PUTNAM VALLEY CENTRAL SCHOOL DISTRICT
PUTNAM VALLEY, NY

MS4PY3 STORMWATER PROGRAM

FACT SHEET # 2
MARCH 2013

ONGOING STORMWATER MANAGEMENT PROGRAM:

CONTROLLING STORMWATER AT THE SOURCE

FOR MORE INFORMATION CONTACT YOUR STORMWATER COORDINATOR:

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1. At-Source Control Strategy

Traditional stormwater management is to collect runoff from the site via catch basins, inlets, streams and drainage swales and to discharge the stormwater offsite to a neighboring MS4. There are alternative management techniques that have the potential to be more effective in preserving the hydrologic functions of the landscape and that offer significant advantages over the traditional stormwater management approach. The alternative techniques can decrease the use of typical materials such as steel and concrete and use such materials as native plants, soil and gravel that can be integrated into the landscape and appear to be much more natural than engineered systems. Natural resource protection measures include:

- Rain gardens and/or bio-retention cells
- Infiltration galleries
- Porous concrete/asphalt pavements and sidewalks
- Impervious area reduction
- Buffers and setbacks to streams and wetlands
- Vegetative roof covers and green swales

2. Site Opportunities and Constraints

Alternative stormwater management techniques encourage innovation and creativity in the management of site planning opportunities and constraints. Opportunities at each site vary according to available space, soil infiltration characteristics, slopes, water table and bedrock and proximity to building foundations. Some of the potential site constraints that may apply to **Rain Gardens/Bio-Retention Cells** are discussed below.

Space Limitations: can vary with a surface area of 50 to 200 sf., a minimum width of 5 to 10 ft., a minimum length of 10 to 20 ft. and a minimum depth of 2 to 4 ft.

Soils: soils should be fairly permeable with infiltration rates of > 0.27 inches/hr. Soil limitations can be overcome with the use of under-drains.

Slopes: are usually not a limitation but a design consideration

Water Table/Bedrock: a 2-4ft clearance above the water table/bedrock is recommended

Proximity to Building Foundations: a minimum distance of 10 ft. down gradient from buildings and foundations is recommended

Maximum Depth: 2 to 4 ft. depth depending on the soil conditions

Emergency Overflow: the rain garden/bio-retention cell should be near a storm sewer system, which can receive the excess flows from the rain garden/ bio-retention cell, during periods of high intensity rainfalls

Maintenance: low requirement, property owner can include in normal site landscape maintenance

3. Reported Pollutant Removal Efficiency from Rain Gardens

Summarized below are reported pollutant removal efficiencies, which of course may vary significantly, based on site constraints encountered:

- **Total Suspended Solids**: 80 – 100%
- **Total Phosphorus**: 70 - 80%
- **Total Nitrogen**; 40% - 50%
- **Zinc**: 90% - 100%
- **Lead**: 90% - 100%

4. Benefits of Onsite Stormwater Management

Onsite Stormwater Management provide quantity and quality control enhancement, including:

- **Groundwater recharge** through the infiltration runoff into the soil
- **Retention and/or detention of runoff** for after the storm release
- **Pollutant settling and entrapment** by conveying runoff slowly through plants, soils and microbes in the rain garden/bio-retention cell
- **Stormwater reduction** through plant evapotranspiration, depending on the number and type of plant utilized
- **Added aesthetics** values to the property by integrating the site with the natural environment
- **Sense of community involvement** through having students/staff engage in the rain garden /bio-retention cell planting and maintenance
- **Reduction in air pollution** through plant photo- synthesis

5. Traditional Stormwater Practices

USEPA has concluded **traditional stormwater practices are not working:**

- Storm sewers collecting used motor oil, pesticides, fertilizers, and other pollutants, discharge these pollutants offsite to adjacent streams and water bodies and contribute to **water quality violations**
- By transporting runoff offsite, rainwater is prevented from soaking into the ground, **limiting local aquifer recharging**
- Moving large amounts of water offsite, significantly **increases localized flooding**
- Expensive, ever-expanding storm sewer systems **strain municipal budgets**

6. Green Design Practices

Green Design practices not only **reduce pollutants and runoff volume, but they do so cost-effectively**:

- Natural features like undeveloped landscapes, vegetation, and buffer zones **effectively reduce and filter stormwater flows**
- Natural features also **benefit recreation, wildlife habitat, and increase property values**
- Case studies of green design practices have shown **substantial decreases in stormwater runoff** in pre-existing communities refitted with bioretention basins, permeable pavements, vegetated roof covers, and grass swales
- A study of runoff and pollutant loading conducted in the parking lot of The Florida Aquarium in Tampa **revealed an 80 percent decline in runoff volumes** when the parking lot was retrofitted with pervious pavement and grass swales. Amounts of copper, manganese, lead, and other metals found in runoff also dropped steeply
- A study of vegetated roofs in Philadelphia, PA found that an older building retrofitted with a green roof **absorbed all but 15 inches of a total 44 inches of rainfall** that fell during the nine-month test period. Twenty-five years of German research on green roofs support this finding
- Green design practices save money by **reducing construction costs for curbing, paving materials, drainage pipes and land clearing.**