Green Infrastructure Overview

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RUTGERS
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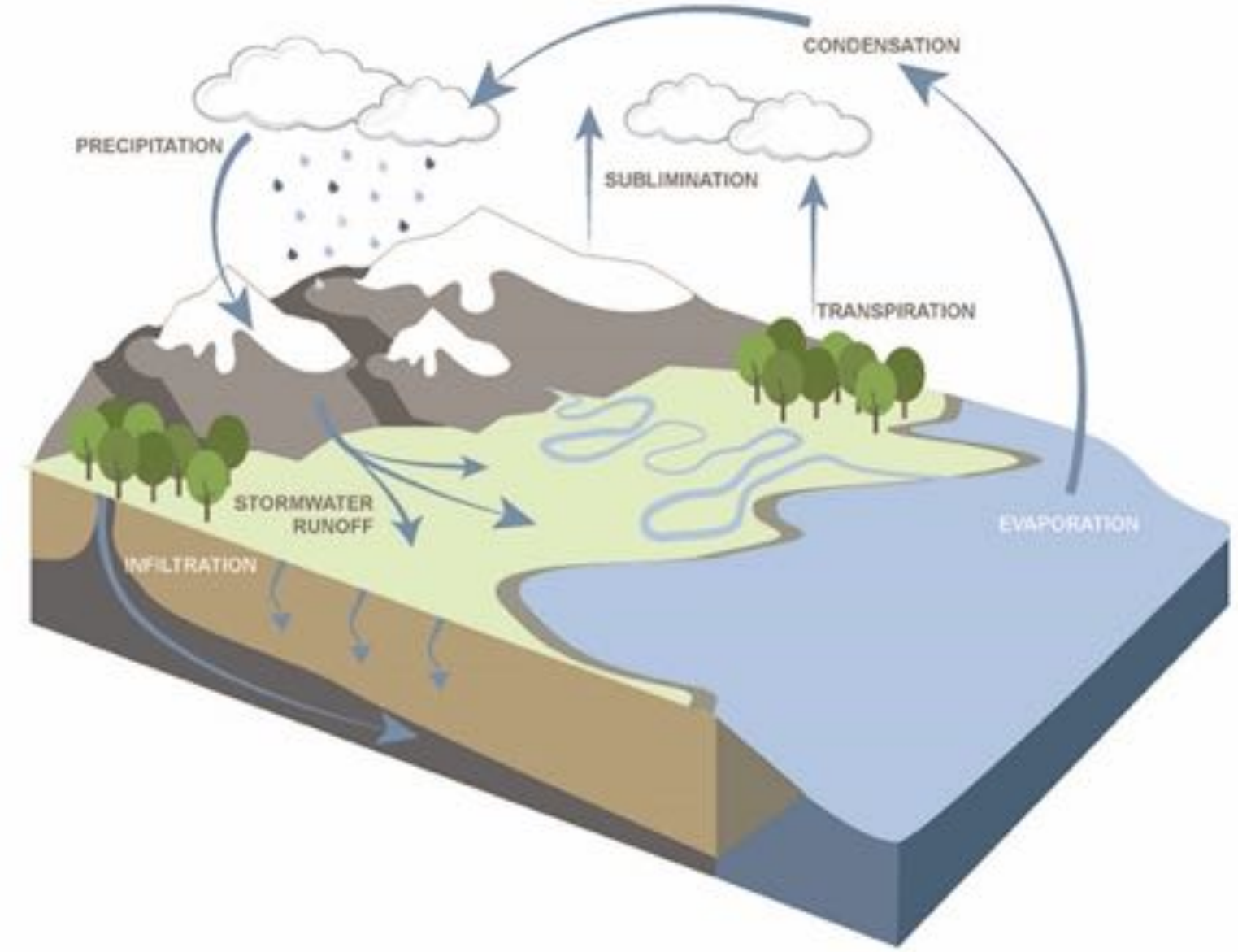
JERSEY WATER WORKS
Smart infrastructure. Strong communities.

Sea Grant
NJ Sea Grant Consortium

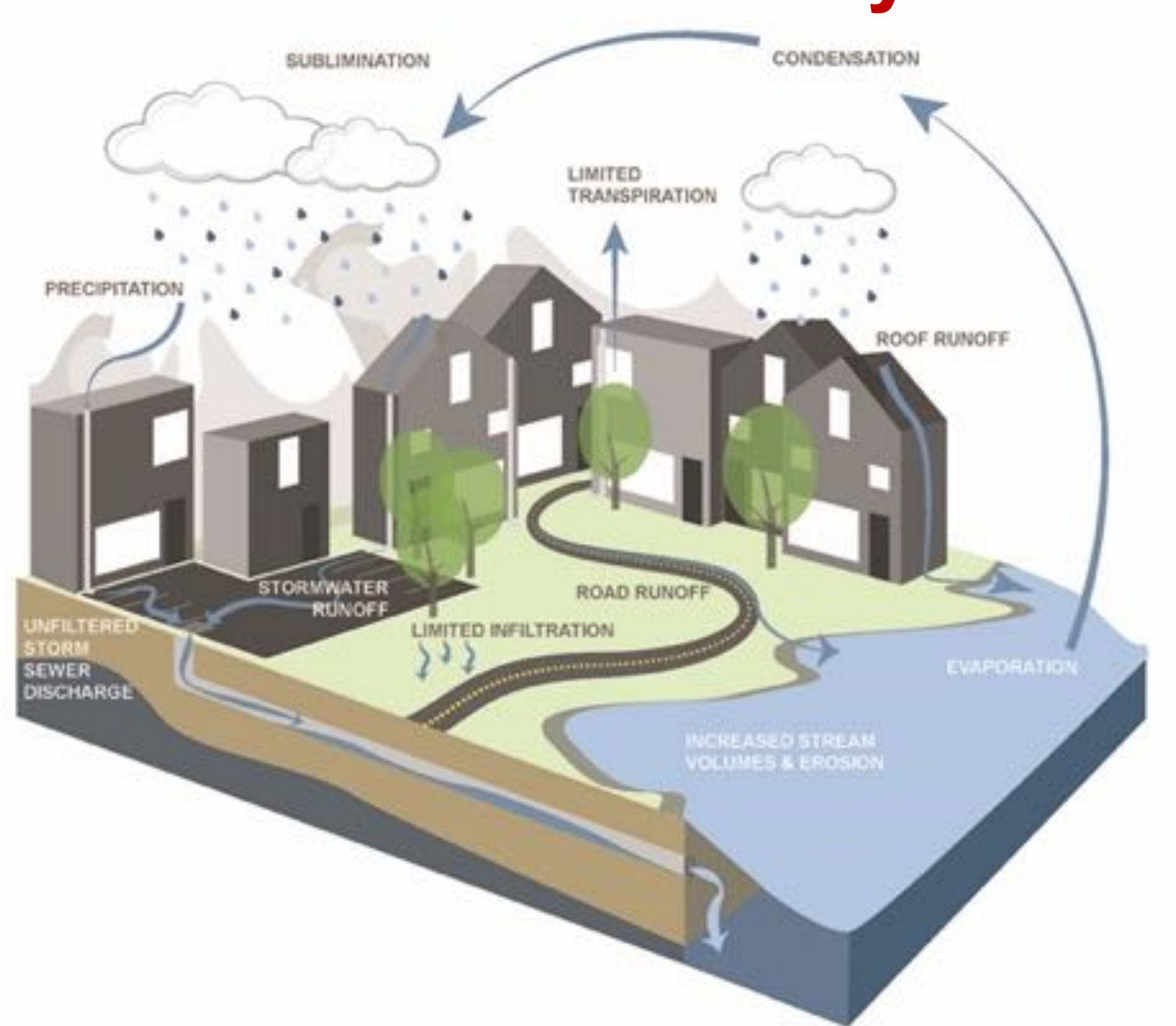
The Natural Water Cycle



Impervious Surfaces

More development → *More impervious surfaces* → *More stormwater runoff*

The Urban Water Cycle



What is stormwater?

Stormwater is the water from rain or melting snows that can become “runoff,” flowing over the ground surface and returning to lakes and streams.

Water Quality

Water Quantity (flooding)

More Flooding

And even more flooding

Is Green Infrastructure a solution?

…an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly.

Green Infrastructure projects:

- capture,
- filter,
- absorb, and
- reuse

stormwater to maintain or mimic natural systems and treat runoff as a resource.

Green Infrastructure

Stormwater management practices that protect, restore, and mimic the native hydrologic condition by providing the following functions:

- Infiltration
- Filtration
- Storage
- Evaporation
- Transpiration

Green Infrastructure Practices

Bioretention Systems

- Rain Gardens
- Bioswales
- Stormwater Planters
- Curb Extensions
- Tree Filter Boxes

Permeable Pavements

Rainwater Harvesting

- Rain barrels
- Cisterns

Dry Wells

Rooftop Systems

- Green Roofs
- Blue Roofs








TYPES OF BIORETENTION

Larger Bioretention Systems

- Single-family lots
- Commercial areas
- Parking lots

Planters & Planter Boxes

- Highly urban areas
- Right-of-way and adjacent to buildings

Rain Gardens

- Single-family lots
- Small commercial areas

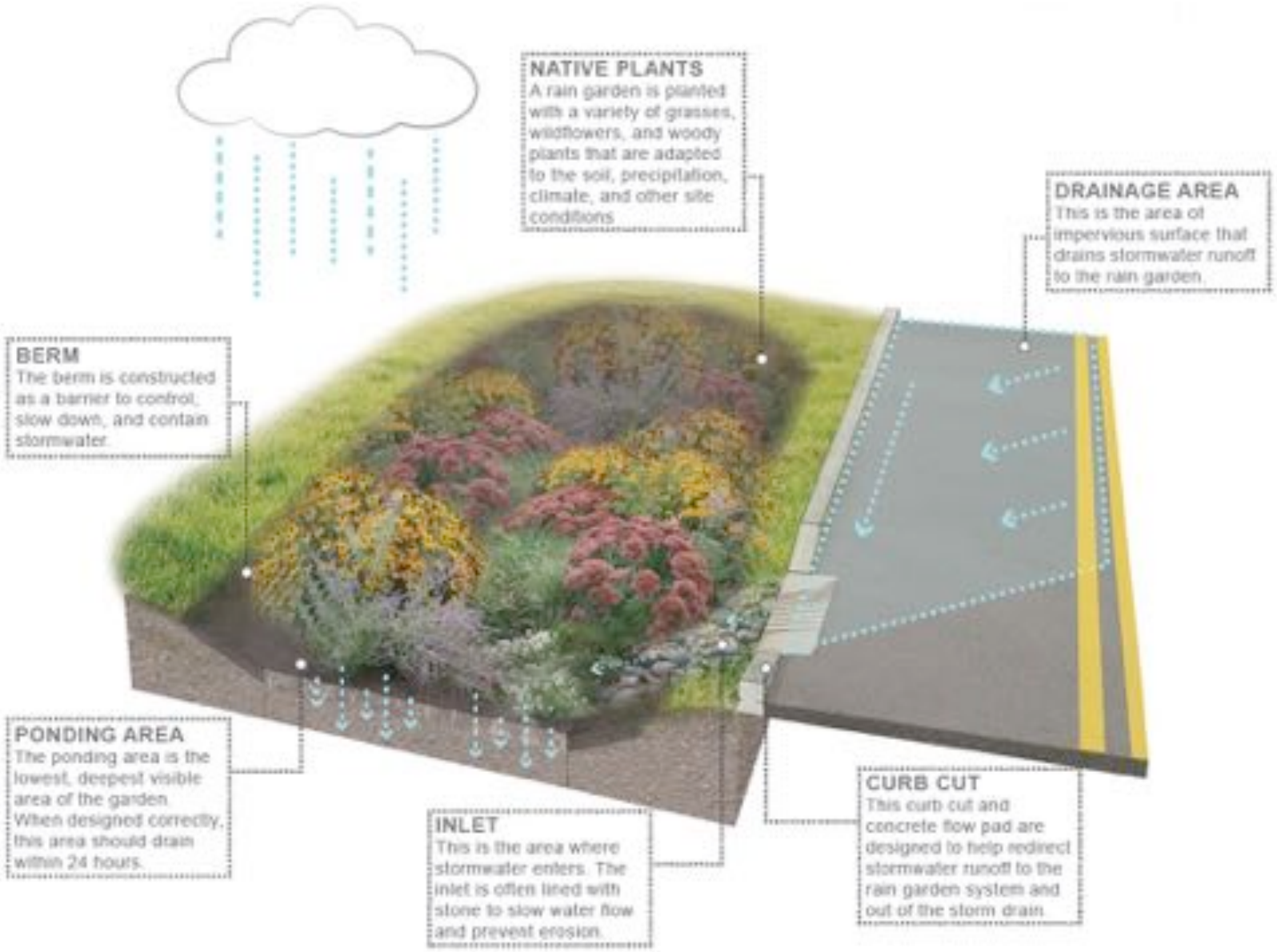
Bioretention Swales/ Bioswales/Vegetated Swales

- Typically in right-of-way

Vegetated Curb Extensions

- Bioretention incorporated into right-of-way in urban and suburban areas

Rain Gardens



Lots of Rain Gardens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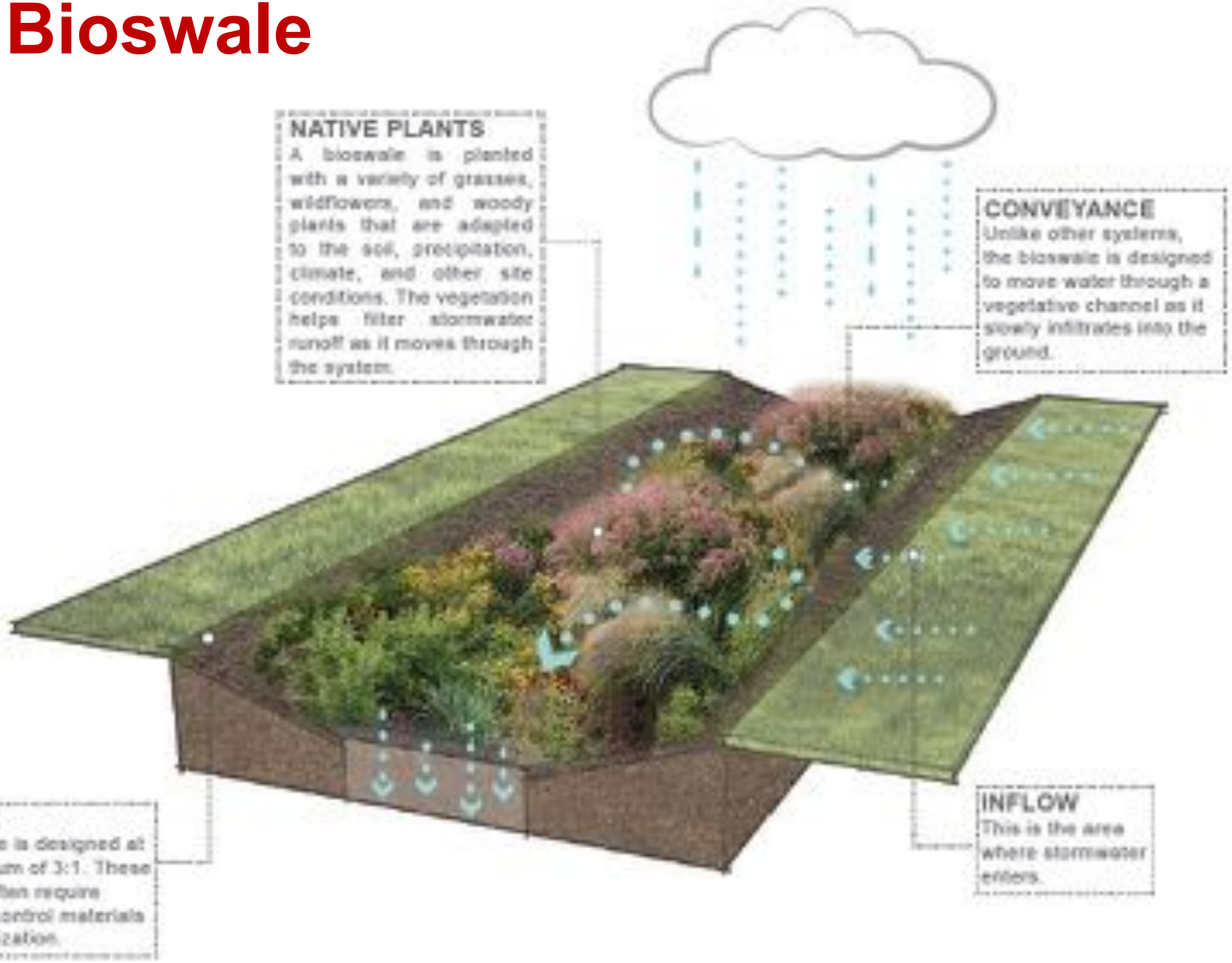
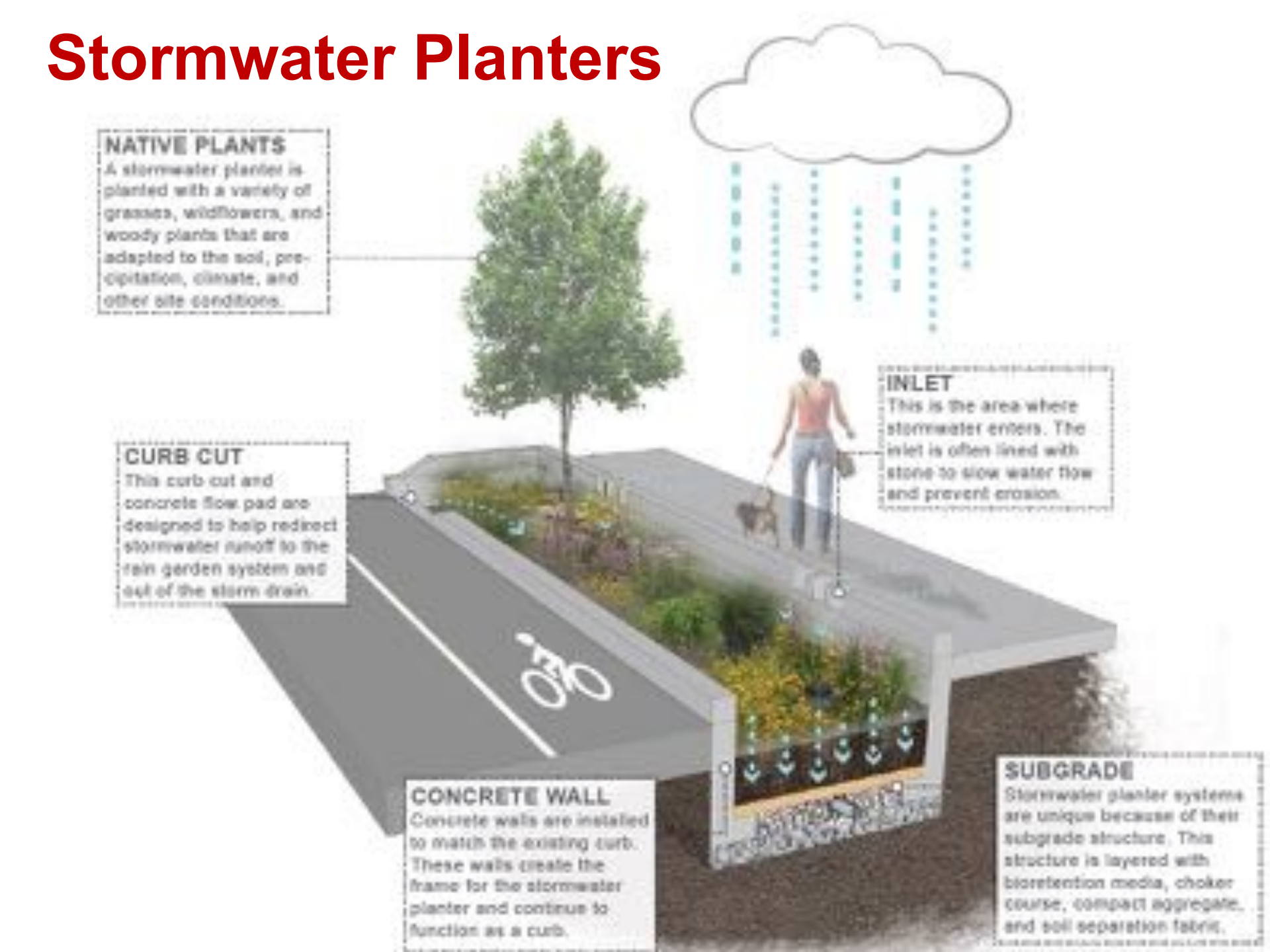
Bioswale

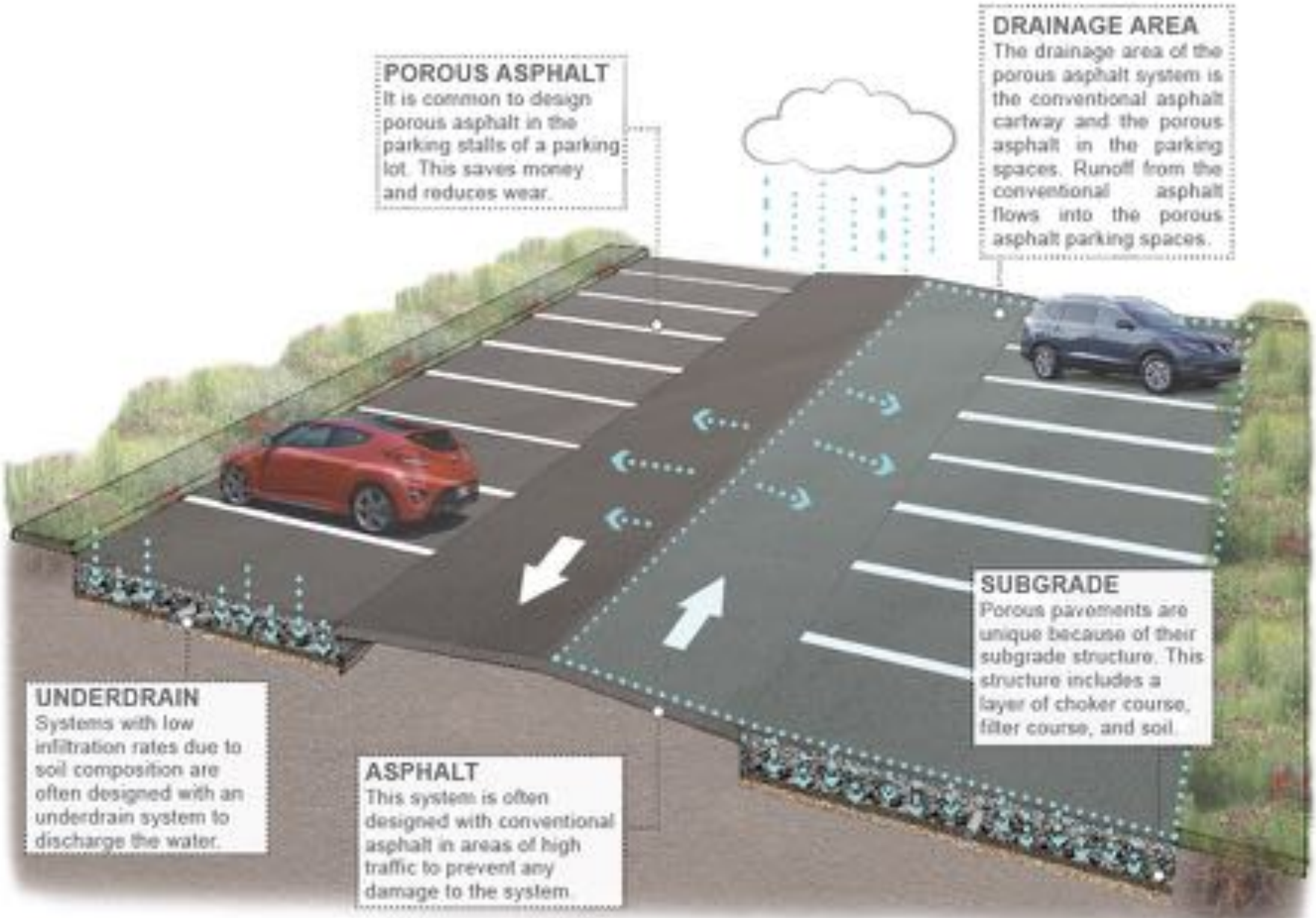

NATIVE PLANTS
A bioswale is planted with a variety of grasses, wildflowers, and woody plants that are adapted to the soil, precipitation, climate, and other site conditions. The vegetation helps filter stormwater runoff as it moves through the system.
CONVEYANCE
Unlike other systems, the bioswale is designed to move water through a vegetative channel as it slowly infiltrates into the ground.
SLOPE
The slope is designed at a maximum of 3:1. These slopes often require erosion control materials for stabilization.
INFLOW
This is the area where stormwater enters.

Stormwater Planters



Curb Extensions

Permeable Pavement



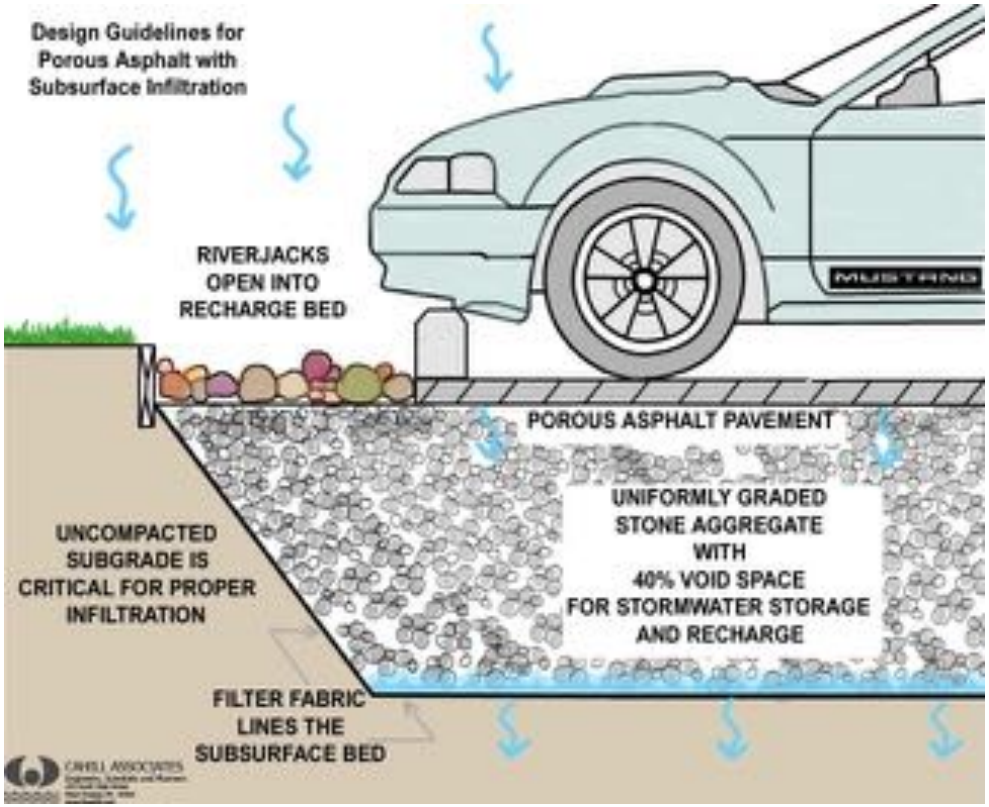
Permeable Pavements

- Underlying stone reservoir
- Porous asphalt and pervious concrete are manufactured without "fine" materials to allow infiltration
- Grass pavers are concrete interlocking blocks with open areas to allow grass to grow
- Permeable pavers systems are concrete pavers with infiltration between the spaces of the pavers
- Ideal application for porous pavement is to treat a low traffic or overflow parking area

ADVANTAGES

- Manage stormwater runoff
- Minimize site disturbance
- Promote groundwater recharge
- Low life cycle costs, alternative to costly traditional stormwater management methods
- Mitigation of urban heat island effect
- Contaminant removal as water moves through layers of system

COMPONENTS



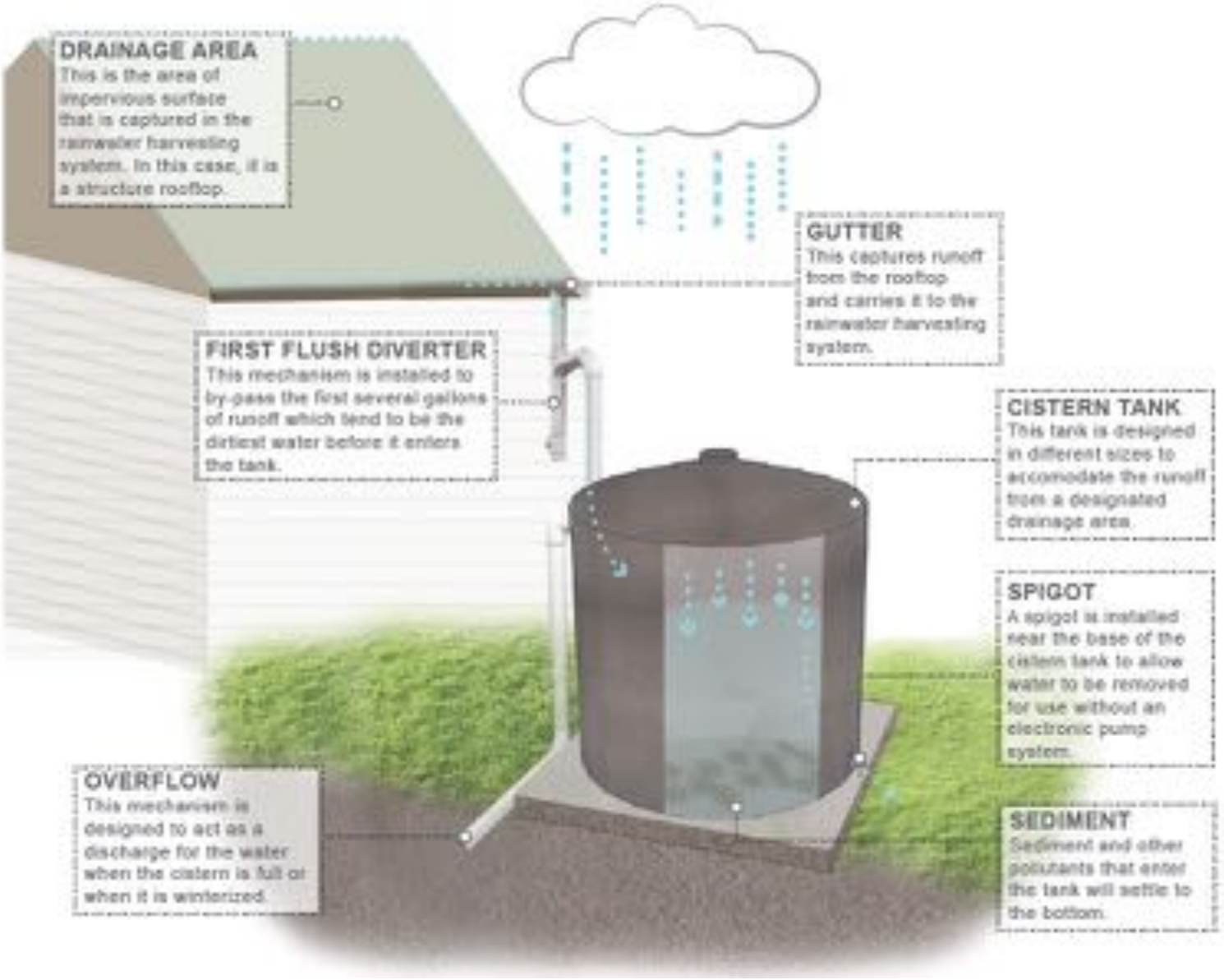
Porous Asphalt


Pervious Concrete

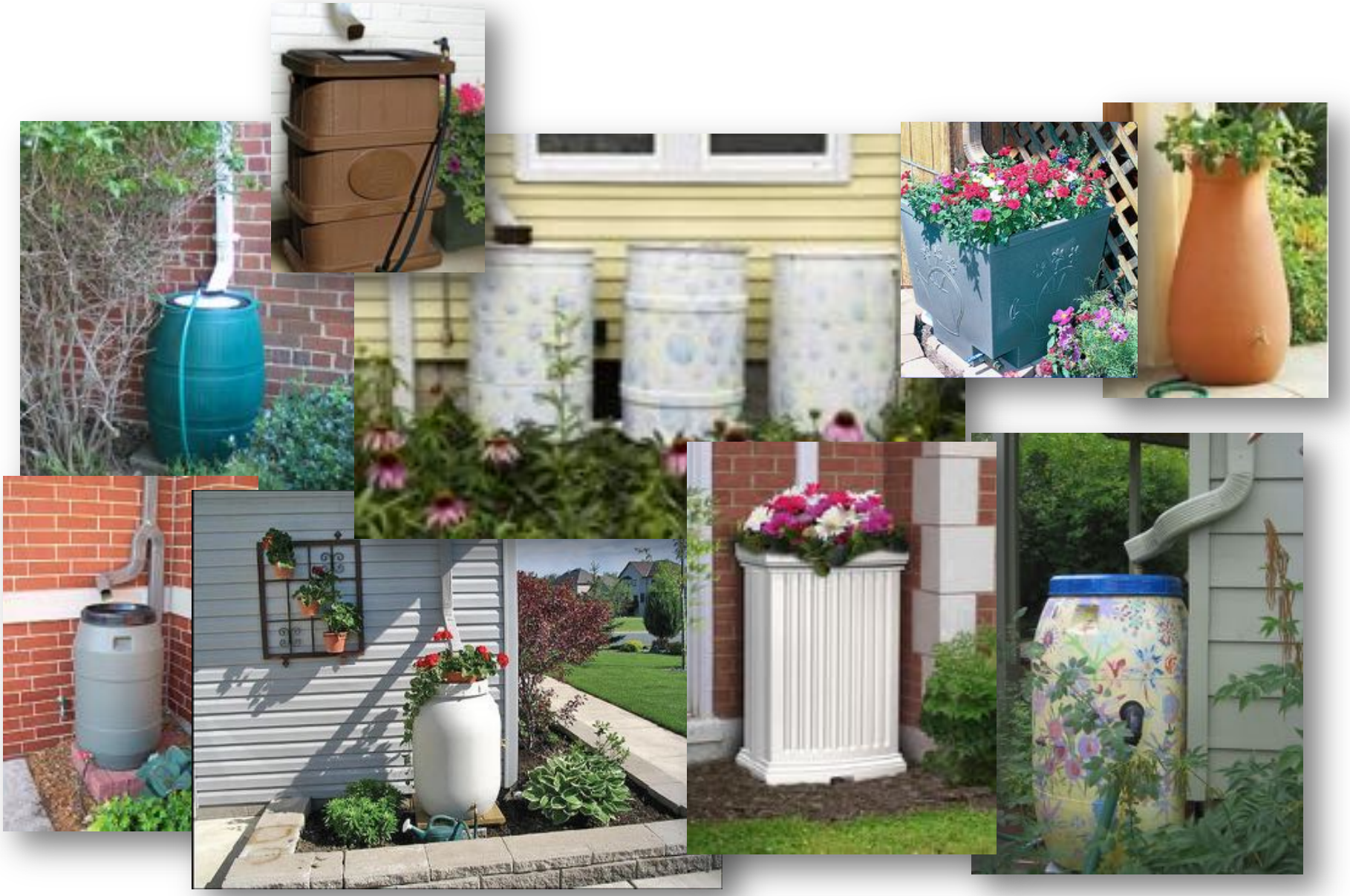

Permeable Pavers


Grass Pavers

Rainwater Harvesting Systems



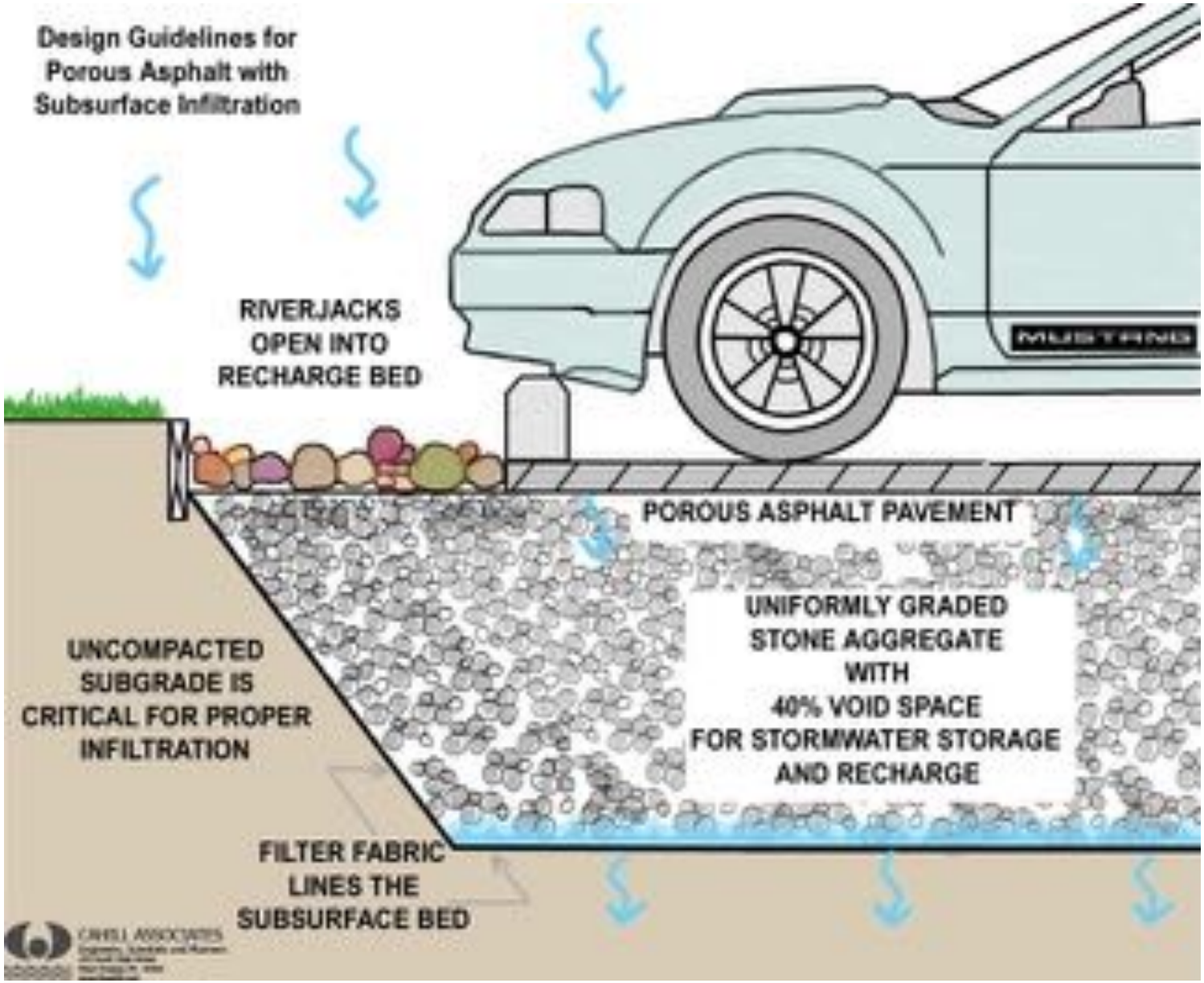
Rain Barrels



Cisterns

Let's get back to flooding – bioretention is an option but does it take up too much space?


7.24.2003


Design Guidelines for
Porous Asphalt with
Subsurface Infiltration
RIVERJACKS
OPEN INTO
RECHARGE BED
POROUS ASPHALT PAVEMENT
UNIFORMLY GRADED
STONE AGGREGATE
WITH
40% VOID SPACE
FOR STORMWATER STORAGE
AND RECHARGE
UNCOMPACTED
SUBGRADE IS
CRITICAL FOR PROPER
INFILTRATION
FILTER FABRIC
LINES THE
SUBSURFACE BED

What if …

every time we repave a parking lot in New Jersey, we convert it into a stormwater management system. For every acre of parking lot, we can capture stormwater runoff from the 100-year storm from four to five acres of impervious surfaces. When we include a rain garden, we can further increase the benefits.

In the meantime, do your part and install a rain garden.

Questions?

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