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FRANKLIN SOIL AND WATER CONSERVATION DISTRICT

The Urban Review

Sediment & Erosion Control Information Newsletter

Wetlands for Storm Water Management

Storm water, or constructed wetlands, play an important part as sustainable infrastructure to manage storm water runoff. These systems are structural practices that function similarly to wet ponds but the runoff volume is both stored and treated in the wetland system. As water moves through the system, pollutants are removed through uptake by wetland vegetation and algae, vegetative filtering, and gravitational settling in the slow moving marsh flow. Other pollutant removal mechanisms are also involved in a storm water wetland, including chemical and biological decomposition and volatilization.

Wetlands are among the most effective storm water management practices in terms of pollutant removal, groundwater recharge, channel protection, and flood protection. They are also low maintenance, while providing wildlife habitat and aesthetic value. Pollutant removal rates of 80% of total suspended solids, 50% of metals, 70% of pathogens, and 30% or more of nutrients can be achieved using these systems. Storm water wetlands are designed specifically for the purpose of managing storm water runoff and are significantly less diverse than natural wetlands in both plant and animal life.

While natural wetlands can sometimes be used for the management of pre-treated runoff, it is not a recommended practice. It is very difficult to maintain the proper hydrologic balance without causing damage to the delicate natural system. Too much added storm water can degrade the wetland and result in destruction of natural habitats and plant life.

Storm water wetlands are generally suitable for most types of new development and redevelopment, and can be used in both residential and nonresidential areas. However, due to the large land requirements, wetlands may not be practical in higher density areas.

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The physical requirements of successful constructed wetlands make them eminently suitable for Franklin County installation. Soils in hydrologic groups C or D with minimal slope (under 8%) and a high seasonal water table are ideal. (If receiving hot spot runoff they must have at least two feet of soil between the bottom of the wetland and the high water table.) A minimum of 25 acres of contributing drainage area and a positive water balance are needed to maintain wetland conditions throughout the year.

Well designed wetlands consist of shallow marsh areas of varying depths with wetland vegetation, a permanent micropool, and an outlying zone in which storm water runoff control volumes are stored. Additionally, all wetland designs must include a sediment forebay at the inflow to allow the heavier sediments to drop out before the runoff enters the wetland marsh area. Other design features include an emergency spillway, length to width ratio of 2:1 for maximum pollutant removal, maintenance access points, wetland buffer, and appropriate wetland vegetation and native landscaping.

Maintenance of constructed wetlands is fairly simple. It usually involves removal of sediment build-up from the forebay when it reaches 10-12 inches deep and harvesting and composting of excess vegetation every few years. Inspection of outlet structures is recommended at least annually.

With the advantage of increased wildlife habitat and visual appeal, wetlands should increase in popularity as another green infrastructure strategy for managing storm water in future projects.

Excerpts from:
Georgia Stormwater Management Manual, Volume 2,

Storm Water Catch Basin Retrofits

A catch basin (a.k.a. storm drain inlet, curb inlet) is an inlet to the storm drain system that typically includes a grate or curb inlet where storm water enters the catch basin and a sump to capture sediment, debris, and associated pollutants. They are also used in combined sewer watersheds to capture floatables and settle some solids. Catch basins act as pretreatment for other treatment practices by capturing large sediments. The performance of catch basins at removing sediment and other pollutants depends on the design of the catch basin e.g., the size of the sump, and routine maintenance to retain the storage available in the sump to capture sediment.

Catch basins have three major limitations. Typically, catch basins cannot remove pollutants as well as other storm water treatment practices such as wet ponds, sand filters, and storm water wetlands. Unless they are frequently maintained, catch basins can become a source of pollutants through resuspension; and catch basins cannot effectively remove soluble pollutants or fine particles. When properly installed, a catch basin will drain completely, dry out, and have no extended period of standing water. Many times the improper installation and alignment of the catch basin results in a pipe connection higher in the catch basin that results in a pool or the connecting pipe has a reverse slope that causes pooling in the catch basin. Pools in catch basins result in stagnant water that often become a source of foul odors, mosquitoes, and high bacterial counts that flush and foul the downstream discharge point. This can be a serious urban problem where combined sewer systems exist and illicit discharges are also taking place.

Typically, the voids in catch basins that cause the pooling can be grouted with cement to fill the pool area. This ensures that water drains completely from the basin. Sometimes this is not possible because of multiple pipes entering a catch basin at differing levels or the need for a sump area for maintenance purposes.

A growing trend in the design of catch basins is to include green infrastructure components. Urban storm water retrofits at the catch basin can result in relatively low cost storm water benefits when compared to the high land costs in ultra urban settings.

New ideas and products for catch basin retrofits include infiltration, bioretention, and evapotranspiration mechanisms to achieve high levels of water quality.

Upcoming Workshops and Events

The Ohio Contractors Association is hosting CESSWI exam review sessions and exams on September 16, 17, and 18. Contact Chris Engle for more information at **cengle@ohiocontractors.org.** All those wishing to sit for the exams must be pre-approved by CESSWI or CPESC, Inc. For application details contact them at **info@cesswi.org** or at **info@cpesc.org**.

The new Grange Insurance Audubon Center on the Whittier peninsula will hold its grand opening on Saturday, August 28. Visit this model for sustainable design for workshops, displays, and an opportunity to review their many green infrastructure practices.

Save the Date! Franklin Soil and Water Conservation District will hold our 63rd Annual Banquet and Board of Supervisors' Election on October 22, 2009 at the Grange Insurance Audubon Center. For more information or to make a silent auction donation contact Sherry at (614) 486-9613.

You're invited to attend MORPC's Summit on Sustainability & the Environment on October 6 at COSI in Columbus. Jack Hanna, a keynote speaker, will be followed by sessions covering energy efficiency, sustainable growth, local food and more. Visit **www.greenregion.org** for more information and to register.

Green Infrastructure Demonstration

Franklin Soil and Water is implementing a green infrastructure project at the Franklin County fairgrounds to demonstrate low cost techniques to improve urban storm water runoff. The first phase was installed and demonstrated during the recent county fair.

Storm water retrofitting is maximizing the use of existing green infrastructure or creating additional features that use natural intrinsic properties. At this site, grassed areas are treating storm water that falls directly on the grass or delivering storm water as concentrated flow along the drainage path. Sheet flow off adjacent pavement and rooftops is concentrated by curb stops, downspouts and grassed swales to the catch basin. Sediments are retained in the grass but little else is accomplished by using this rapidly draining system.

The location consists of a large paved parking area, midway, and paved display surface adjacent to curbed lawn areas along the Edwards Building. A catch basin located in the middle of one of the grassed areas is the drainage point for almost 10,000 square feet of drainage area. Runoff is directed off the pavement to the grassed areas; however, the placement of curbing along all of the edges directs flows to the open portions at intersecting sidewalks and down the existing grassy swale to the catch basin. Rooftop runoff is piped directly to the catch basin.

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In order to increase the treatment of storm water runoff for this site, various low cost techniques are used. They lengthen the flow path before discharge and increase the time of concentration on the site to allow greater sedimentation and infiltration into the soil. They also retain and reuse the rainwater.

The existing curb stops along the pavement have been raised slightly at alternate curb sections to achieve broad sheet flows off the pavement area to the grassed areas. Broad, low flows to grassed areas increase the flow path and the time of concentration. This lessens the energy of the runoff allowing sediments to settle and infiltration to occur over more of the grassed areas before reaching the discharge point.

The catch basin has been retrofitted with a small overflow weir at the outfall. This will create a shallow pool around the structure and serve to promote infiltration of lesser rain events into the surrounding soil while allowing larger events to flow normally into the existing storm water system. Standing water will occur at the catch basin; the ground water and grass will benefit from the additional input. Infiltration of runoff into the soil will be rapid and bare or soggy areas will not develop nor will potential pest problems.

A rain barrel was installed during the recent fair at one of the downspouts for storage of the rooftop runoff. The addition of several rain barrels would add to the storage of runoff during storm events. This helps to control downstream storm water volumes that erode stream banks and allows the reuse of a valuable natural resource.

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District programs and services are offered on a non-discriminatory basis.

BMP Review: Construction Site Pollution Controls

While sediment is the primary pollutant of concern during construction activity, other pollutants need to be considered as well. These include; asphalt, oil, construction chemicals, paints, concrete wash water, solvents, and construction debris. Keeping these pollutants out of runoff can be accomplished, for the most part, through good housekeeping and following the manufacturer's recommendations for use and disposal.

Wastes generated by construction activities must be disposed of in accordance with ORC 3734 and ORC 3714. Hazardous and toxic substances are used on most construction sites. Good management of these substances is always needed.

Good erosion and sediment control will prevent some pollutants in addition to sediment from leaving the site; however, pollutants carried in solution or as surface films on runoff water will be carried through most erosion control practices. These pollutants become nearly impossible to control once carried offsite in runoff. Construction wastes, many containing toxic chemicals, are routinely buried on-site, dumped on the ground, poured down a storm drain, or disposed of with construction debris. This brings up the need for additional preventive measures.

Construction personnel, including subcontractors, must be made aware of the following guidelines regarding disposal and handling of hazardous and construction wastes:

- Prevent spills
- Use up all products
- Follow label directions for disposal
- Recycle wastes whenever possible
- Don't pour wastes into waterways, storm drains, or onto the ground
- Don't bury chemicals or containers
- Don't burn chemicals or containers
- Don't mix chemicals together

ODNR Rainwater and Land Development Manual