## GENERAL DESCRIPTION

Vegetated filter strips (a.k.a. buffer strips and grassed filter strips) are gently sloping, densely vegetated areas that treat runoff as sheet flow from adjacent impervious areas. They slow runoff velocity and filter out suspended sediment and associated pollutants, and provide some infiltration into underlying soils. Originally used as an agricultural treatment practice, filter strips have evolved into an urban SWM practice. Vegetation may be comprised of a variety of trees, shrubs and native plants to add aesthetic value as well as water quality benefits. With proper design and maintenance, filter strips can provide relatively high pollutant removal benefits. Maintaining sheet flow into the filter strip through the use of a level spreading device (e.g., pea gravel diaphragm) is essential. Using vegetated filter strips as pretreatment practices to other best management practices is highly recommended. They also provide a convenient area for snow storage and treatment, and are particularly valuable due to their capacity for snowmelt infiltration.

## DESIGN GUIDANCE

### GEOMETRY AND SITE LAYOUT

The maximum contributing flow path length across adjacent impervious surfaces should not exceed 25 metres. The impervious surfaces draining to a filter strip should not have slopes greater than 3%.

The filter strip should have a flow path length of at least five (5) metres to provide substantial water quality benefits; however, some pollutant removal benefits are realized with three (3) metres of flow path length.

### PRETREATMENT

A pea gravel diaphragm at the top of the slope is recommended to act as a pretreatment device and level spreader to maintain sheet flow into the filter strip.

### CONVEYANCE AND OVERFLOW

Level spreaders are recommended to ensure runoff draining into the filter strip does so as sheet flow (e.g., pea gravel diaphragms, concrete curbs with cutouts). When filter strip slopes are greater than 5%, a series of level spreaders should be used to help maintain sheet flow.

When designed as a stand alone water quality BMP (i.e., not pretreatment to another BMP) the vegetated filter strip should be designed with a pervious berm at the toe of the slope for shallow ponding of runoff. The berm should be 150 to 300 millimetres in height above the bottom of the depression and should contain a perforated pipe underdrain connected to the storm sewer. The volume ponded behind the berm should be equal to the water quality storage requirement. During larger storms, runoff overtops the berm and flows directly into a storm sewer inlet.

### SOIL AMENDMENTS

If soils on the filter strip site are highly compacted, or of such low fertility that vegetation cannot become established, they should be tilled to a depth of 300 mm and amended with compost to achieve an organic content of 8 to 15% by weight or 30 to 40% by volume.

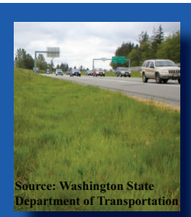
## OPERATION AND MAINTENANCE

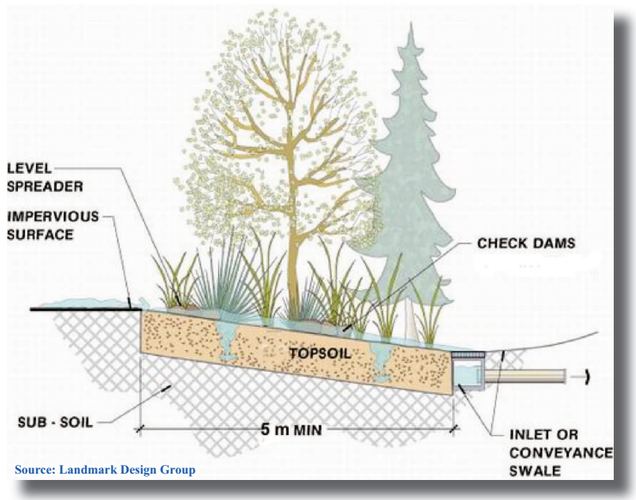
Generally, routine maintenance will be the same as for any other landscaped area; weeding, pruning, and litter removal. Regular watering may be required during the first two years until vegetation is established. Routine inspection is very important to ensure that dense vegetation cover is maintained and inflowing runoff does not become concentrated and short circuit the practice. Vehicles should not be parked or driven on filter strips. For routine mowing of grassed filter strips, the lightest possible mowing equipment should be used to prevent soil compaction.

For the first two years following construction the filter strip should be inspected at least quarterly and after every major storm event (> 25 mm). Subsequently, inspections should be conducted in the spring and fall of each year and after major storm events. Inspect for vegetation density (at least 80% coverage), damage by foot or vehicular traffic, channelization, accumulation of debris, trash and sediment, and structural damage to pretreatment devices.

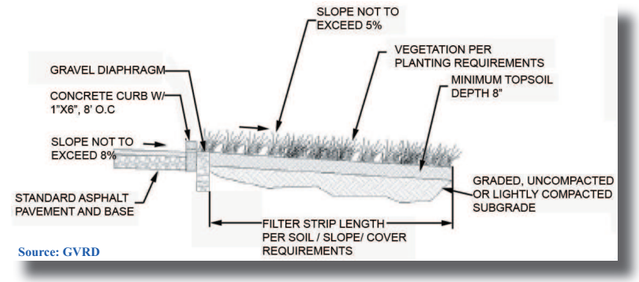
Trash and debris should be removed from pretreatment devices and the filter strip surface at least twice annually. Other maintenance activities include weeding, replacing dead vegetation, repairing eroded areas, dethatching and aerating as needed. Remove accumulated sediment on the filter strip surface when dry and exceeding 25 mm depth

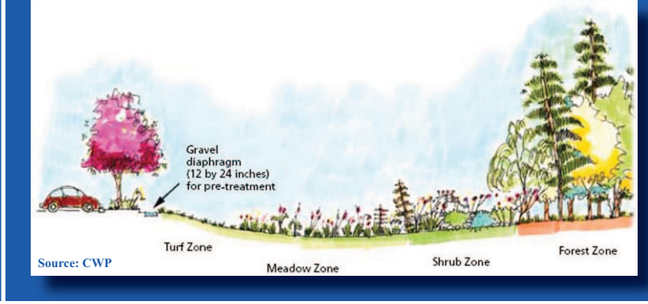



## VEGETATED FILTER STRIPS



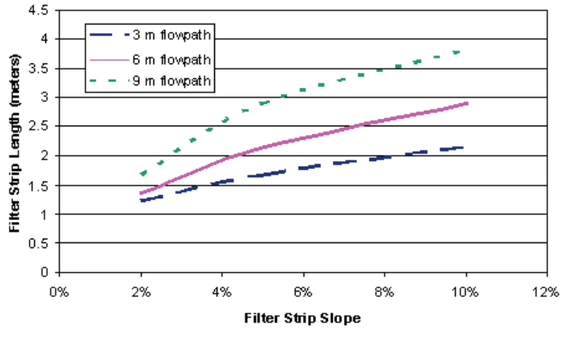




## ABILITY TO MEET SWM OBJECTIVES

| BMP | Water Balance Benefit | Water Quality Improvement | Stream Channel Erosion Control Benefit |
|---|---|---|---|
| Vegetated Filter Strips | Partial - depends on soil infiltration rate | Partial - depends on soil infiltration rate and flow path length | Partial - depends on soil infiltration rate |

## GENERAL SPECIFICATIONS

| Material | Specification | Quantity |
|---|---|---|
| Gravel Diaphragm | Washed 3 to 10 mm diameter stone | Diaphragm should be a minimum of 300 mm wide and 600 mm deep (MDE, 2000). |
| Gravel/ Earthen Berm | Berm should be composed of sand (35 to 60%), silt (30 to 55%), and gravel (10 to 25%) (MDE, 2000) Gravel should be 15 to 25 mm in diameter. | N/A |




Source: Pennsylvania Department of Environmental Protection

## CONSTRUCTION CONSIDERATIONS

### Soil Disturbance and Compaction

The limits of disturbance should be clearly shown on all construction drawings. Before site work begins, areas for filter strips should be clearly marked and protected by acceptable signage and silt fencing. Only vehicular traffic used for construction should be allowed within three metres of the filter strip.

### Erosion and Sediment Control

Construction runoff should be directed away from the proposed filter strip site. If used for sediment control during construction, it should be re-graded and revegetated after construction is finished.

## SITE CONSIDERATIONS

### Available Space

The flow path length across the vegetated filter strip should be at least 5 metres to provide substantial water quality benefits. Vegetated filter strips incorporated as pretreatment to another BMP may be designed with shorter flow path lengths.

### Site Topography

Filter strips are best used to treat runoff from ground-level impervious surfaces that generate sheet flow (e.g., roads and parking areas). The recommended filter strip slope is between 1 to 5%.

### Flow Path Length Across Impermeable Surface

The maximum flow path length across the contributing impermeable surface should be less than 25 metres.

### Soil

Filter strips are a suitable practice on all soil types. If soils are highly compacted, or of such low fertility that vegetation cannot become established, they should be tilled to a depth of 300 mm and amended with compost to achieve an organic content of 8 to 15% by weight or 30 to 40% by volume.

### Pollution Hot Spot Runoff

To protect groundwater from possible contamination, source areas where land uses or human activities have the potential to generate highly contaminated runoff (e.g., vehicle fueling, servicing and demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites) should not be treated by vegetated filter strips.

### Water table

Filter strips should only be used where depth to the seasonally high water table is at least one (1) metre below the ground surface.

CVC/TRCA LOW IMPACT DEVELOPMENT
PLANNING AND DESIGN GUIDE - FACT SHEET

# VEGETATED FILTER STRIPS

TORONTO AND REGION Conservation for The Living City

CVC CREDIT VALLEY CONSERVATION

FOR FURTHER DETAILS SEE SECTION 4.6 OF THE CVC/TRCA LID SWM GUIDE