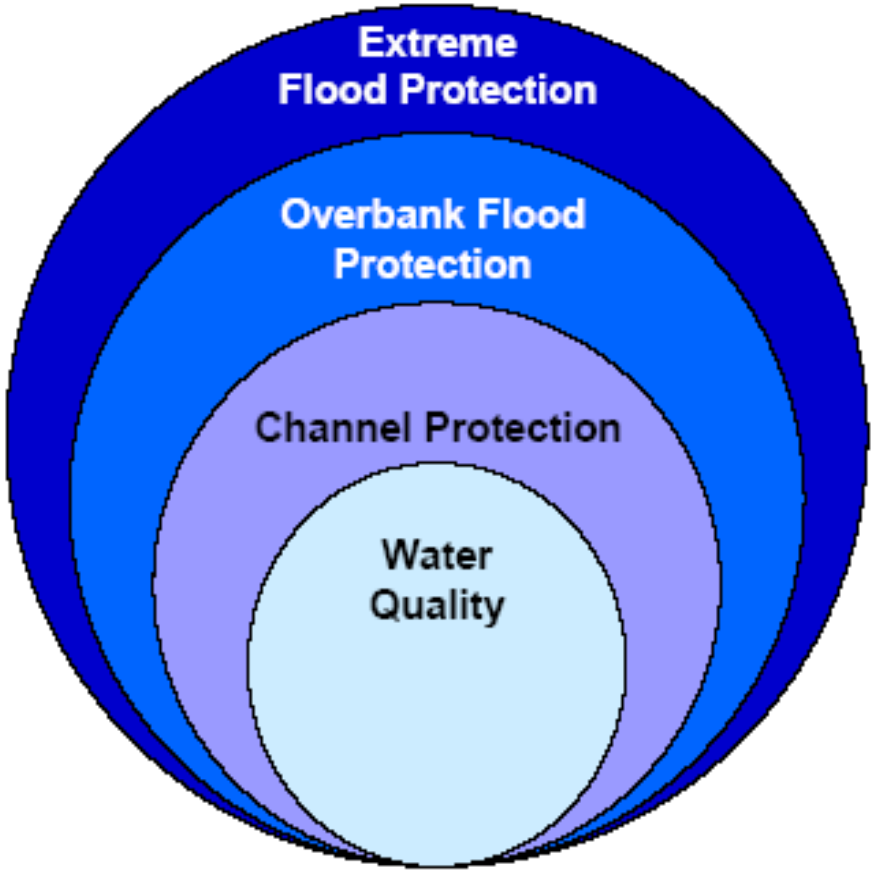
- Bed Erosion
- Sedimentation
- Inlet Erosion

TAKEAWAY 3

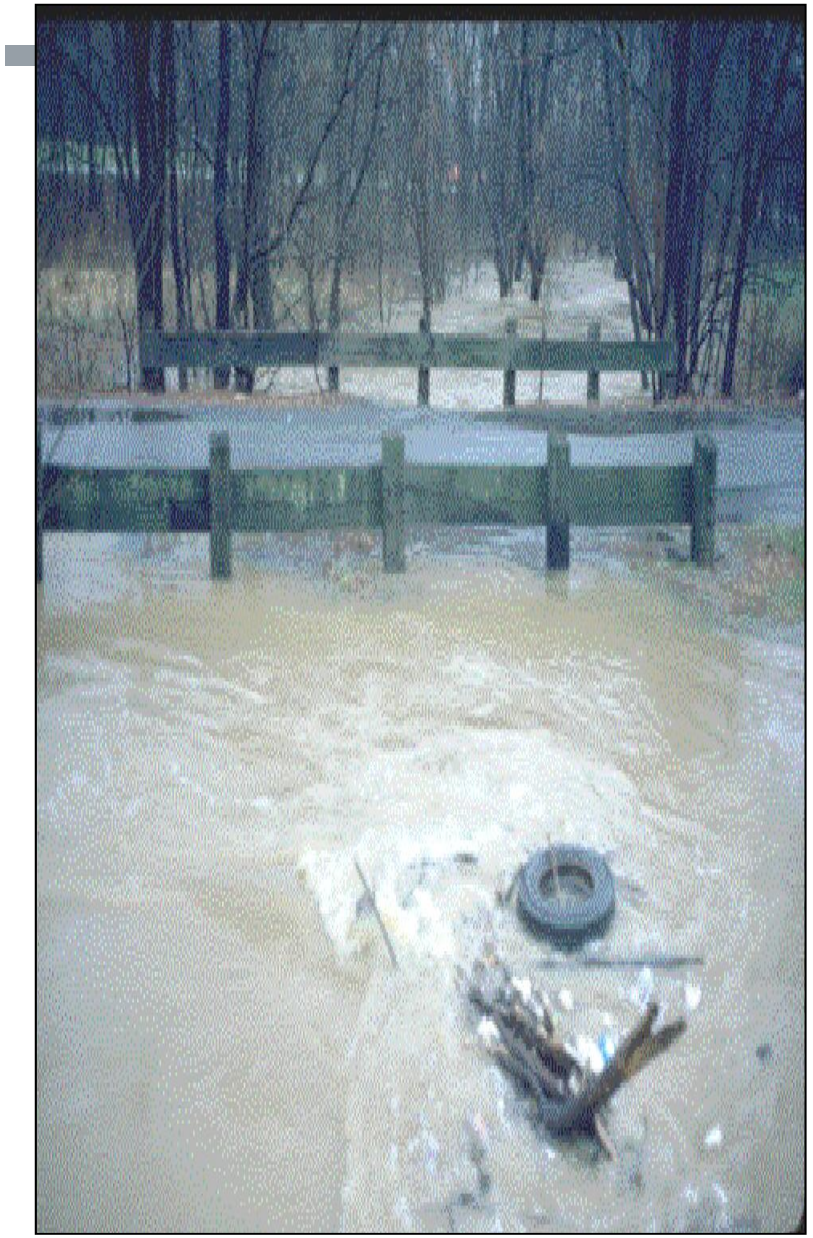
- Respondents are not comfortable with the current quality and utility of engineering design criteria on future rainfall intensity



Stormwater Volume Targets to Manage Municipal Risks

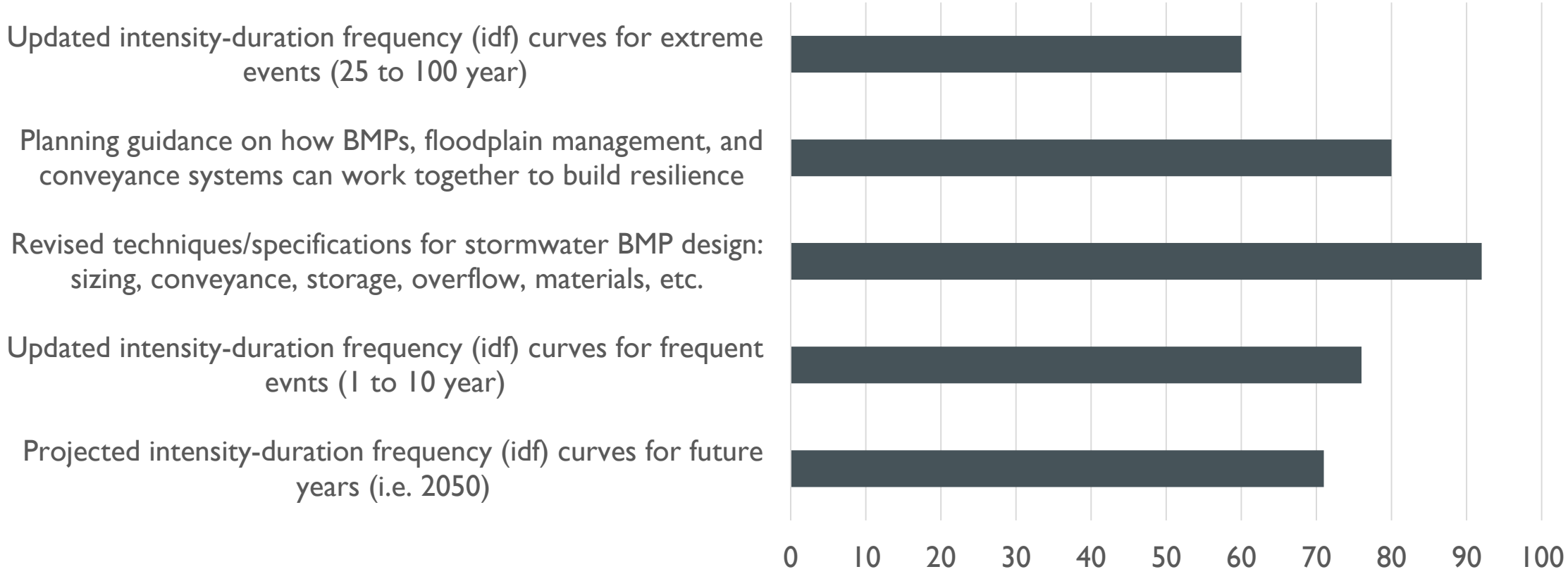


Historically Driven by Increased Subwatershed Impervious Cover Generated From Continued Urban Land Development



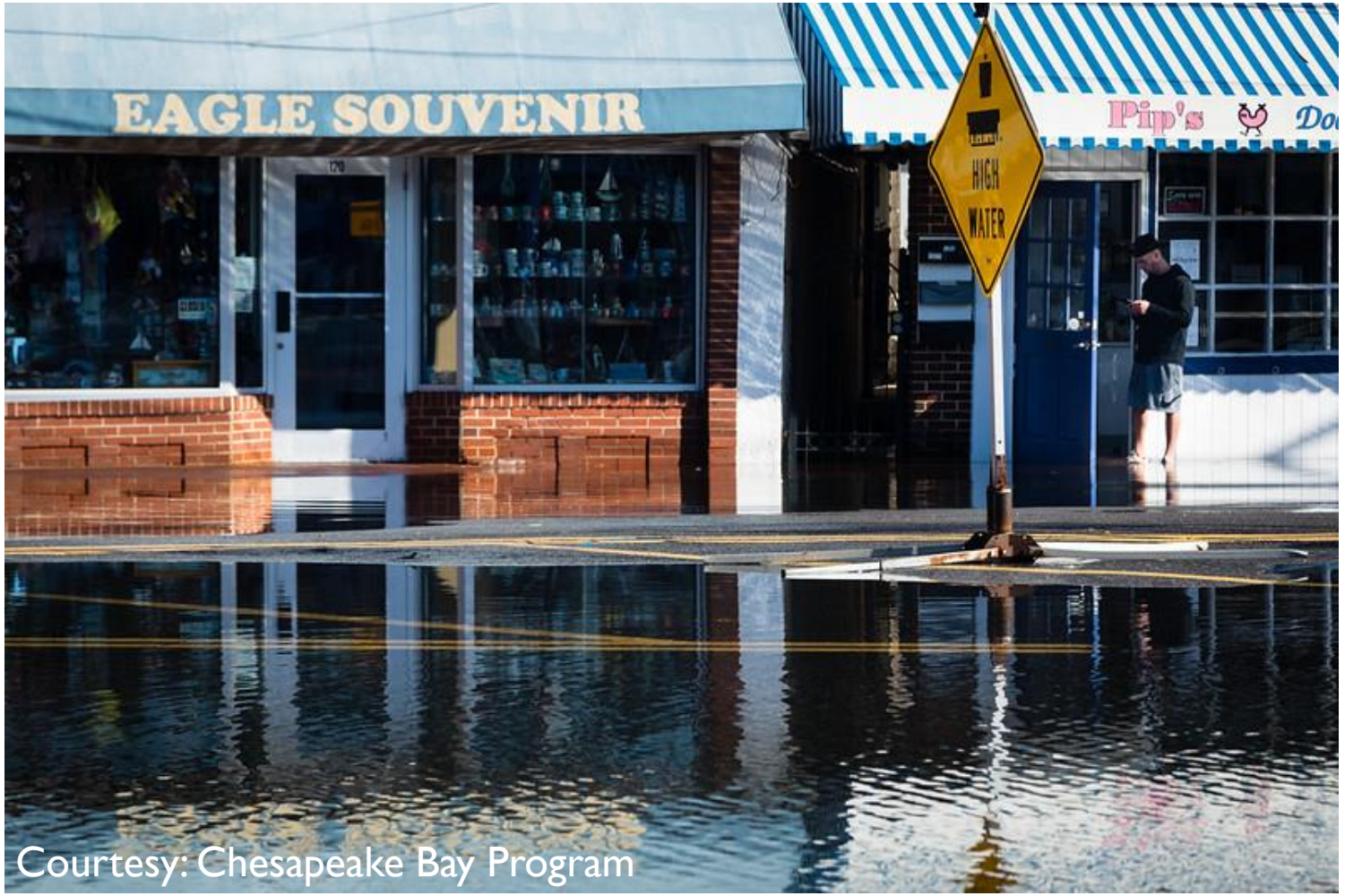
TAKEAWAY 4

- All tools are useful, but if we need new designs, give us new design specs



TAKEAWAY 5

- Responses were generally consistent across community sizes and geographies



Courtesy: Chesapeake Bay Program

DIFFERENCES ACROSS THE WATERSHED

- Headwater States and Small Communities – cost and resource constraints magnified
- Small Communities – more interested in easing maintenance burdens and planning guidance
- Large Communities – more interested in retrofitting existing practices
- State Agencies – more interested in projected IDF curves
- Local Govs – more interested in historic IDF curves

WHAT'S COMING NEXT

WHAT IS COMING NEXT

- Memo 2: State-By-State Summary of Current Engineering Standards

Table 1

Range of Urban Stormwater Design Criteria and Engineering Models Potentially Influenced by Future Changes in Rainfall Depths, Intensity or Hourly Distributions [1, 4]

Management Objective	**Design Storm**	**Purpose(s)**	**Engineering Models**
Recharge	Annual rainfall depth for site HSG	Promote infiltration & groundwater recharge	Equation = runoff coefficients
Water Quality (WQv)	90% frequency hourly rainfall event [2]	BMP sizing to remove pollutants in urban runoff	Simple Method, runoff capture equation or SWMM
Channel Protection	One-year storm event	Prevent downstream bank erosion	NRCS TR-55 and TR-20
Channel Conveyance	2 and/or 10-year storm event	Sizing of swales, channels, storm drain pipes, and detention ponds	NRCS models or SWMM
Road Drainage & Culvert Design	10 and/or 25-year storm event	Protect road infrastructure from erosion	Rational method
Dam & Bridge Safety	100-year storm event or greater [3]	Design of embankments, risers and emergency spillways	
Floodplain Delineation		Lateral and vertical boundaries of existing and ultimate 100-yr floodplain	
Stream and Floodplain Hydraulics		Protect roads, sewer and other public infrastructure. Maintain stability of stream/floodplain restoration projects	TR-20, HEC-2, HEC-RAS 2D and 3D models, and others

WHAT IS COMING NEXT

Memo 3: Summary of Current Science on Local Precipitation Projections

- CBPO Climate Assessment Findings for Rainfall Volume and Intensity
- Projected IDF curve development work
- Design and management considerations

WHAT IS COMING NEXT

Memo 4: BMP Vulnerability Analysis

- Change in pollutant removal performance due to climate change
- Best practices to improve resilience (retrofits, sizing, maintenance)
- Traditional stormwater practices and "Bay BMPs"

QUESTIONS?