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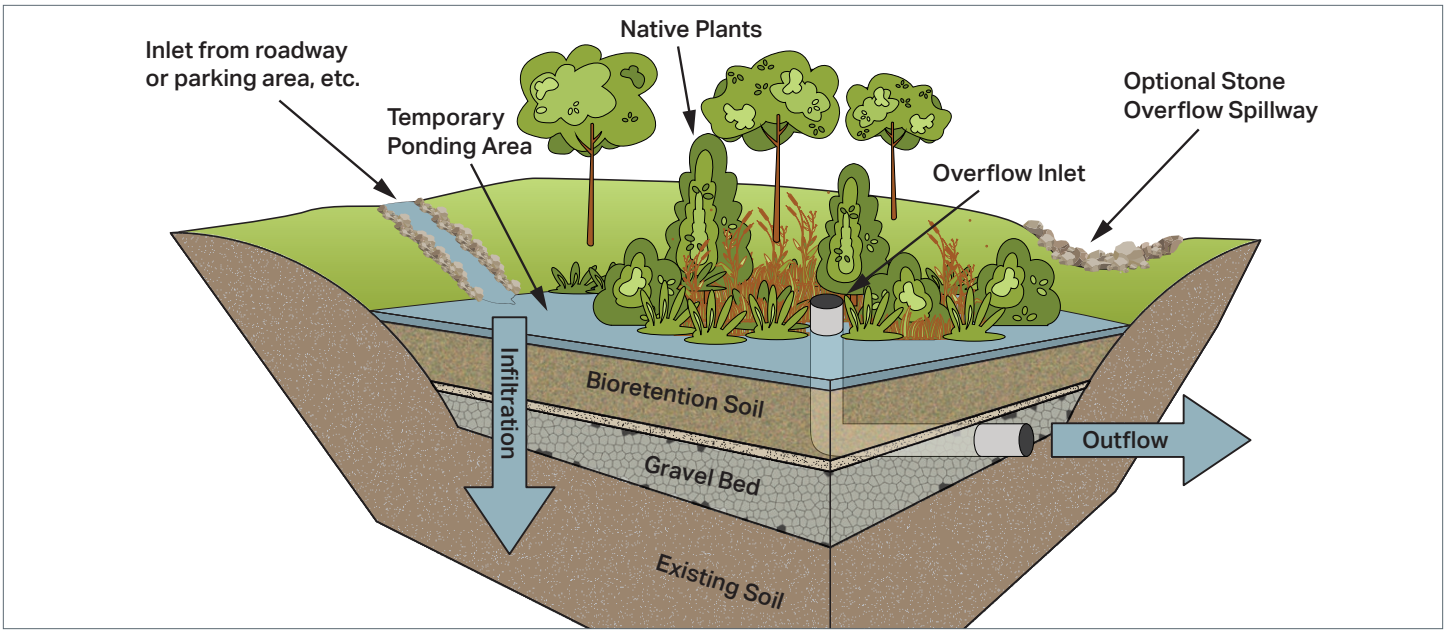
Bioretention Ponds

Their Distinct Role in Stormwater Management



A bioretention pond is a landscaping feature designed to manage and treat stormwater runoff. It helps slow down, capture, and filter water from impervious surfaces like roads, parking lots, and roofs, allowing pollutants like sediment, nutrients, and chemicals to be removed naturally before the water enters the groundwater or nearby water bodies.

Bioretention ponds are typically shallow, with a mix of soil, sand, and vegetation such as native plants, grasses, and trees. These plants help absorb water, reduce erosion, and improve water quality by filtering out contaminants.

HOW DOES A BIORETENTION POND DIFFER FROM A REGULAR STORMWATER DETENTION POND?

A bioretention pond and a regular stormwater detention pond both manage stormwater, but they function in different ways and serve slightly different purposes. A bioretention pond focuses on water quality and filtration, while a stormwater detention pond manages water quantity by controlling runoff.

Primary Purpose:

Bioretention Pond: Focuses on filtering and treating stormwater runoff. It uses plants, soil, and microorganisms to remove pollutants before the water infiltrates the ground or is released.

Stormwater Detention Pond: Primarily designed to temporarily hold and slowly release excess stormwater to prevent flooding. Its focus is more on controlling water volume rather than water quality.

Water Treatment:

Bioretention Pond: Treats water by filtering pollutants through layers of soil and vegetation. The water is cleaned as it infiltrates the ground or is drained out.

Stormwater Detention Pond: Typically does not treat water. The water is collected and stored during heavy rain and gradually released into the drainage system.

Vegetation:

Bioretention Pond: Includes native plants, shrubs, and trees that help with water filtration and uptake.

Stormwater Detention Pond: May have little to no vegetation, often just grass or no specific planting, since its primary role is holding water.

Water Infiltration:

Bioretention Pond: Allows water to infiltrate into the ground, promoting groundwater recharge.

Stormwater Detention Pond: Often lined to prevent infiltration and designed to discharge water at a controlled rate into storm drains or nearby water bodies.

Appearance:

Bioretention Pond: Typically more landscaped, resembling a natural garden or wetland area.

Stormwater Detention Pond: Appears more like a large basin or artificial pond designed to hold excess water during storms.

WHY ARE BIORETENTION PONDS NEEDED?

In urban and developed areas, impervious surfaces like roads, parking lots, and rooftops prevent rainwater from naturally infiltrating into the ground. This causes excessive runoff, leading to flooding, erosion, and strain on drainage systems. Bioretention ponds help capture and control this runoff, reducing the risk of floods.

As stormwater flows over surfaces, it picks up pollutants like oil, chemicals, sediment, and nutrients from fertilizers. Bioretention ponds use natural processes involving soil, plants, and microorganisms to filter and remove these contaminants, significantly improving the quality of the water before it reaches groundwater or streams.

HOW DO BIORETENTION PONDS WORK?

A bioretention pond works by capturing and treating stormwater runoff through a series of natural filtration processes. When rainwater enters the pond, it passes through several layers:

Surface Layer: The top is covered with plants like native grasses, shrubs, and trees that slow down water flow, promote infiltration, and absorb some pollutants.

Mulch Layer: Beneath the plants, a layer of mulch traps larger debris and provides a habitat for microorganisms that break down organic matter.

Soil Layer: The main filtering layer, made of sandy or loamy soil, removes contaminants like metals, nutrients, and sediment as the water seeps through.

Drainage Layer: Below the soil, a gravel or sand layer helps with drainage, ensuring the filtered water either infiltrates the ground or flows to an underdrain system for controlled release.

Through this multi-layer system, bioretention ponds clean stormwater, manage runoff, and promote groundwater recharge.

CONSTRUCTION

East Coast Civil Group brings extensive experience in civil construction to the installation of bioretention ponds. Our expertise in managing complex site development projects ensures that every aspect of pond construction is handled with precision and efficiency – from excavation and drainage installation, to soil layering and planting. Our dedicated and experienced team is well-equipped to handle both large and small-scale bioretention pond projects.