



STORMWATER
MANAGEMENT



VIRGINIA
TURFGRASS COUNCIL
FEBRUARY 16, 2022



Topics for Discussion

- What is an MS4?
- Why does the City care about stormwater quality?
- How does the City protect waterways?
- Q&A

Stormwater 101

- Virginia Beach stormwater is managed through an MS4 – municipal separate storm sewer system
- Separate from sanitary sewer
- Virginia Beach stormwater, by the numbers:
 - 134.5 days precipitation per year
 - Average 47” rainfall per year
 - Area: 310 mi.², of which 51.3 mi.² (~16.5%) is water
 - More than 50,000 storm drains
- All storm drains lead to surface waters



"All drains lead to the ocean."

- Finding Nemo



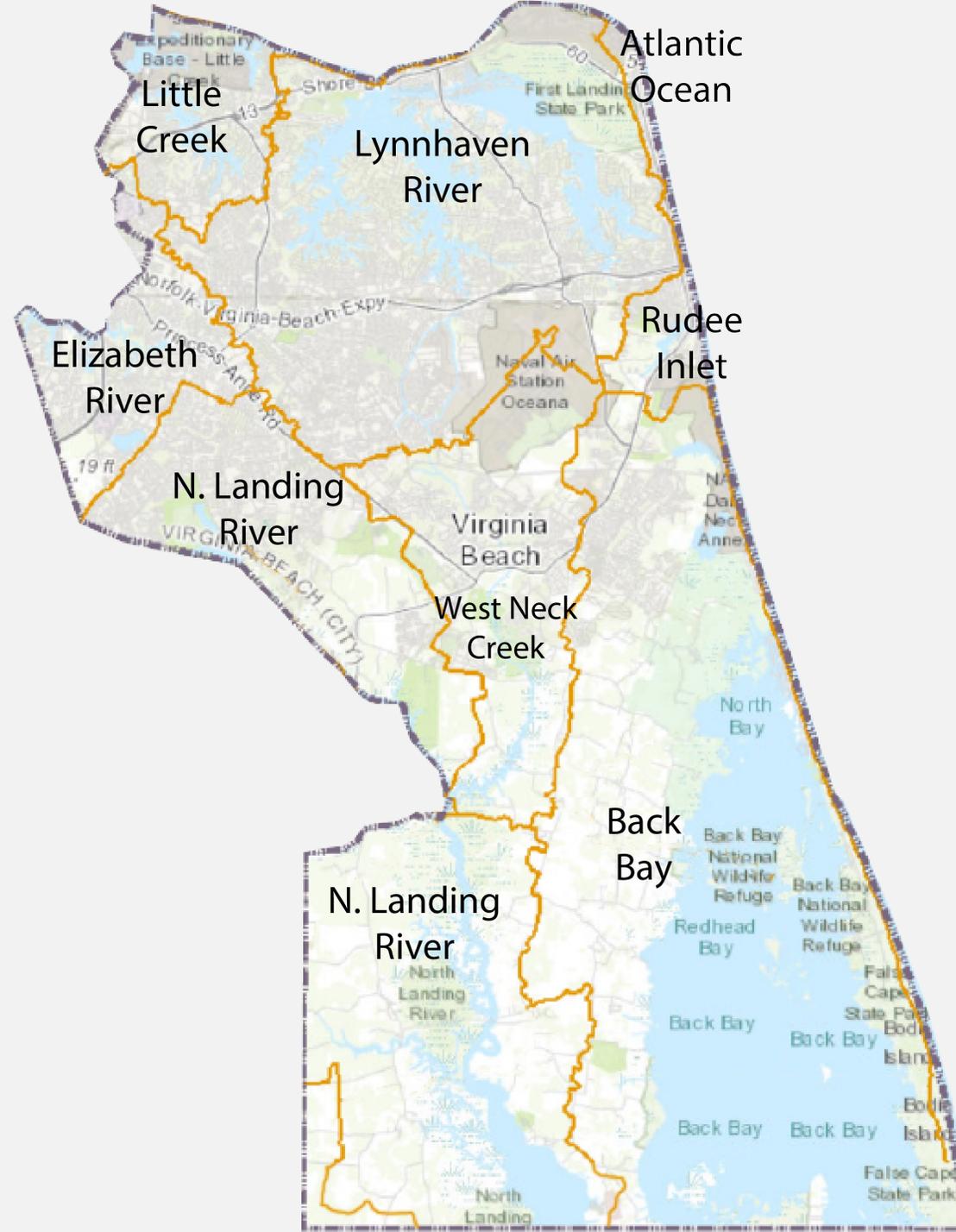
Stormwater 101

3 primary watersheds in Virginia Beach

- Chesapeake Bay
- Atlantic Ocean
- Southern Rivers

8 smaller watersheds within

- Elizabeth River
- Little Creek
- Lynnhaven
- Atlantic
- Rudee Inlet
- Back Bay
- West Neck Creek
- North Landing River



Why does the City care about Stormwater Quality

- Primary pollutants of concern
 - Bacteria
 - Phosphorus
 - Nitrogen
 - Sediment
 - Trash
- Primary sources
 - Pet waste, waterfowl, sanitary sewer overflows (bacteria)
 - Fertilizer, yard waste (phosphorus & nitrogen)
 - Bare, loose soils (sediment)
 - Litter, unsecured dumpsters/bins (trash)
- Primary problems
 - Swimming advisories
 - Fish kills
 - Damage to wetlands (natural buffers of storm surge)
 - Erosion
 - Harmful to local economies (tourism, fisheries)

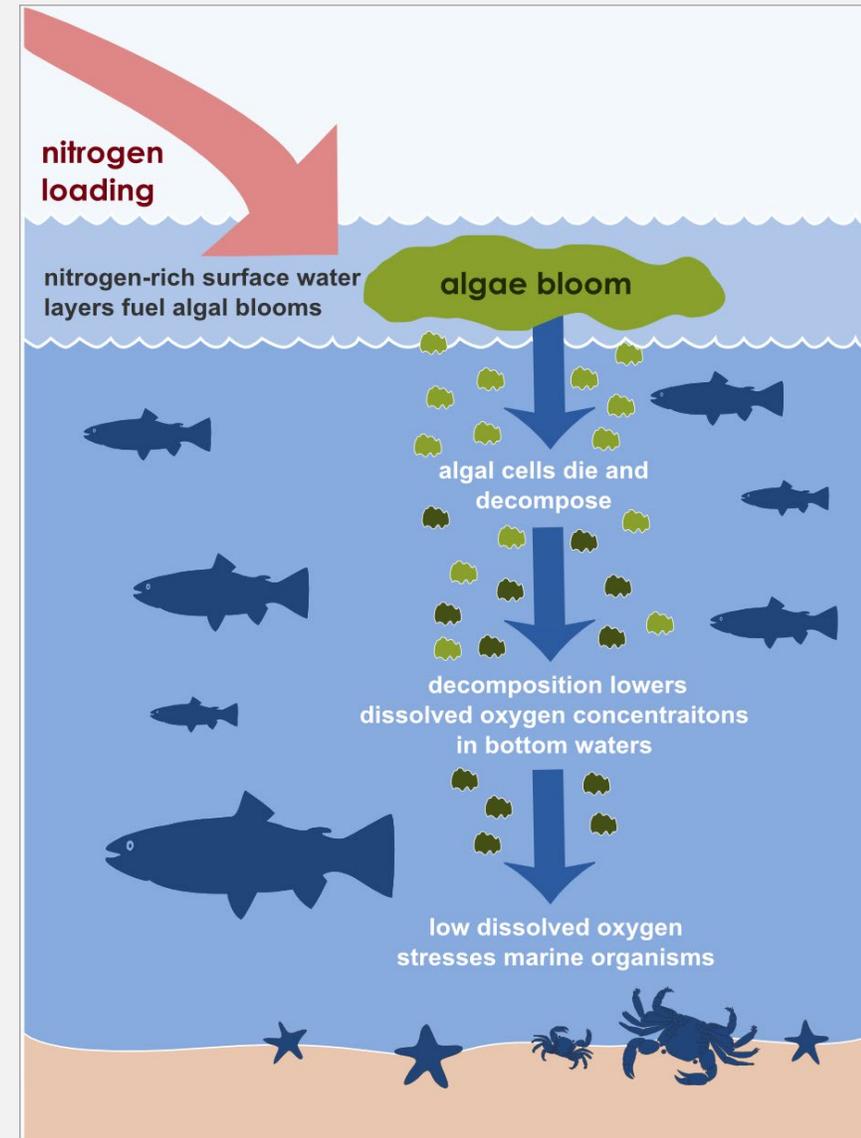
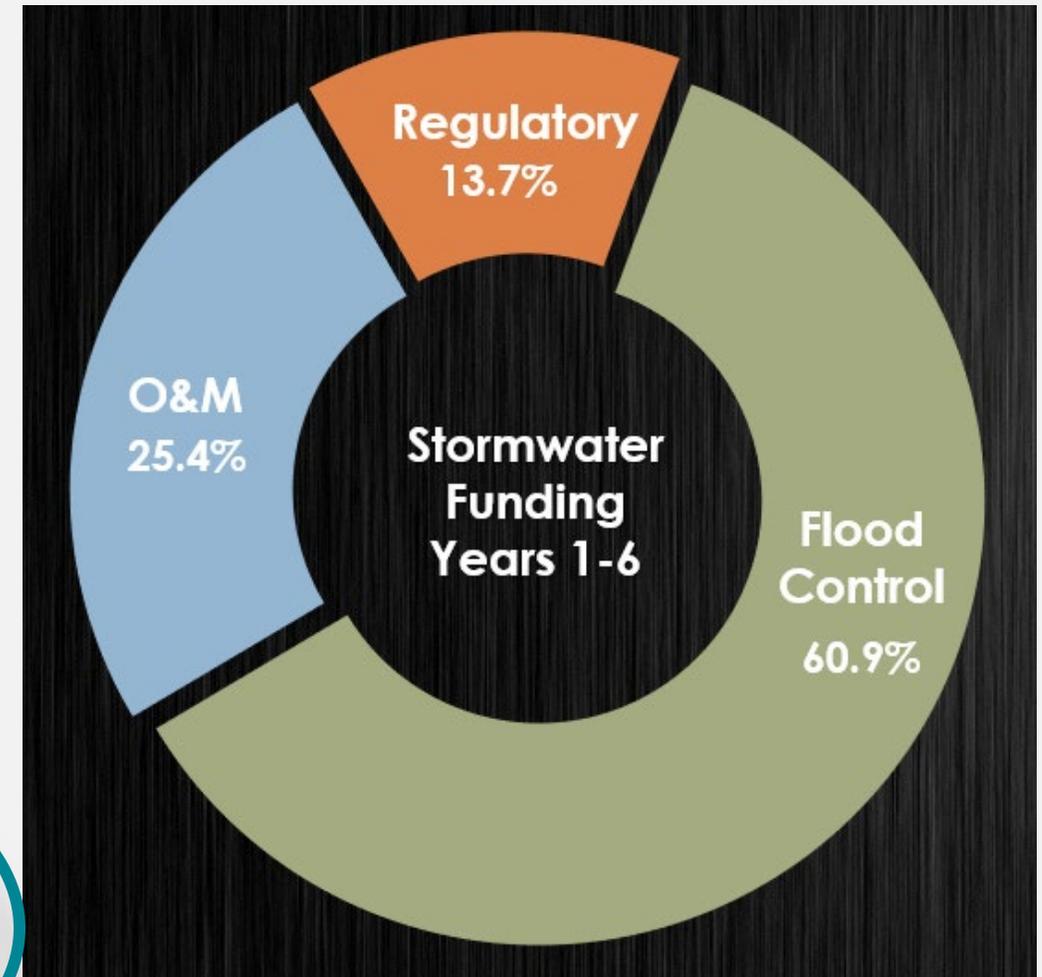


Photo credit: Washington State Department of Ecology

How does the City protect waterways?

- Public Works responsibilities
 - Operations (385-1470)
 - Perform inspection and maintenance of stormwater infrastructure (drains, pipes, ditches, BMPs, etc.)
 - Stormwater Engineering Center (385-4131)
 - Flood control projects, Stormwater Master Plan, referendum projects (Flood Protection Program - The Ripple Effect)
- Water Quality (385-4131)
 - Pollution prevention through City MS4 Program Plan implementation, including projects, education, plan review, etc.
 - www.vbgov.com/stormwater-program





The MS4 Program Plan

Comply with state and federal laws to reduce the discharge of pollutants to the *maximum extent practicable*. The MEP standard means that the City must always be evolving to use the best methods to achieve its mandate to reduce pollution from stormwater runoff. The MS4 Program Plan is regularly updated. Some of the ways the City achieves this purpose:

- Enact and enforce local ordinances to protect waterways
- Follow state and federal guidelines for land development of City-owned property, such as the New City Hall building, School buildings, Parks construction and management, and Roadway projects
- Monitor the MS4 and measure stormwater quality
- Constructing stormwater quality improvement projects
- Act as regulator for private development
- Serve as a resource and partner for anyone who wants to learn more and prevent stormwater pollution at home or in their business practices
 - **That's YOU!**



This is where it gets INTERESTING...

- Bay Star Business is a FREE program
 - Pledge to employ green practices at your business and become a partner with askHRgreen.org
 - Window cling/signage to advertise your partnership
 - Free listing on askHRgreen.org as a Bay Star Business partner
- Available to businesses operating in the following locations:

- | | |
|----------------|--|
| • Chesapeake | • Smithfield |
| • Franklin | • Suffolk |
| • Hampton | • Virginia Beach |
| • Newport News | • Williamsburg |
| • Norfolk | • Gloucester, Isle of Wight,
James City, Southampton
County, and York Counties |
| • Poquoson | |
| • Portsmouth | |



Opportunities to Better Serve Your Residential Clients

- VCAP with VASWCD. Projects include:
 - Conservation landscaping
 - Rain gardens
 - Bioretention
 - Constructed wetlands
 - Living shorelines
 - Green roofs
 - Infiltration practices and MORE
- Partnerships with watershed organizations
 - Lynnhaven River NOW and Elizabeth River Project



LYNNHAVEN River NOW





MS4
Stormwater
conveyance system



Cities Care
Vested interest in
protecting water



**Multifaceted
Protection**
Regulated
Regulator
Here to Help



FREE Programs
We are a resource for
the community

Recap

Q&A Time

Topics for Discussion

- Good Housekeeping practices
- Common BMP types
- General BMP maintenance
- Q&A

Good Housekeeping

Store clearly labeled bulk materials and chemicals off floors in dry indoor areas or in covered outdoor areas.

Properly contain and dispose of garden waste, chemicals, and wastewater from nurseries.

Protect stormwater systems from stockpiles. Implement erosion and sediment controls such as filter socks and storm inlet filter bags at inlets to minimize soil loss to the stormwater system.

Use a commercial wash facility OR wash vehicles and equipment in a designated area or over grass or other permeable surfaces so that no water gets to the stormwater system.

Use a hose nozzle with flow restrictions or an automatic shutoff to conserve water and reduce runoff.

Apply fertilizer, pesticides, and herbicides according to manufacturer's specifications and adopt integrated nutrient and pest management practices whenever possible.

Maintain a readily accessible and properly stocked spill kit onsite so spills can be contained and cleaned promptly.

Best Practices:

- Store bulk materials in covered areas
- Prevent sediment from entering storm drains with a boom/sock
- Properly dispose of waste and secure dumpsters
- Store pesticides, herbicides and fertilizers in properly sealed containers, off the ground, or indoors if possible
- Keep a spill kit stocked and know how to use it to contain spills
- Wash vehicles or equipment at a commercial car wash, over a designated area connected to the sanitary sewer, or on permeable surface

Only Rain Down the Drain

- Never sweep or blow grass clippings or yard debris into the gutter or storm drain
- Mulch mow when possible (clippings are natural fertilizer)
- Pick up litter and dispose of it properly – trash in the streets ends up in our waterways
- Keep storm drains clear of sediment and debris
- Maintain trash receptacles and dumpsters
 - Lids closed
 - Secure from tipping/critters





You're On the Frontline of Water Protection

- Eyes and ears to detect issues and report them
 - Report illegal dumping or illicit discharges to the stormwater system
 - Call 3-1-1
 - Use the app VB Works
 - Email Vbstormwater@vbgov.com
- Skills to prevent pollution in your everyday practice
 - PHF are tools in your toolbox – use them wisely



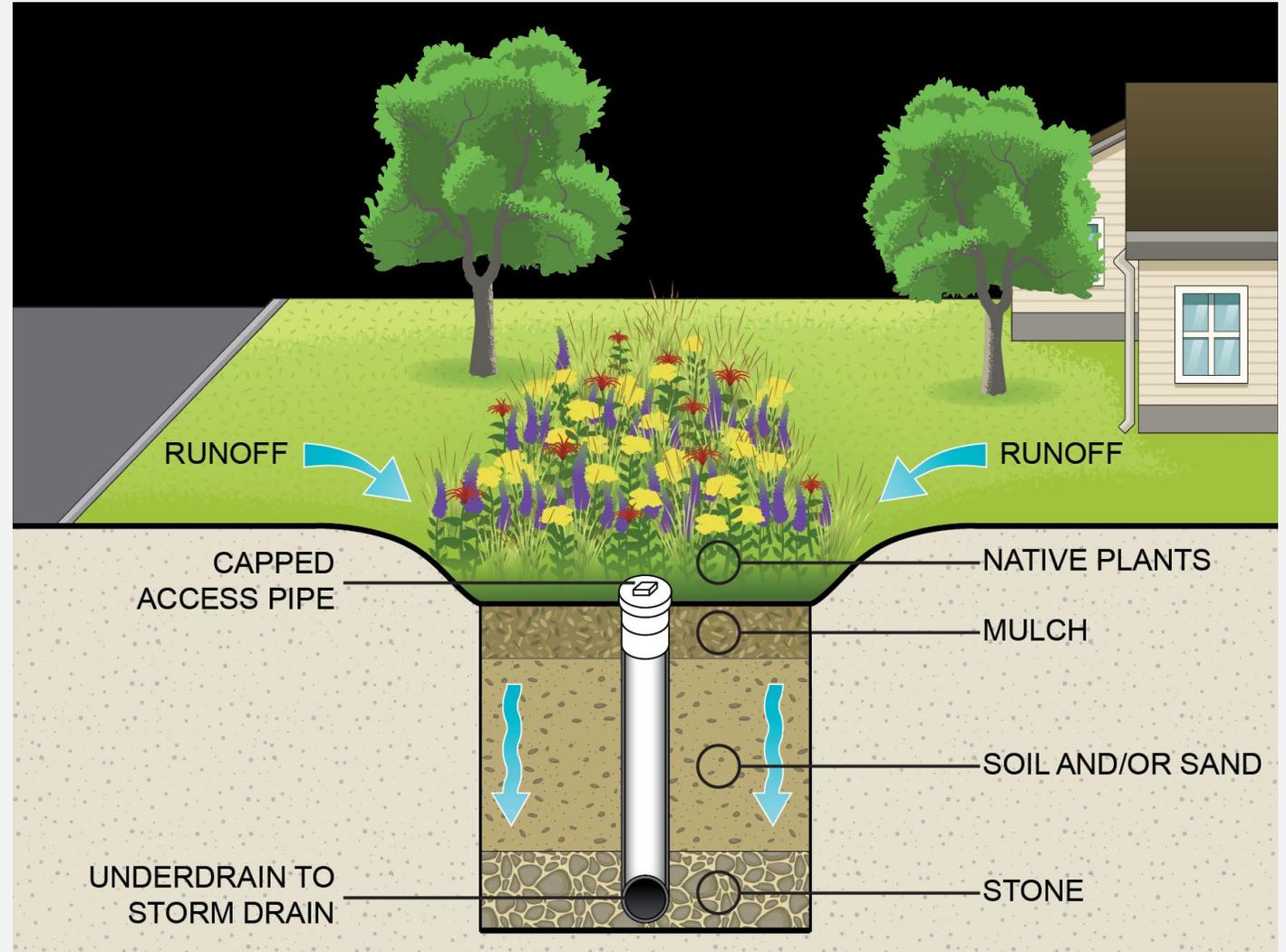
Common Best Management Practices (BMPs)

- Rain Gardens/Bioretenention
- Sheet Flow to Vegetated Strip
- Dry Wells
- Infiltration Trench
- Permeable Pavement
- Conservation Landscaping
- Wet Ponds
- Extended Detention Pond

SWMF Maintenance Fact Sheets available at:
www.vbgov.com/stormwater-program

General Maintenance: Rain Garden/Bioretention

- Designed to capture and treat runoff by helping it permeate the ground
- Plants stabilize the fill media and take up water
- Key maintenance:
 - Keep the area free from sediment accumulation, leaves, and debris
 - Remove dead/diseased plants and replace with healthy new ones
 - Remove invasive species
 - Avoid compaction! Never drive a vehicle or mower over a rain garden/bioretention area



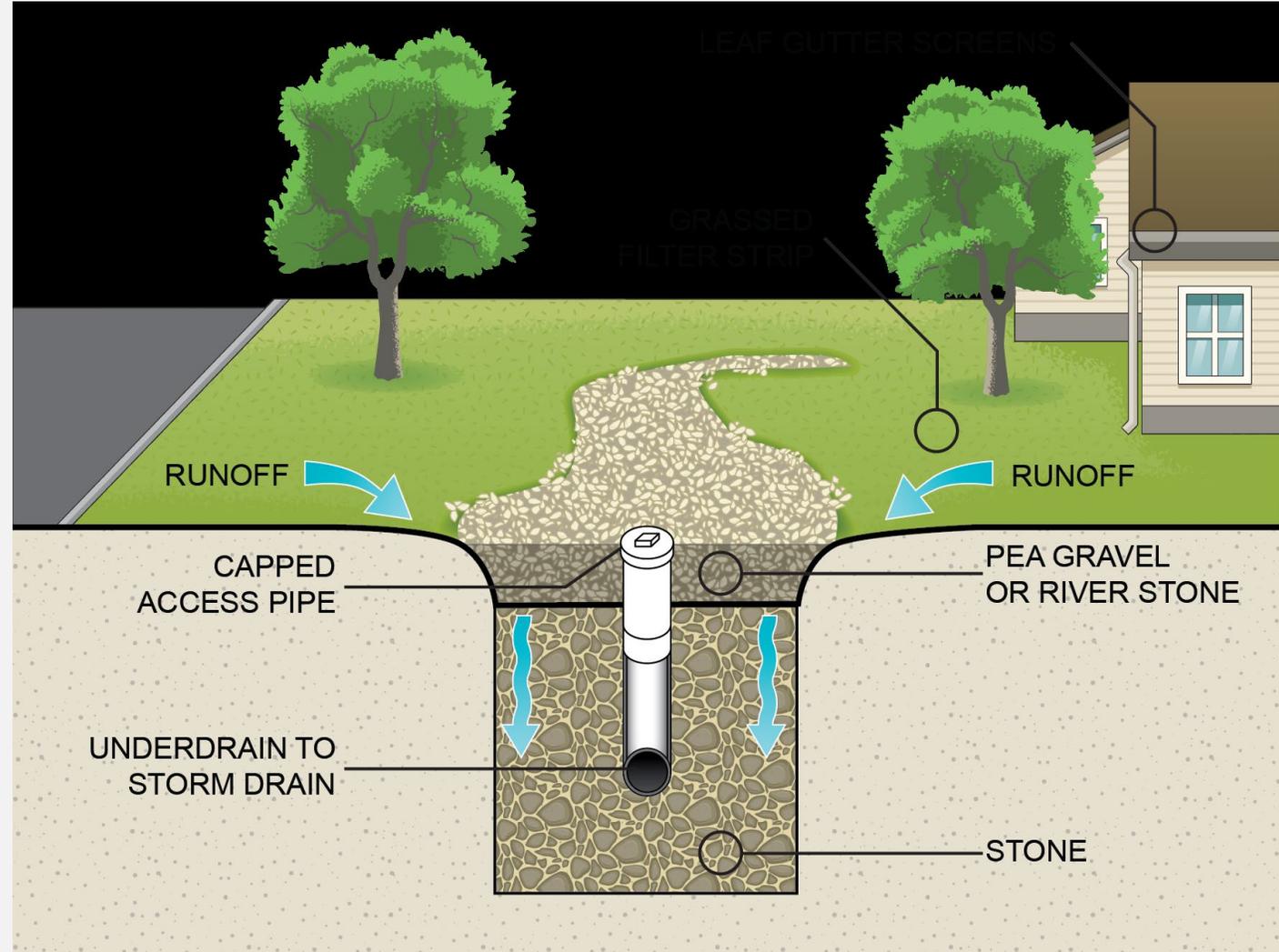
General Maintenance: Sheet Flow to Vegetated Strip

- Sheet flow from a paved area is directed to a vegetated area where it can be absorbed into the ground and used by the plants rather than running off to the stormwater system
- Key maintenance:
 - Mow only as necessary
 - Control invasive species in the vegetated strip
 - Remove litter, debris, leaves and sediment from gravel areas once per month
 - Replace or replenish gravel as needed
 - Check for erosion and cover bare soil with gravel, seed, or mulch



Dry Wells/Infiltration Trench

- Helps water infiltrate the ground rather than sheet flow off the property
- Water is typically directed to a “pretreatment area” then allowed to flow through the dry well/infiltration trench where it can permeate the subsurface media
- Remaining water is captured in an underdrain
- Key maintenance:
 - Keep the pretreatment and dry well/infiltration trench surface free from debris, leaves, and sediment.
 - Avoid compaction: NEVER drive a vehicle or mower over the area



General Maintenance: Permeable Pavers

- Help water infiltrate the ground rather than running off the property
- Key maintenance:
 - Permeable pores or areas between pavers should be free of litter, debris, and sediment.
 - Pavers should be free of cracks and any damaged pavers replaced and reset.
 - Owners should have the area professionally vacuum-swept at least once per year.



General Maintenance: Conservation Landscaping

- Reduces runoff by replacing lawn or bare areas with native plantings. Native plants are preferred in all practices as they will be more resilient to the local climate, require less frequent watering, and require less fertilizing.
- Key maintenance:
 - Remove and replace any dead/diseased plants
 - Remove any invasive species
 - Keep the area free of litter, leaves, and debris



Image credit: <https://vaswcd.org/conservation-landscaping>

General Maintenance: Wet Pond

- Wet ponds collect stormwater runoff and hold stormwater volume. Pollutants and sediment are captured in forebays or wetland plantings and settle out over time in the permanent pool
- Key maintenance:
 - Maintain a No-Mow zone 10-feet out from the top of the bank as well as the side slopes of the pond. Mowing to 6" is okay once a month in the growing season.
 - Remove shrubs or trees that try to grow on the slopes
 - Eliminate invasive species
 - If excessive algae growth, limit use of fertilizers upstream of the pond



General Maintenance: Extended Detention Pond

- Recognizable as a dry, shallow depression, which is designed to store runoff for a short time after a storm (24-36 hours). Helps water slowly infiltrate ground and allows sediment and pollutants time to settle out of the water.
- Key maintenance:
 - Keep pond free from woody growth
 - Avoid using herbicides and pesticides in the pond area and around the grass meadow
 - Maintain a no-mow zone of 10 feet from the top of the side slope and the side slope. Okay to mow no less than 6" once a month during the growing season.
 - Remove invasive species
 - Remove trash, sediment, and debris





Good Housekeeping

Proper storage is key to clean water



Common BMPs

Wet Ponds & Ext. Det.
Rain Gardens/Dry Wells



Key Maintenance

No-mow Zones
Avoid Compaction



Recap

Q&A Time

THANK YOU

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