



# COMMUNITY BUILDER

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## Retention vs. Detention Ponds

A retention pond is designed to hold a specific amount of water indefinitely. Usually, the pond is intended to have drainage leading to another location when the water level gets above the pond capacity, but still maintains a certain volume of water. Retention ponds capture the diverted stormwater runoff from streets, gutters, and other impervious surfaces, such as roofs, parking lots, and sidewalks. Retention ponds provide two primary services. First, they retain runoff before releasing it into streams or other bodies of water. The ponds release the water at flow rates and frequencies similar to those that exist under natural conditions (before land clearing and development). The flood volume held in a retaining pond reduces the impact on downstream stormwater systems. The second service of retaining ponds is providing pollutant removal through settling and biological uptake. (Biological uptake is the transfer of substances from the environment to plants, animals, and humans.) Ponds remove 30-80% of certain pollutants from water before entering other water bodies or watersheds. Common pollutants reduced are sediments, bacteria, greases, oils, metals, total suspended solids, phosphorous, nitrogen, and trash. Ponds are one of the most effective tools for providing channel protection and pollutant removal in urban streams. Essentially, retention ponds offer water quality and quantity control.



Aquatic vegetation is often associated with wet ponds. Vegetation such as grasses and plants can establish themselves in the wet ponds, thus providing extra pollution removal. The aquatic plants serve as an extra filter in the pond. They assimilate dissolved pollutants and, by "biological uptake," transform pollutants into less toxic materials. Microorganisms often establish themselves in wet ponds and aid in breaking down pollutants.

Dry ponds, also called "detention ponds," are stormwater basins designed to intercept a volume of stormwater runoff and temporarily impound the water for gradual release to the receiving stream or stormwater sewer system. Dry ponds are designed to empty between

runoff events and therefore provide mainly runoff rate control instead of water quality control. Dry ponds can provide limited settling of particulate matter, but subsequent runoff events can resuspend a large portion of this material. Therefore, dry ponds should be viewed as a way to reduce the peak discharge of stormwater into receiving streams or stormwater sewers to limit downstream flooding.

Most dry detention ponds are designed to empty in a period of less than 24 hours, resulting in lower contaminant removal (the inter-event settling time does not exist) than wet ponds. If water quality treatment is the intended goal of the pond, a wet or extended storage pond design should be considered.

Maintenance is required for the proper operation of dry ponds. Plans for dry ponds should identify owners or parties responsible for maintenance and an inspection and maintenance schedule for extended storage ponds. Once constructed, the dry pond should be inspected after several storm events to confirm drainage system functions, bank stability, and vegetation growth. The outlet structure should be inspected for evidence of clogging or outflow release velocities greater than the design flow. At least twice during the growing season, accumulated trash and debris should be removed from the side slopes, embankment, and spillway. All dry pond outlet devices should be protected from clogging. Sediment should be removed from the pond as necessary, at least once every 5 to 25 years (usually sooner rather than later).

Residential areas also pose an added threat to the stormwater systems with such everyday activities as fertilizing and watering lawns, washing cars, and painting houses. The simple act of water runoff from fertilization will increase the buildup of nutrients in a wet pond. A shallow basin and warm weather can create an algae bloom that will cause the pond to attain green scum or large clumps of algae floating on the surface. This bloom can remove the oxygen from the water and kill off any fish or other aquatic inhabitants, creating an unsightly and smelly mess. Grass clippings blown into the pond from mowers facing the wrong way when washed into the storm sewers, contributing to problems with sediment and clogging of the pipes. Not only is it unsightly, but the decomposition of the material adds nutrients that can cause other problems.

Ponds are beneficial for providing stormwater abatement and the removal of pollutants from stormwater, whether dry or wet. Many states realize the potential benefits of retention ponds. For example, Florida began requiring stormwater treatment in new developments in the 1980s, and thousands of ponds have been designed and built to help meet this need.

Speak to your community manager, pond management company, or local stormwater regulatory group on best practices for your community's ponds.

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