

Lockatong and Wickecheoke Creek Watersheds Stormwater-Control Project ***Automated Flow Monitoring and Water Quality Sampling*** **(<http://www.raritanbasin.org/lockwick.html>)**

Program Basis

The Watershed Protection Programs Division of the NJ Water Supply Authority was awarded 319(h) grant funding from the NJ Department of Environmental Protection, totaling \$952,500, to manage the implementation of innovative stormwater controls on public park land and roadside drainage ditches within the Lockatong and Wickecheoke Creek Watersheds. The projects were recommended in the “Lockatong and Wickecheoke Creek Watersheds Restoration and Protection Plan” for demonstrating techniques to reduce rainfall runoff volume and the associated contaminants (see website above for reports). Project sites selected for stormwater controls were Kingwood Township Park and four roadside drainage locations, one each in Raritan, Franklin, Kingwood, and Delaware Townships, Hunterdon County. Up to 60 tons per year of sediment is eroded from Kingwood Park and conveyed into Lockatong Creek. Approximately 3,300 tons per year of sediment is conveyed to the streams from road surfaces and drainage ditches, and up to 12,300 tons of sediment per year is contributed from the collapse of stream banks due to greater runoff flows reaching the stream from the increase of impervious land cover. The sediment load is conveyed downstream and ultimately discharges into the Delaware and Raritan Canal. The Canal provides the water supply for approximately 700,000 New Jersey residents. Solids and nutrient loads increase the cost of treatment for potable water at downstream water-purveyor intakes, and sediment deposited in the Canal increases the frequency of dredging operations and the associated costs.



Erosion along Pine Hill Road.

The stormwater remediation projects will demonstrate innovative management techniques for reducing stormwater “impacts” and increasing “sustainable uses” of the natural resource. All of the runoff-control designs will be applicable throughout these watersheds and to similar sites throughout the State.

Water Quantity/Quality Monitoring

To determine the effectiveness of the stormwater controls, assessments of stormwater runoff volume and quality are being conducted prior to, and following, the installations. To perform the assessments, six automated stormwater samplers have been purchased by the Authority, outside of the grant funding, to collect runoff flow data and water samples during storm events at each of the project sites. Two units were installed in Kingwood Park and have been operational since May 2011. Each sampler unit is programmed to collect up to 14 samples during a runoff event. Individual samples are collected at selected pre-programmed water depths, representing water quality snapshots along the runoff hydrograph. A refrigeration system is automatically activated after the first storm sample is collected to preserve the samples prior to laboratory analyses. The samplers simplify the collection of storm samples that historically were collected by field personnel. Due to impervious land cover (both natural and the increasing artificial) runoff flow travels very quickly to the streams following a storm. Field personnel would have only 15 to 20 minutes to organize, drive to each project site, and collect the samples. The automated samplers eliminate this problem. In addition, storm events occurring on a weekend or in the evening, and/or in remote locations will be automatically monitored and sampled when flow conditions are acceptable. Total runoff volume and pollutant loads for nutrients and solids can then be calculated for each storm event. The runoff data will be used to determine the effectiveness of the stormwater controls, and for calibrating computer simulations of runoff volume and quality for selected storm events at the project sites.

Secure field structures were designed, constructed, and installed by Authority staff at each of the project sites to house the sampler units. Each sampler is powered by 12-volt batteries that are recharged daily by a solar panel attached to the field structure.



Sampler housing with solar panel.



Automated stormwater sampling system.

Sediment Transport – Upland Erosion

Flow and water quality data collected during the first 30 minutes of a single storm (0.73 inches of precipitation) in May 2011 showed nearly 600 pounds (about 2/3 pickup truck load) of sediment was suspended in the runoff flow from Kingwood Park and transported to Lockatong Creek. Analyses of the data collected during the first 10 minutes of this same rain storm at a roadside drainage site located in Delaware Township revealed more than 1,300 pounds (about 1 1/3 pickup truck loads) of suspended sediment conveyed to the stream. Suspension and

transport of large loads of sediment to the Lockatong and Wickecheoke Creeks occurs very quickly during rain storms. These samples do not include the larger sediment (rocks and gravel) that is conveyed to the stream through rolling and sliding. Data analyses continue for subsequent storms.

Following one year of sampling in the Lockatong and Wickecheoke watersheds, the samplers and housing structures will be removed and relocated to other selected sites within central New Jersey to continue the identification and quantification of impacts from storm runoff flow.