Examples of Green Infrastructure for Stormwater Management in Rockland County

Compiled by the Rockland County
Environmental Management Committee (EMC)

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Introduction

The Rockland County Environmental Management Council (EMC) recognizes the importance of green infrastructure (GI) to help deal with heavy rains and storm water run-off. GI protects natural water sources, minimizes land erosion, and helps to safeguard human health. Types of GI include rain gardens, bioretention areas, green roofs, swales, porous pavements, sand filters, and stream buffer restorations.

Below are examples of GI for storm water run-off in Rockland County. More GI implementations are in various stages of development as Rockland municipalities and other agencies increasingly require GI in new construction, and will be added here upon completion. Examples of GI for stormwater management across the Hudson Valley are available on the New York State Department of Environmental Conservation's (DEC) website. A form is available to request a GI be listed.

County-wide resources help manage stormwater run-off and other water-related conservation activities. They include the **Soil and Water Conservation District (SWCD)**, the **Task Force on Water Resource Management**, and the **StormWater Consortium of Rockland County**. The SWCD provided financial support for several GI implementations.

The New York Department of Environmental Conservation (DEC) provides tools and services to help public and private property owners manage to stormwater run-off and discharges. They include a construction stormwater toolbox and stormwater training.

Rain Gardens

Rain gardens filter pollutants naturally as the rainwater percolates down through the soil and fibrous roots of the native plants - improving the water quality as it recharges the groundwater supply. Native plants, acclimated to local soils and weather conditions, reduce water consumption and the need for fertilizers, and provide habitat for wildlife. Some of the rain gardens listed below have interpretive signs created and provided by the SWCD and the Rockland Audubon Society.

- **Bowline Point Park** - Constructed in 2017 by the Town of Haverstraw. Funding for the garden design and planting materials was provided by the SWCD, who also designed and provided the interpretive sign.
- **Kennedy Dells County Park** - Created in 2007 by a member of Boy Scout Troop 97 for his Eagle Scout service project. The interpretive sign was provided by the SWCD who also designed it. More information about this rain garden is available here.
- **Montebello Village Hall** - Created in 2013, the first on public property in Rockland County. The garden was partially funded by the SWCD.
- **Orangeburg Library** - Constructed in 2016 by the Town of Orangetown the rain garden is fed by runoff from the library's slate roof. Funding for the garden design and planting materials was provided by the SWCD, who also designed and provided an interpretive sign.
- **Piermont Library** - Created in 2010 by the Rockland Audubon Society, who also designed and provided the interpretive sign. More information about this rain garden is

available here.
- **Valley Cottage Library** - Created in 2011 along with bioswales. The rain garden is located near the southwest corner of the library's property.

Bioretention Areas

Bioretention areas also capture and treat stormwater, allowing the water to filter through soil and vegetation. Bioretention areas are usually larger than rain gardens and are designed with an underdrain to connect to the storm drain system.

- **Suffern Village Hall** - Created in November, 2014 a few yards northeast of the main entrance. It was designed by Marcy Denker and funded and installed by the Village of Suffern.

Green Roofs

Green roofs are layers of soil and vegetation installed on rooftops that capture runoff. Green roofs also provide insulation, create a habitat for wildlife, decrease stress of the people around the roof by providing a more aesthetically pleasing landscape, and help to lower urban air temperatures and mitigate the heat island effect.

- **Rockland Country Club** - Green roof is situated on top of the pump station.

Vegetated and Dry Swales

Swales are natural drainage paths or vegetated channels used to transport water instead of underground storm sewers or concrete open channels. Swales increase the time of concentration to remove silt and pollution out of surface runoff water, reduce discharge, and provide filtration.

- **Dominican College** - Dry swale was created in 2007. More information about this installation is available here.
- **Valley Cottage Library** - Vegetated swales were created in 2011 throughout the parking lot, along with a rain garden. More information about this installation is available here.

Porous Pavements

Porous pavements allow rain to pass through to a gravel storage bed beneath. The water gradually percolates into the ground, where many of the impurities are filtered out or captured by sub-surface geology and soils. Ice will not easily form since no puddles of standing water can form. The surface lasts up to 25 years, whereas standard asphalt usually needs to be resurfaced every 8-10 years.

- **Parking lot Lamont-Doherty Earth Observatory Campus** - 85-space, 24,000 square-foot parking lot created in 2006. More information about this installation is available here.

- **Basketball Court at Nyack Memorial Park** - Installed by the Village of Nyack.

Sand filters

Sand filters treat stormwater by settling out larger particles in a sediment chamber, followed by filtering through a sand matrix. Sand filters are often selected to avoid an extended detention pond or wet pool environment that can attract mosquitoes.

- **Dominican College** - Installed in 2007 by Columbia Development. It is located northeast of Guzman Hall parking lot (north of building), east of Western Avenue in Orangeburg, New York.

Stream buffer restorations

A healthy vegetated buffer helps improve stream health and water quality by filtering and slowing polluted run-off. All of the restorations listed below were done with support from New York state's Hudson Estuary "Trees for Tribs" program which provides native trees, shrubs, and grasses to reduce water pollution, erosion, and flooding damage, and to provide habitats for fish and other wildlife. The list does not include seven stream buffer restorations with Trees for Tribs on private, residential properties. As of December, 2017, 531 trees and 2,130 shrubs have been planted on public and private properties in Rockland County to restore stream buffers.

Cedar Pond Brook, Minisceongo Creek, Pascack Brook, and Sparkill Creek are among 14 streams regulated by Rockland County's Drainage Agency under the Rockland County Stream Control Act which went into effect July 1, 1976. The intent of the Act is to alleviate recurring flood damage to private and public property, and to prevent damage to public health and safety resulting from floods in Rockland County.

- **Cedar Pond Brook -** Cedar Pond Brook winds its way across the northeastern part of Rockland County to the Hudson River from Lake Tiorati Brook which connects to Lake Tiorati in Harriman State Park.
    - In May, 2017 Stony Point Cub Scout Pack 17 and the Cornell Cooperative Extension (CCE) of Rockland County worked with the Town of Stony Point's Parks and Recreation Department to plant 16 trees and 60 shrubs along the brook at Charles S. Eccher Park in Stony Point. Tree species include eastern redbud and red maple. Shrub species include sandcherry and meadowsweet.
    - Also in 2017 the CCE in collaboration with the Rockland County Conservation and Service Corps and local girl and boy scouts planted 132 trees and 92 shrubs along the brook at the Town of Haverstraw's landfill. Tree species include black gum, white pine, and hackberry. Shrub species include buttonbush.

- **Lake DeForest Tributary -** In 2012 the Cejjes Institute planted 7 trees and 40 shrubs along the Lake Deforest tributary. Tree and shrub species included river birch, flower dogwood, and sandbar willow.

- **Minisceongo Creek** - The Minisceongo Creek flows from Lake Welch in Harriman State Park through several towns and villages in the northeast part of Rockland County to the Hudson River.
    - In 2009 and 2011 the Garnerville Industrial and Arts Center planted 25 trees and 125 shrubs along the Minisceongo Creek in Garnerville. Tree species include flowering dogwood and sassafras. Shrub species include silky dogwood and cranberry bush viburnum.
    - In 2017 the Cornell Cooperative Extension of Rockland County with support from the Rockland County Conservation and Service Corps and local boy and girl scouts planted 22 trees and 147 shrubs along the creek at Railroad Avenue Park in the Village of West Haverstraw. Tree species include ironwood, eastern redbud, and basswood. Shrub species include sweet pepperbush, winterberry, and swamp rose.

- **Pascack Brook** - The Pascack brook has tributaries in the center of Rockland County that connect and flow south to the Oradell Reservoir in New Jersey which is part of the Hackensack-Passaic Watershed.
    - In 2011 and 2012 Keep Rockland Beautiful planted more than 50 trees and 700 shrubs along Pascack Brook in Memorial Park in the Village of Spring Valley. Tree species included silver maple, smooth adler, river birch, and black gum. Shrub species included red-osier dogwood, northern bayberry, witch-hazel, pussy willow, and elderberry.
    - In 2017 the Cornell Cooperative Extension of Rockland County and the Town of Ramapo Parks Department planted 11 trees and 66 shrubs along the brook at the Children's Park in the Town of Ramapo. Tree species included tulip and pine oak, and shrub species included buttonbush, swamp rose, and meadowsweet.

- **Sparkill Creek** - Sparkill Creek is an 8-mile long waterway that flows from Clausland Mountain in the Town of Orangetown and other smaller tributaries northward into Piermont Marsh and the Hudson River.
    - Since 2012 the Sparkill Creek Watershed Alliance (SCWA) has coordinated at least six restorations at the St. Thomas Aquinas College campus, the Tappan Reformed Church, and other locations in the Town of Orangetown. Half of these were done in collaboration with St. Thomas Aquinas College. Nearly 200 native trees and more than 250 native shrubs have been planted as of December, 2017.
    - Riparian Buffer along Route 340 - In 2015, the SCWA partnered with the Rockland County SWCD and Dominican College to plant 17 trees and 99 shrubs along Route 340 in Sparkill, New York. SWCD funded the design plans for the project which included red maple, sycamore, and white pine trees, as well as red-osier dogwood, northern bayberry, and arrowwood shrubs.