

Bucks County

Innovative Stormwater Management Best Management Practices

Water Reuse - Land Application BMP Component
Designed & Presented by:



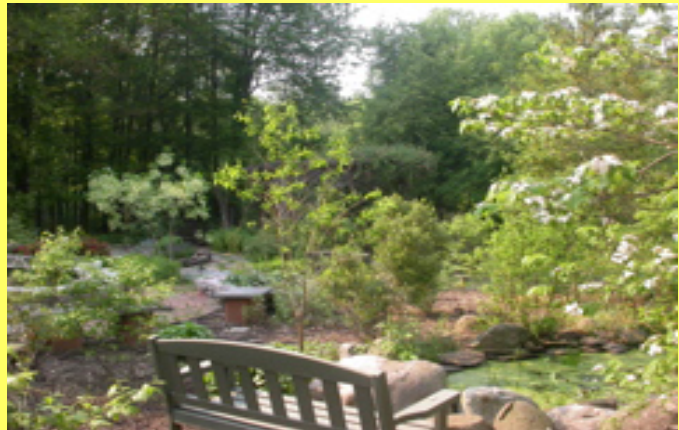
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BMP Tour and Brochure Organized by:

Bucks County Planning Commission

Buckingham Township Water and Wastewater Department

Innovative Wastewater Treatment and Reuse

Spray irrigation began as a method of disposing and recycling treated wastewater from municipal systems.

From a public health and environmental health perspective, spray irrigation is one of the most beneficial ways of dealing with all aspects of wastewater.

When properly designed, spray irrigation places effluent where plants can take up nutrients; sunlight can provide some disinfection; soil microbes can consume

remaining organic matter; groundwater resources are recharged; and point source discharges are eliminated.

Once the wastewater is treated and disinfected to remove harmful substances, what remains are valuable nutrients such as nitrogen and phosphorus.

The treated wastewater can then be sprayed onto agricultural crops, golf courses and forested areas. The nutrients are also used by the plant material as fertilizer. The water is continually treated as it passes through the layers of soil and eventually returns to the groundwater, ready to begin the cycle again.

The land is irrigated at a rate based on the ability of the plants to use the nutrients and the ground to accept the water. This process prevents groundwater contamination and runoff.

Properly designed and operated, spray irrigation is cost effective, beneficial and is not a nuisance.

Source: Community Wastewater Systems Lagoon/Spray Irrigation brochure. Castle Valley Consultants



Left: Aerial views of the Furlong lagoons in Buckingham Township.

Buckingham Township Water and Wastewater Department

Benefits of Spray Irrigation

- ★ Capable of producing the highest quality of treated water of all land disposal methods;
- ★ Significantly reduces the potential of surface water and groundwater degradation;
- ★ Serves as a means for recharging the groundwater aquifers, thereby reducing the risk of saltwater intrusion into freshwater supplies in coastal areas;
- ★ Provides an alternative source of water for irrigation purposes, thereby eliminating the need to tap freshwater supplies;
- ★ Promotes preservation of open space and recreational areas;
- ★ Promotes preservation of agriculturally productive lands;
- ★ Economic return from use of water and nutrients to produce marketable crops;
- ★ Long-term savings in operation and maintenance particularly when used in conjunction with a lagoon treatment system;
- ★ Leasable irrigated lands available to farmers or nurserymen;
- ★ Cost savings realized from the reduction in the amount of commercial fertilizers needed when crops are irrigated with treated wastewater;
- ★ Potential enhancement of property values of surrounding properties with the assurance that irrigated lands will never be developed.

Source: Community Wastewater Systems Lagoon/Spray Irrigation brochure. Castle Valley Consultants

Buckingham Township Water and Wastewater Department

Stage one Lagoon was installed in 1989. Raw sewage enters this holding area where solids settle out before the water is released into lagoon two, which is the second stage of the process.

Treated wastewater is sprayed via an irrigation system, which is located in the lawn area to the left of the lagoon.



Wastewater Recycling System

Buckingham Township Water and Wastewater Department

Treatment Process

When a lagoon treatment/spray irrigation system is used, the wastewater is continually treated from the time it enters the lagoon until it filters through the soil. In many of the 50 states, wastewater must be subjected to secondary treatment before spray irrigation is undertaken. In a secondary treatment process, wastewater is first run through a coarse screen or comminutor to break apart the solids. The wastewater is then subjected to a biological treatment process followed by disinfection before reaching the spray field.

This biological process is accomplished by using a series of lagoons that combine natural sunlight and air with mechanical devices that introduce air (oxygen) into the wastewater to obtain the required treatment level. These lagoons have the built-in ability to treat and store the wastewater for a period of up to 90 days without any discharge to the spray irrigation system.

It is recommended that a lagoon treatment system be used in conjunction with spray irrigation to maximize the environmental and economic benefits of each technology. In place of expending vast amounts of energy to remove the nitrates and phosphates, these nutrients remain suspended in the wastewater and are used by the plants as fertilizer as the water is irrigated onto crops.

Wide variations in flow and the introduction of toxic substances into a system are common problems encountered in the day-to-day operation of most conventional wastewater systems. While a lagoon treatment system cannot prevent these events from occurring, it can eliminate or substantially reduce the negative environmental impacts that are inevitable in a conventional stream discharge plant.

A lagoon can also substantially reduce sludge handling and eliminate the need to periodically upgrade the process to meet increased discharge requirements found in conventional discharge systems. Both storage and treatment time are items built into the design of a lagoon treatment system, which minimizes these environmental and economic impacts.



Above: The proximity of the lagoons and spray irrigation system has not been an impediment to the construction or sale of new homes. A housing development, located just beyond the wastewater treatment system, is visible in this picture.