



Traversing Stormwater Treatment Technologies

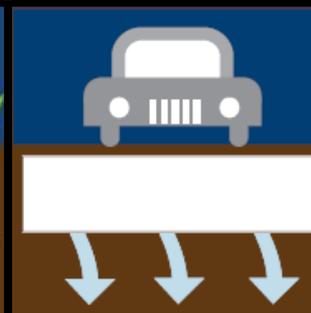
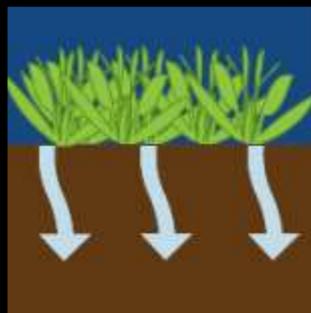
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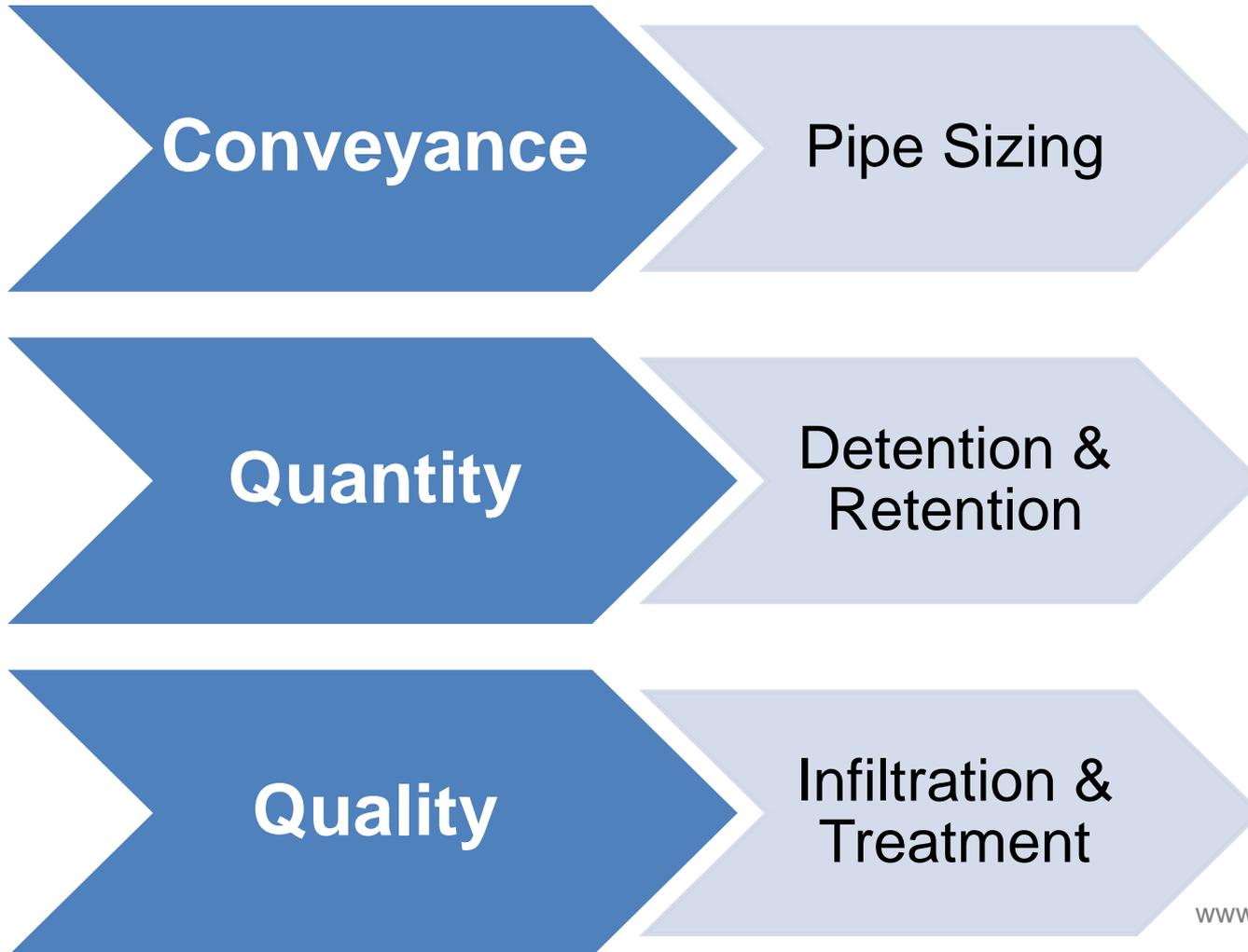
**COUNTY ENGINEERS
ASSOCIATION OF OHIO**

"ALL TRAVEL STARTS AND ENDS ON A LOCAL ROAD"

Samantha Brown,
Regional Regulatory Manager

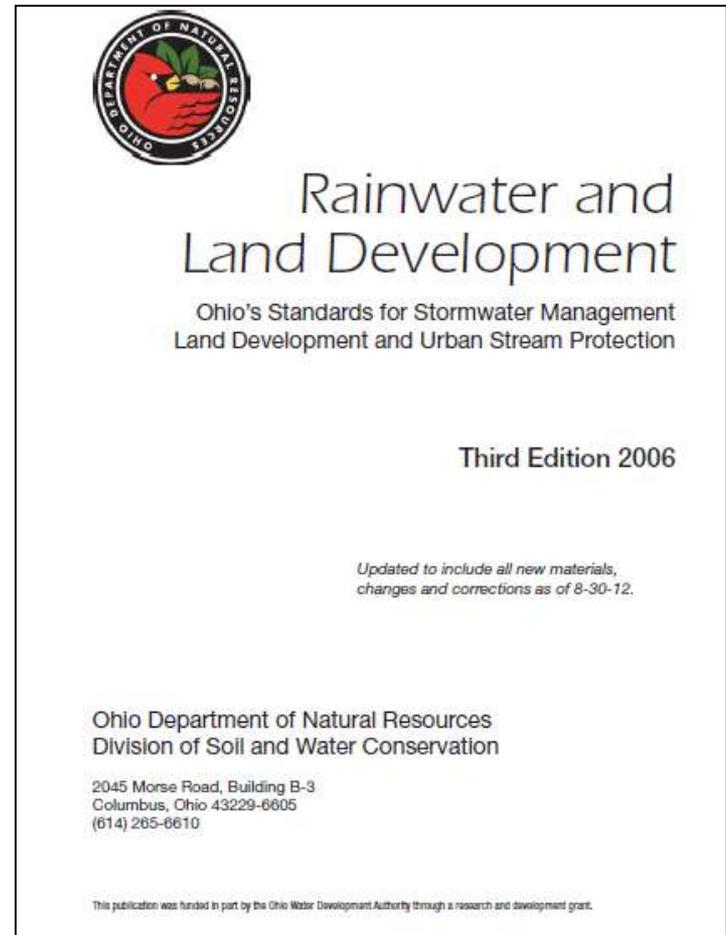


Evolution of Stormwater Management



Ohio Stormwater Regulations

- Water Quality Volume
 - 0.75 inches
 - Consistent across state
- Large Construction Activities
- Small Construction Activities
- Redevelopment Activities
 - Treat 20% of WQv
 - Reduce impervious by 20%



Changes ahead...

- Phase II Permit Renewal
 - 2018
 - Underground detention as Table II BMP
- ODOT Roadway Runoff Study
 - Particle size distribution analysis
 - Impact on future regulations?
- NJDEP Certification Process
 - New PSD for testing protocol
 - HDS: 50% removal
 - Filter: 80% removal

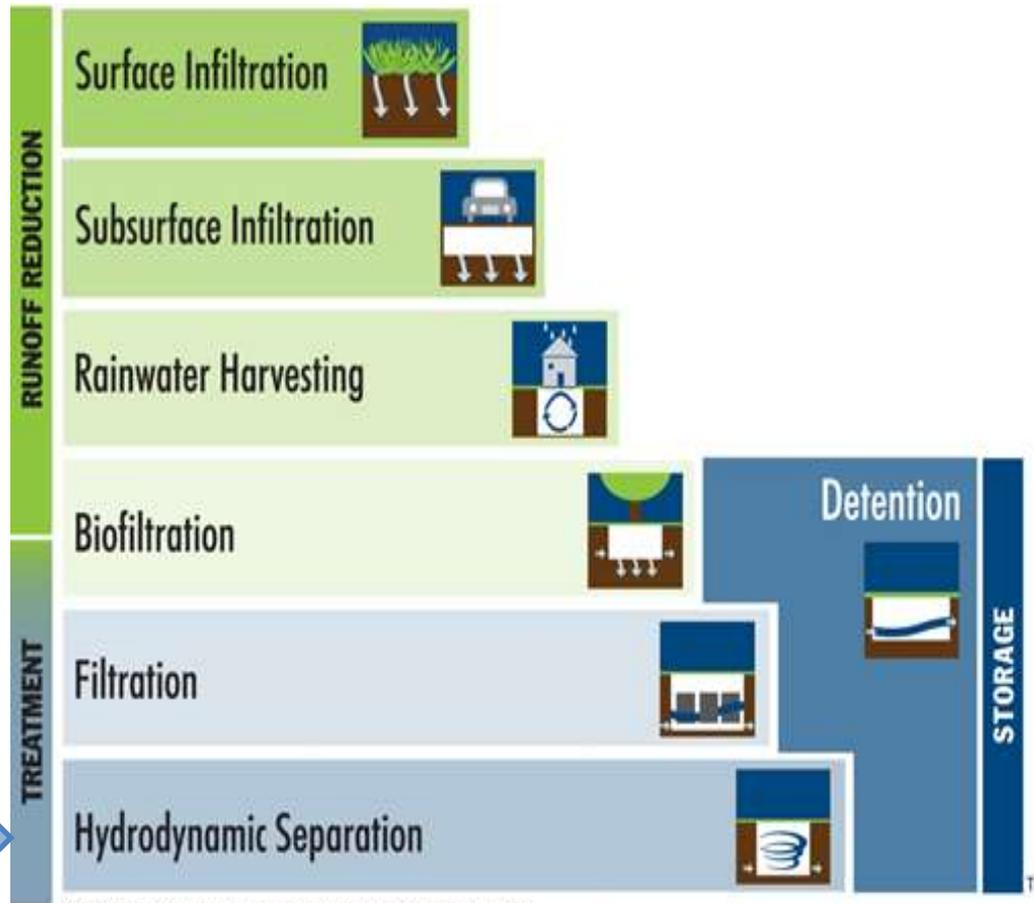


LID Design Staircase

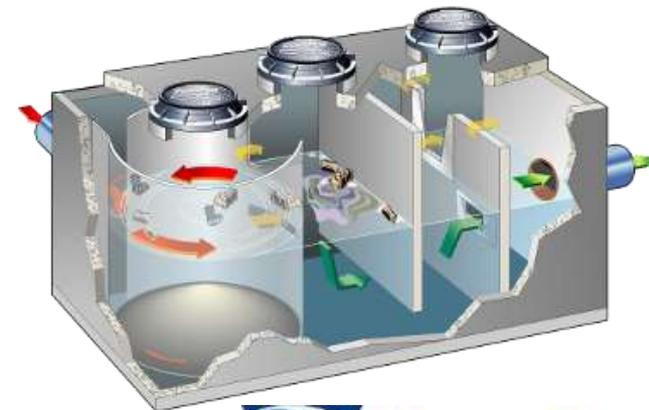
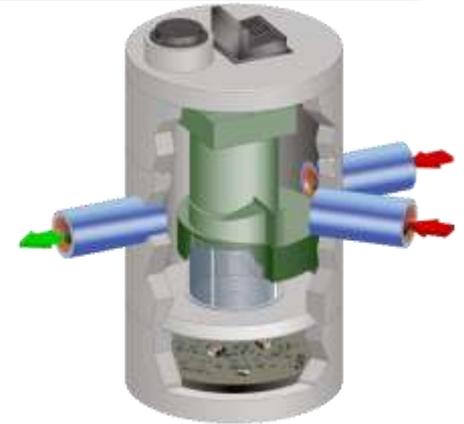
- Represents regulatory hierarchy and site design process
- Available surface area and soil conditions often drive solution choices
- Contech products offer space and cost efficient solutions at every step
- Contech design support provides the best options to fit your site conditions and local regulations



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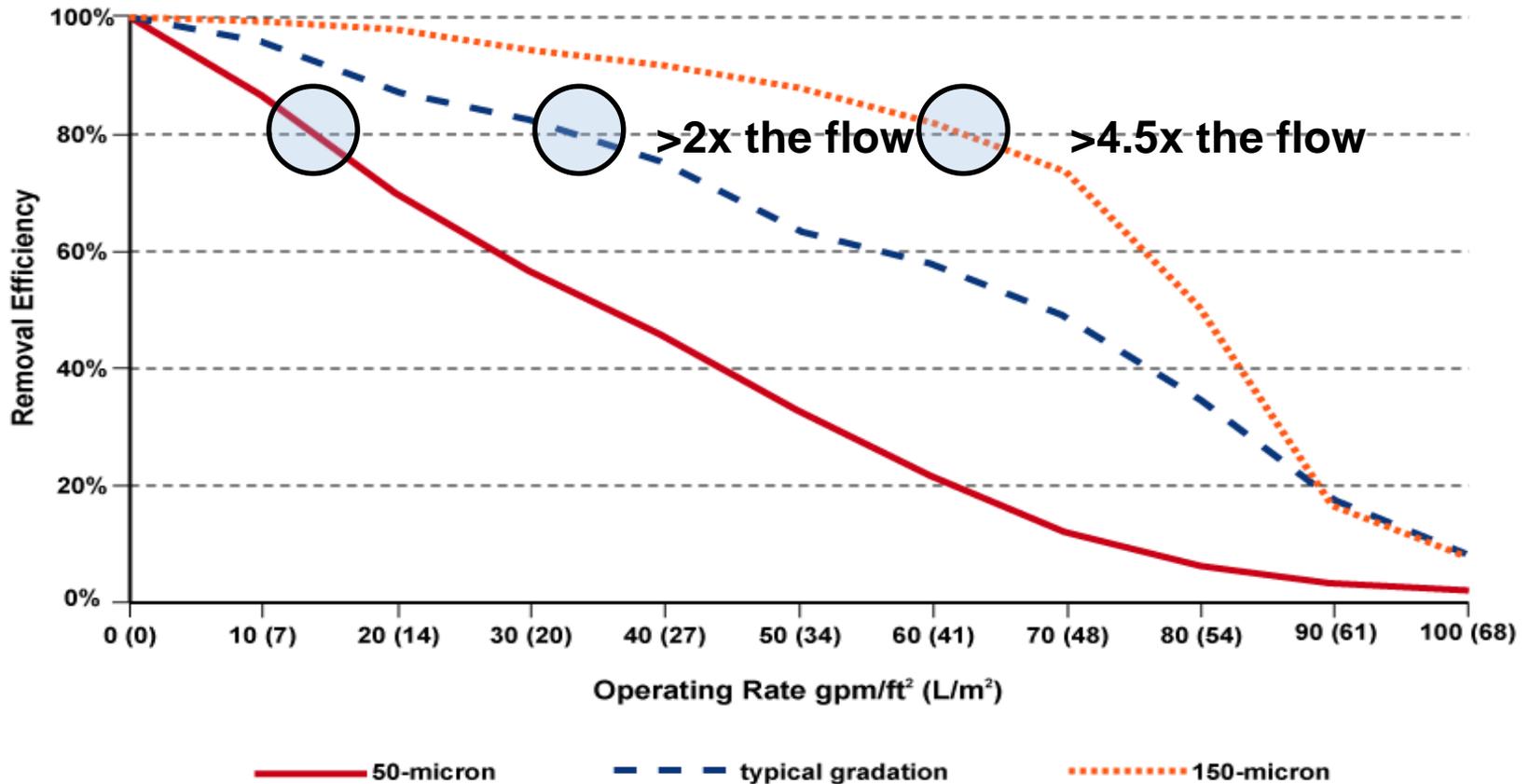


Treatment Efficiency Evaluation

- Pollutant Concentration
 - High concentrations are easier to reduce
 - Typical SW TSS concentration is 50-300 mg/l
 - Testing should use similar concentrations
- Flow rate
 - Treatment efficiency increases as flowrate decreases
 - System should be tested across full range of design flows
- Particle size
 - Large particle sizes are easier to remove than small ones
 - An “apples to apples” product comparison must use the same Particle Size Distribution (PSD)

The Influence of Particle Size

Vortechs[®] System Removal Efficiencies for Selected Particle Gradations

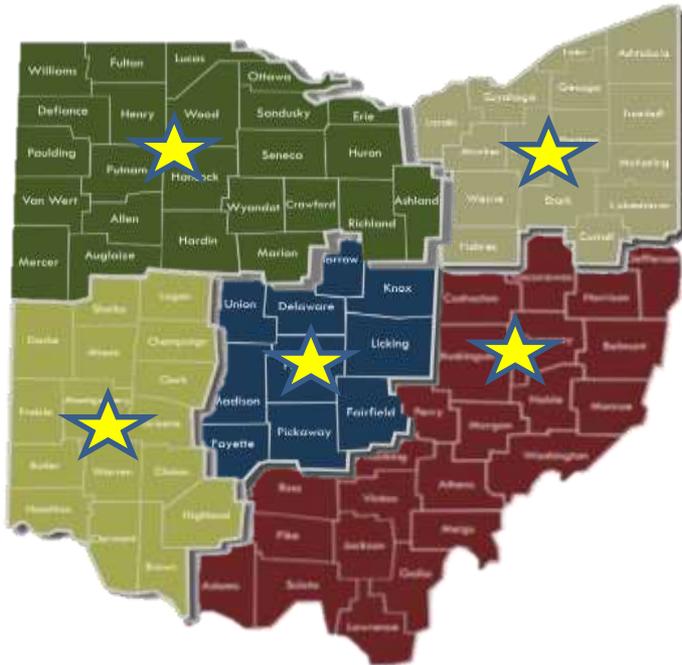


ODOT Requirements

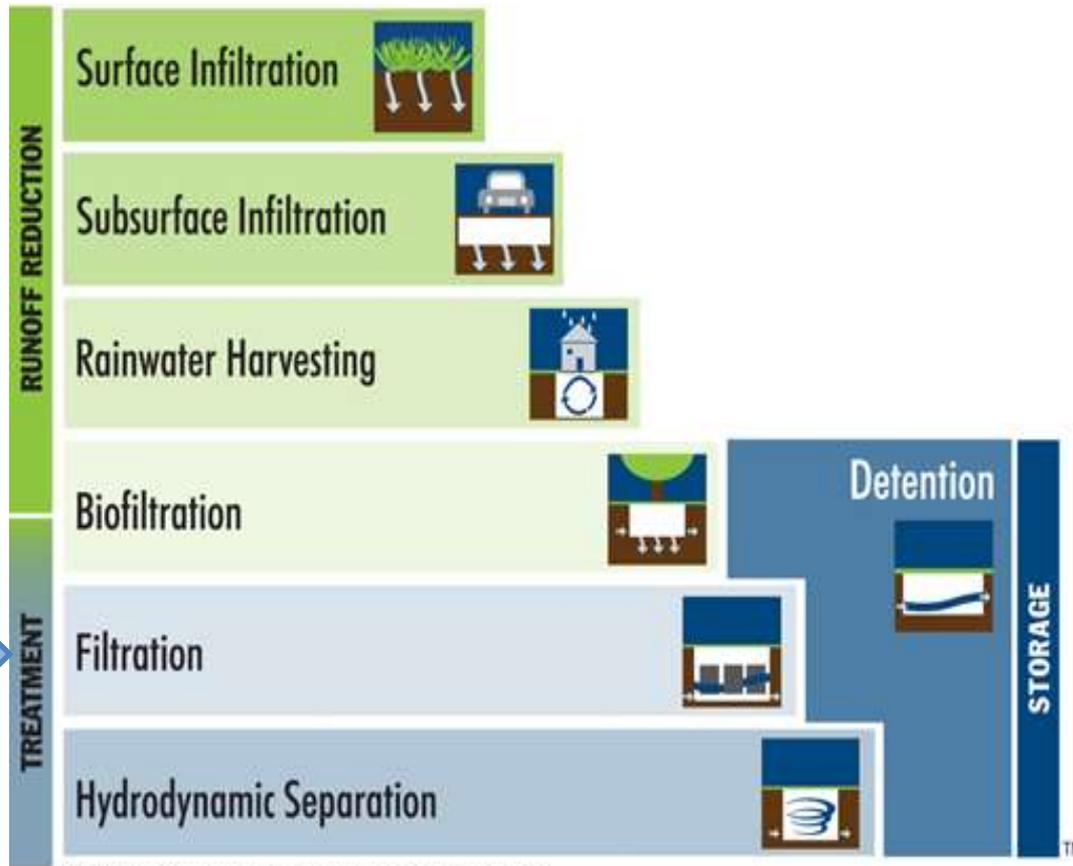
- SS - 995
 - Establishes performance requirements for approved BMPs to be utilized on roadway projects
- Performance Criteria
 - Offline configuration
 - **80% TSS capture of water quality flow (third party testing)**
 - Influent concentration of 450mg/L or less
 - **OK110 or F110 particle distribution**
 - Capture all floatable free oil

HDS: Where is it?

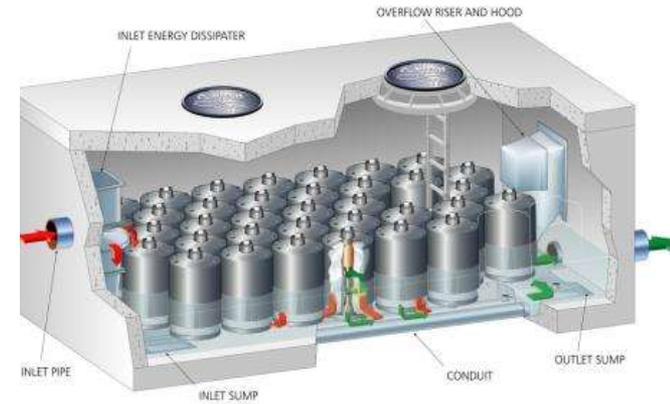
- Sites <5 acres
- ODOT/Roadway Projects
- Pretreatment
- Standalone Treatment BMP
 - New Development
 - Redevelopment
 - Retrofit
- LID Pretreatment
 - Surface Infiltration
 - Subsurface Infiltration
 - Rainwater Harvesting



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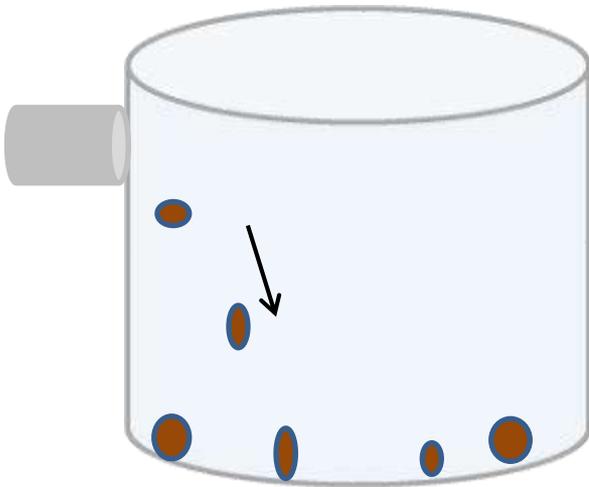
Moving Beyond TSS

- TSS initially thought to be a good surrogate for all stormwater pollutants
- Good control of TSS translates to good control of other pollutants of concern
- We have since realized 80% TSS removal is not enough to address nutrients, metals etc. in impaired watersheds
- Solids removal does not address soluble (dissolved) pollutants

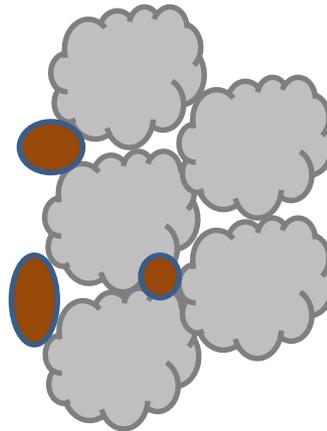
Filtration Mechanisms

- Three primary mechanisms

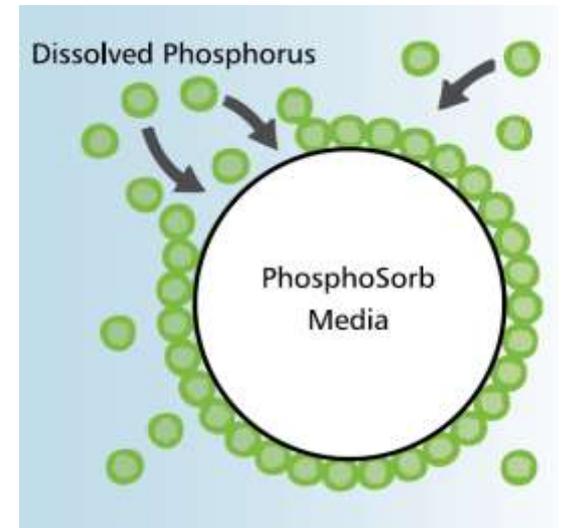
Sedimentation



Physical Filtration



Reactive Filtration



Media vs. Membrane



	PhosphoSorb™	Perlite	CSF® Leaf Media	ZPG
Sediments	■	■	■	■
Phosphorous	■			■
Oil and Grease	■	■	■	■
Soluble Metals	■		■	■
Organics			■	■
Nutrients	■	■	■	■

Maintenance

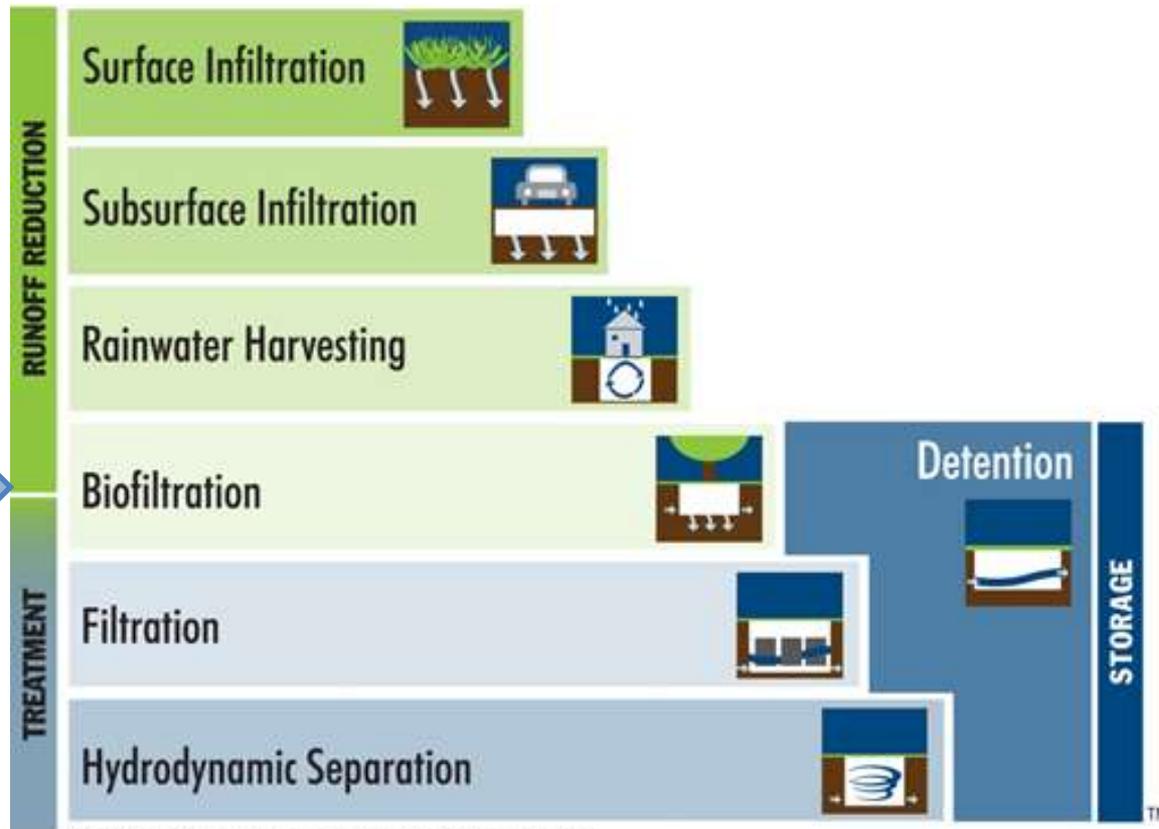


Filtration: Where is it?

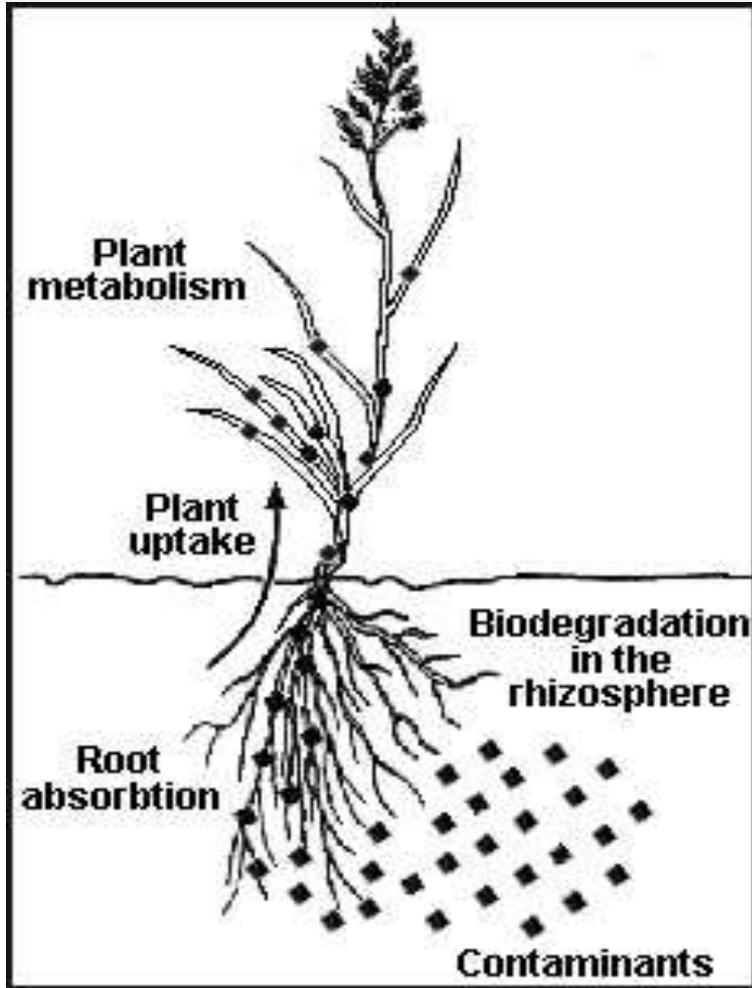
- Sites >5 acres
- Municipalities that reference NJDEP
- Standalone Treatment BMP
 - New Development
 - Redevelopment
- Pretreatment
 - Subsurface Infiltration
 - Rainwater Harvesting
- Polishing Treatment BMP
 - Downstream of Detention System



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Biofiltration Pollutant Removal Mechanisms



- Physical/Chemical Processes
 - Filtration
 - Adsorption/Absorption
 - Cation/Anion exchange
 - Metals complexing
- Biological Processes
 - Degradation/Decomposition
 - Plant/Bacteria uptake

Biofiltration: New Technologies

- **Filterra: High Flow Media**
 - Same principles as traditional biofiltration
 - 100+ inches/hr flowrate
 - Reduced footprint – typically 1% of tributary drainage area
 - Quality control of media composition
 - NJDEP Approval

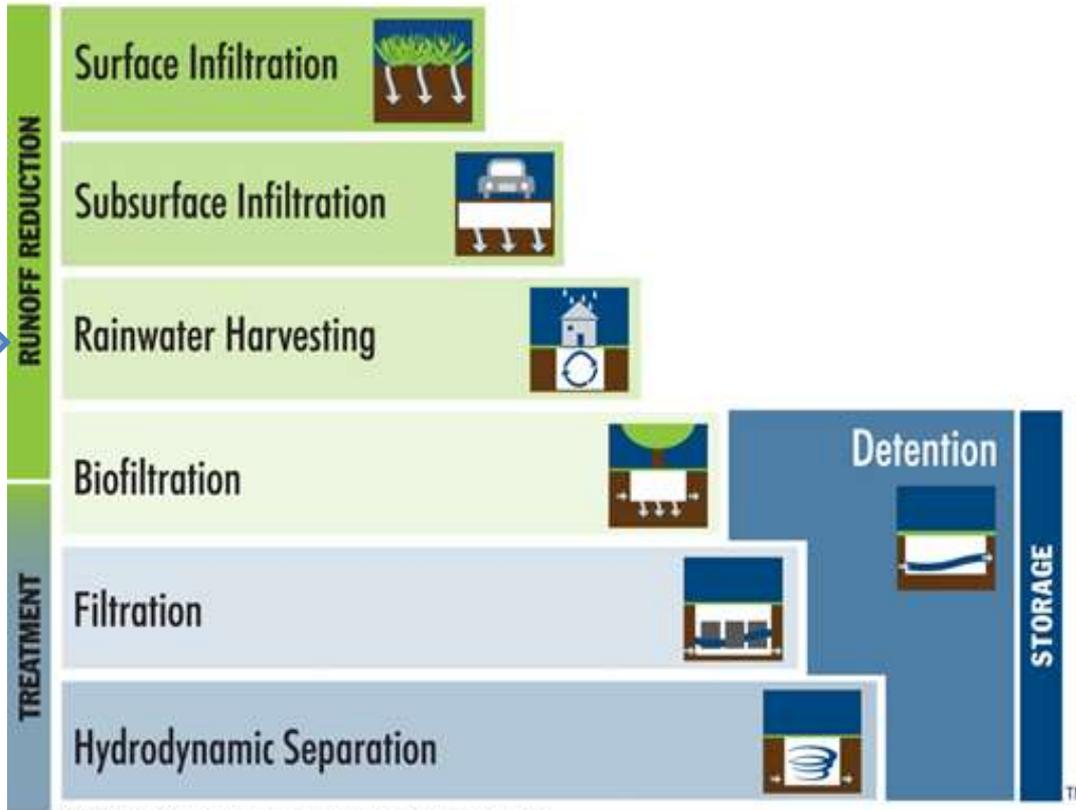


Filterra: Where is it?

- Sites >5 acres
- Municipalities that reference NJDEP



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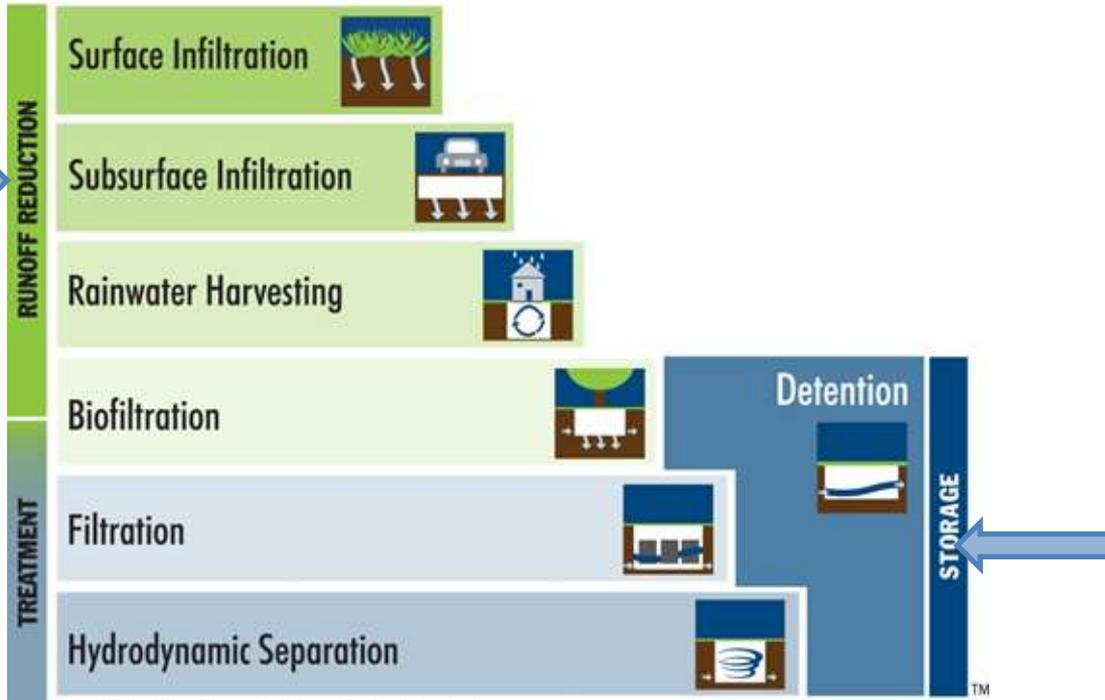


Rainwater Harvesting

- For Runoff Reduction
 - Must find reuse applications during wet season
- Reuse Applications
 - Irrigation
 - Toilet flushing
 - Clothes/Vehicles/Equipment Washing
 - Process water & Cooling Tower Makeup water



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