

Forested Filter Strip

Description

A traditional filter strip is a grass area that is intended to treat sheet flow from adjacent impervious areas. Sheet flow is runoff that flows over land with no defined channels. Filter strips function by slowing runoff velocities, filtering out sediment and other pollutants, and providing some infiltration into underlying soils.

A forested filter strip provides a similar function but incorporates trees and a small ponding zone (optional) into the design (Figures 29 and 30). The ponding zone is a small depression with a low berm where water ponds during most storm events (e.g., around a 1-inch rainfall). The entire filter strip is planted with trees and shrubs, but since the depression is wetter than the remainder of the practice, the two zones are distinguished by referring to them as the ponding zone and the forested zone. Additional benefits provided by a forested filter strip include evapotranspiration, wildlife habitat, and infiltration promoted by macropore formation.

Forested filter strips may be used as follows:

- In linear areas such as stream buffers and transportation corridors.
- As pretreatment for a stream buffer or other storm water treatment practice.
- Where visual screening or a buffer is desired.

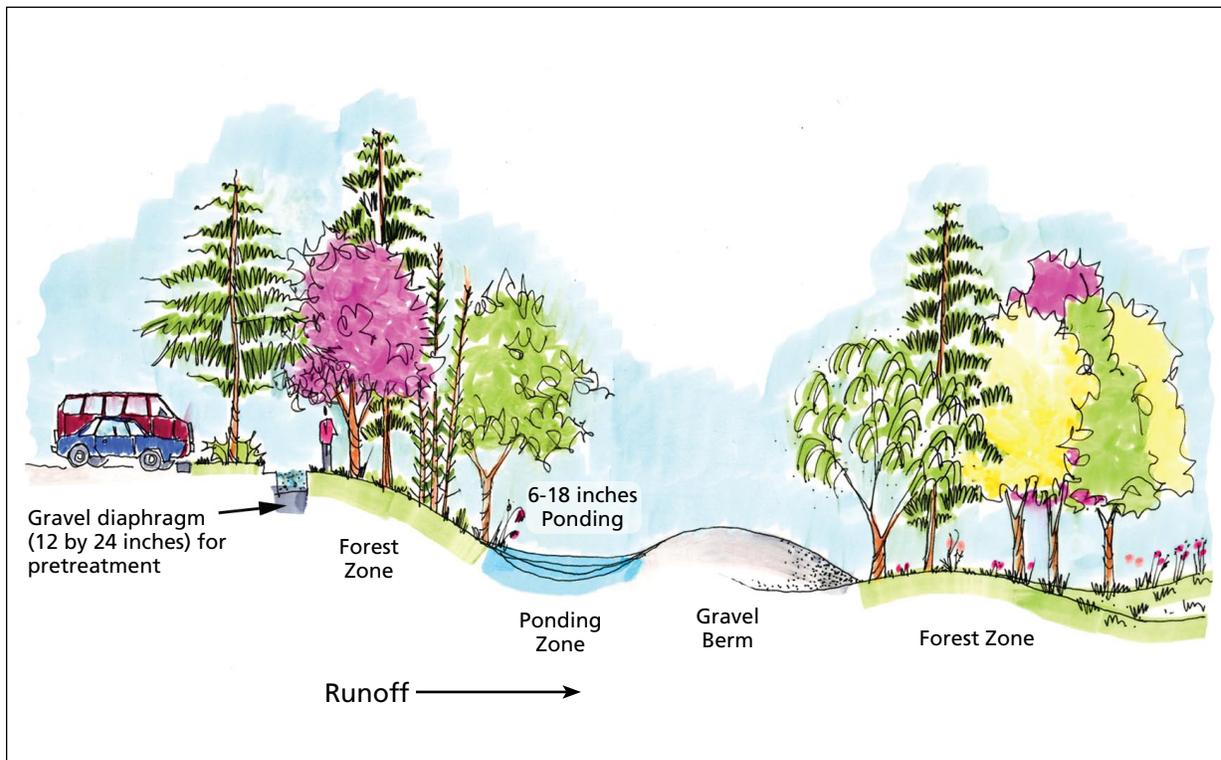


Figure 1. Forested filter strip profile shows how runoff flows through the various zones.

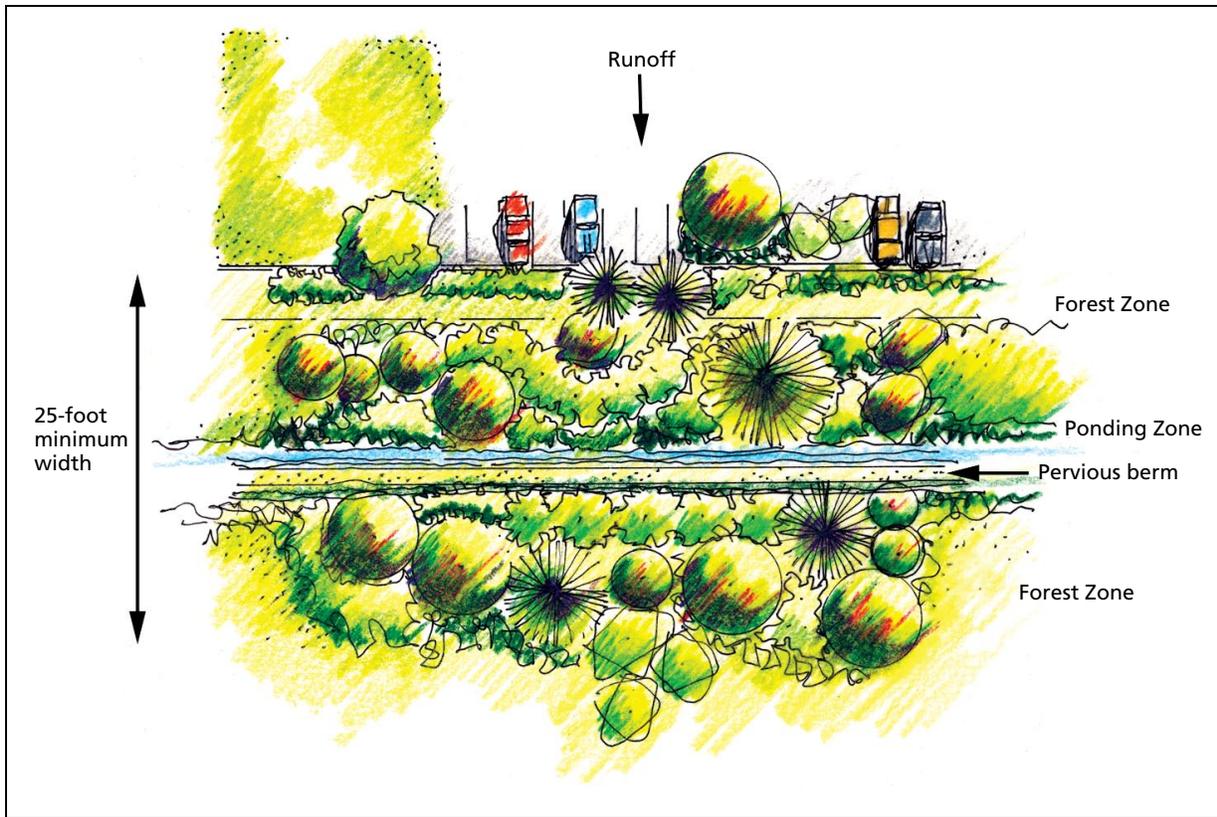


Figure 2. Forested filter strip plan shows its suitability to a linear area.

Design Modifications

- Unlike a traditional grass filter strip, the forested filter strip is not limited to accepting sheet flow runoff. If runoff is concentrated, the filter strip inlet should be armored with rock.
- Use a gravel diaphragm for pretreatment (acts as a level spreader and allows fine sediment to settle out where sheet flow is present).
- When a significant volume of storm water runoff is expected, the forested filter strip should have a small berm constructed of pervious material such as gravel, rock, or earth. If the berm is earthen, insert weep hole pipes so ponded water filters to the other side. If the berm is gravel, gabions may be used. A gabion is a wire mesh cage filled with rock and is used to prevent erosion. The height of the berm should be 6-18 inches above the bottom of the depression and at least 6 inches below the lowest inflow elevation.
- Overall dimensions should provide surface storage for the water quality volume. During larger storms, runoff will overtop the berm. Minimum width of the filter strip should be 25 feet. The slope should range from 2% to 6%.

Species Selection

Existing trees should be incorporated into the design where possible. Otherwise, select a diverse mix of native species (minimum of three) that have these characteristics:

- Tolerant of salt
- Tolerant of inundation (standing water in ponding zone, fluctuating water levels in forested zone).

General Planting Guidance

- Shrubs and small trees can be incorporated into the ponding zone, and larger trees can be incorporated into the forested zone.
- Conserve existing soil, if undisturbed, and use soil amendments if site soils are compacted.
- Overplant with seedlings for fast establishment and to account for mortality. Alternatively, plant larger stock at desired spacing intervals (35-50 feet for large and very large trees) using random spacing.

Maintenance

- Use mulch to retain moisture.
- Use tree shelters to protect seedlings.

Topics for Future Research

- Quantify increased pollutant removal due to trees in filter strip.

Further Resources

Center for Watershed Protection. 1996. Design of stormwater filtering systems. Ellicott City, MD.

Maryland Department of the Environment. 2000. Maryland stormwater design manual. Baltimore, MD.

This fact sheet was excerpted from:

Cappiella, Karen; Schueler, Tom; Wright, Tiffany. 2006. Urban Watershed Forestry Manual. Part 2: Conserving and Planting Trees at Development Sites. NA-TP-01-06, Newtown Square, PA: p 43-45. USDA Forest Service, Northeastern Area State and Private Forestry.

This information was developed by:

Center for Watershed Protection
8390 Main Street, 2nd Floor
Ellicott City, MD 21043
www.cwp.org

and

USDA Forest Service
Northeastern Area State and Private Forestry
11 Campus Boulevard, Suite 200
Newtown Square, PA 19073
www.na.fs.fed.us