



BMP Implementation Plan

Bioinfiltration

London, Laurel County, KY

Third Rock Consultants, LLC

June 20, 2008

Technologies to be Installed

The proposed (Best Management Practices) BMP projects described in this BMP Implementation Plan (BMP IP) are the construction of Bioinfiltration areas (rain gardens) located in the immediate vicinity of Whitley Branch.

BMP examples:

1. Creation of five rain gardens on commercial, public, and private property within the immediate subwatershed of Whitley Branch. Specific tasks include:
 - Locate two rain gardens along Main Street in a position to capture both rooftop and road runoff with the goal of treating the "first flush" of a rain event (commercial and public property). Excavate areas within the site to create a depression sized to accommodate the first inch of rainfall in the drainage area. Evaluate to soils to insure desired infiltration rate will be obtained. Native vegetation will be planted and mulch will be added.
 - Create three rain gardens on private property. Two of the rain gardens would be located in the immediate vicinity of Whitley Branch just downstream of a cattle stockyard at the residence of a Master Gardner. These rain gardens are the largest proposed and would be excellent promotion for popularizing rain gardens in the gardening community. The additional rain garden would be located at a residence in the immediate vicinity of the Corbin City Reservoir to popularize water quality improvement projects in the City of Corbin.
 - Overflow structures will be installed to manage for large storm events.

2. Creation of a bioinfiltration zone in conjunction with existing flood-control design and construction. Specific tasks include:
 - Supplementing existing storm-water detention plans along Mill Street/Whitley Branch with bioinfiltration techniques. These techniques will promote increased infiltration and lower stream flows versus the detention only method that typically leads to sustained high stream flows that cause bank erosion and damage stream habitat.
 - Establishment of native plants in bioinfiltration areas.

- Install public information and educational signs. Public information and educational signs will be submitted to KDOW for review.
- Overflow structures will be installed to manage for large storm events.

BMP Selection Process and How BMP is Targeted to Specific Location

Data gathered and presented in the approved Corbin Reservoir Watershed Plan indicate that runoff from the City of London is the most significant source of pollution to the Corbin reservoir. Goals of the subsequent Implementation Plan are to reduce pollutants (nutrients and sediment) resulting from the London urban area through a series of BMPs. BMPs are being selected and located in and around London in order to reduce the amount of sediment and nutrients entering the Little Laurel River and ultimately the Corbin City Reservoir. The type and location of BMPs are based on the data gathered from the Watershed Plan.

The proposed BMP projects described in this BMP IP are the construction of Bioinfiltration areas (rain gardens) located in the immediate vicinity of Whitley Branch. Whitley Branch drains a portion of downtown London, and therefore receives pollutants from many of the sources noted in the Watershed Plan. The London Wastewater Treatment Plant discharges to Whitley Branch. Portions of Whitley Branch are on the 303(d) list of impaired waters. Segments 0.0 to 1.0 and 1.1 to 2.6 are impaired for Primary Contact Recreation (Partial support/no TMDL required and Nonsupport, respectively). Segment 0.0 to 1.0 is impaired for Aquatic Life (Nonsupport) and segment 1.1 to 2.6 has not been assessed for that use. Pollutants causing these impairments are pathogens, nutrient eutrophication, and organic enrichment. Suspected sources of this pollution are municipal point source discharges and sanitary sewer overflows.

- Bioinfiltration is one proven way to reduce urban stormwater runoff into streams, thereby reducing a prominent cause of nonpoint source pollution. Rain gardens, bioinfiltration swales, and stormwater wetlands are a few examples of bioinfiltration that are proposed in this implementation plan for the City of London.

In regard to treatment efficiency, it is difficult to predict an exact amount of TSS, TP and flow reduction from the BMP installation, but studies indicate that metals, some nutrients, solids, and pathogens are treated by bioinfiltration areas. This is a small-scale project relative to the size of the Little Laurel River, but it does enhance the capacity of the area to store and treat stormwater. By decreasing the amount of impervious area, the capability to store runoff and filter out nutrients, sediment, and other particulates is increased. Pre- and post-construction storm monitoring may be used to determine the effective reduction of stream flow and subsequent nutrient and sediment loading.

The bioinfiltration areas will be monitored for sustained stability and function as a part of the larger Implementation Plan through the grant period. Success will be indicated by structural stability, ability to infiltrate stormwater, and a high rate of vegetation survival. A vegetation survey will be completed after the bioinfiltration areas have been planted and subsequently at the end of the grant period to determine percent survival of installed plant material.

Though no permits are anticipated for the completion of the bioinfiltration BMPs, if needed Third Rock Consultants, LLC will secure all required federal and state permits and will adequately address comments made by the state permitting agencies.

At a minimum, all bioinfiltration BMPs will adhere to the Kentucky Agriculture Water Quality Act and/or the Forest Conservation Act.

Financial Plan of Action

Estimated costs associated for the stormwater bioinfiltration BMPs will be approximately \$5 per ft² of bioretention area. Greater than 25 percent of the cost of each BMP includes in-kind donations of property and labor for completing the project. Construction costs will at least be partially provided through volunteer efforts and through in-kind labor and equipment donations. It is anticipated that plants and planting costs will be offset through donations and volunteers with assistance from London Downtown and eastern Kentucky PRIDE.

Maintenance Agreement with Landowner

Minimal maintenance will be required of the landowners once the BMPs are established. The bioinfiltration areas will be quite self-sustaining, but will require periodic maintenance typical of flower gardens. For example, mulch should be added as need to enhance the appearance of the area, minimize weeds, and provide a key water quality function (binds pollutants). If any undesirable or invasive species begin to threaten the planted species, they will need to be removed or cautiously treated with herbicide approved for aquatic use. It is possible that over the long term, sediment deposited in the bioinfiltration areas may require periodic removal to maintain treatment capacity. The owners of the private residences are dedicated gardeners and will fulfill this role. London Downtown will maintain rain gardens situated along Main Street in association with their current downtown beautification program. Bioinfiltration areas along Mill Street will be maintained by the City of London.

DOW Notification

Third Rock will notify the Kentucky Division of Water (KDOW) by email and/or phone prior to BMP implementation. Design specifications for each bioinfiltration project will be created and submitted to KDOW prior to implementation.