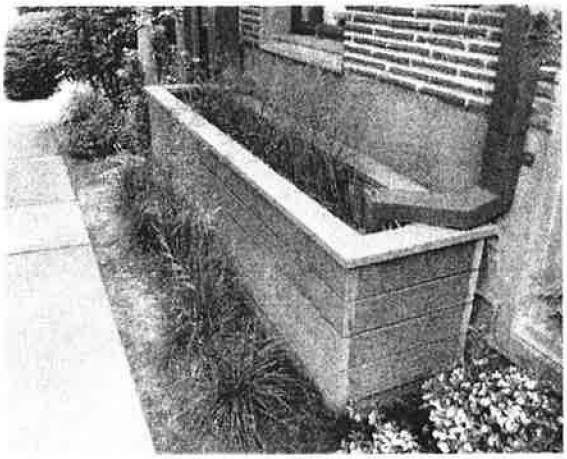
SOLUTIONS

We can start addressing stormwater runoff through changes in **infrastructure.** **Gray infrastructure** carries stormwater out of cities through sewers and pipes. **Green infrastructure** uses vegetation, soils, and natural processes to soak up and store stormwater.

Common examples of green infrastructure include:

Planter boxes that intercept, store, and filter stormwater runoff from downspouts that are flow into pervious, instead of impervious, ground. These are called **disconnected downspouts**. Runoff is retained and stored in the soil and intercepted by plants, which **evapotranspire** moisture. Planter boxes are commonly used in urban areas next to buildings and along sidewalks.



Green roofs are vegetated roof covers. The vegetation helps absorb and evapotranspire stormwater runoff, as well as delay and filter runoff flows that exceed the roof's runoff storage capacity. Green roofs also provide natural thermal insulation, meaning they are cooler in summer and warmer in winter. As a result, they help reduce building energy use.

Native plants are species that were growing naturally in an area before humans introduced plants from distant places. They evolved to survive the soil, moisture, and weather conditions of a particular location, with a higher ability to survive winter cold and summer heat. They are also resistant to more pests and diseases in a given area. Once established, they require no irrigation or fertilization, thereby increasing water conservation and protecting water quality. They increase biodiversity by providing food and shelter for wildlife like birds and butterflies.

Phytoremediation refers to the use of plants to contain, degrade, or eliminate contaminants such as metals, pesticides, solvents, explosives, crude oil and its derivatives from contaminated soils, water, or air.

Rain gardens are gardens filled with native plants. The plants and soil in the garden remove contaminants and sediment from stormwater runoff through **bioretention.** Native plants provide wildlife habitat, and have lower irrigation and maintenance costs than traditional forms of landscaping.

Rain barrels and **cisterns** collect stormwater through a disconnected downspout. They help protect water quality by keeping runoff out of sewers, and conserve water by eliminating the need to use potable water for irrigation.

Bioswales are gently sloped ditches vegetated with native plants that reduce runoff through infiltration and evapotranspiration. They are often located in parking lots or next to roads in lieu of curbs and gutters. They improve water quality by infiltrating and filtering stormwater runoff.

Permeable pavement systems allow liquids to infiltrate through void spaces in hard materials while maintaining the functionality of an impervious surface. These might include porous asphalt, porous concrete, gravel, and pavers, which are concrete surfaces installed with gaps to allow water to pass through.

VOCABULARY LIST

Stormwater
Groundwater
Pore Space
Impervious / Impermeable Surface
Runoff
Watershed
Polluted Runoff
Erosion
Thermal Pollution
Hydrographs
Rising Limb
Lag Time
Peak Flow
Falling Limb
Combined Sewer System
Combined Sewer Overflow
Infrastructure
Gray Infrastructure
Green Infrastructure
Planter Boxes
Disconnected Downspouts
Evapotranspiration
Green Roofs
Native Plants
Phytoremediation
Rain Gardens
Bioretention
Rain Barrels/ Cisterns
Bioswales
Permeable Pavement