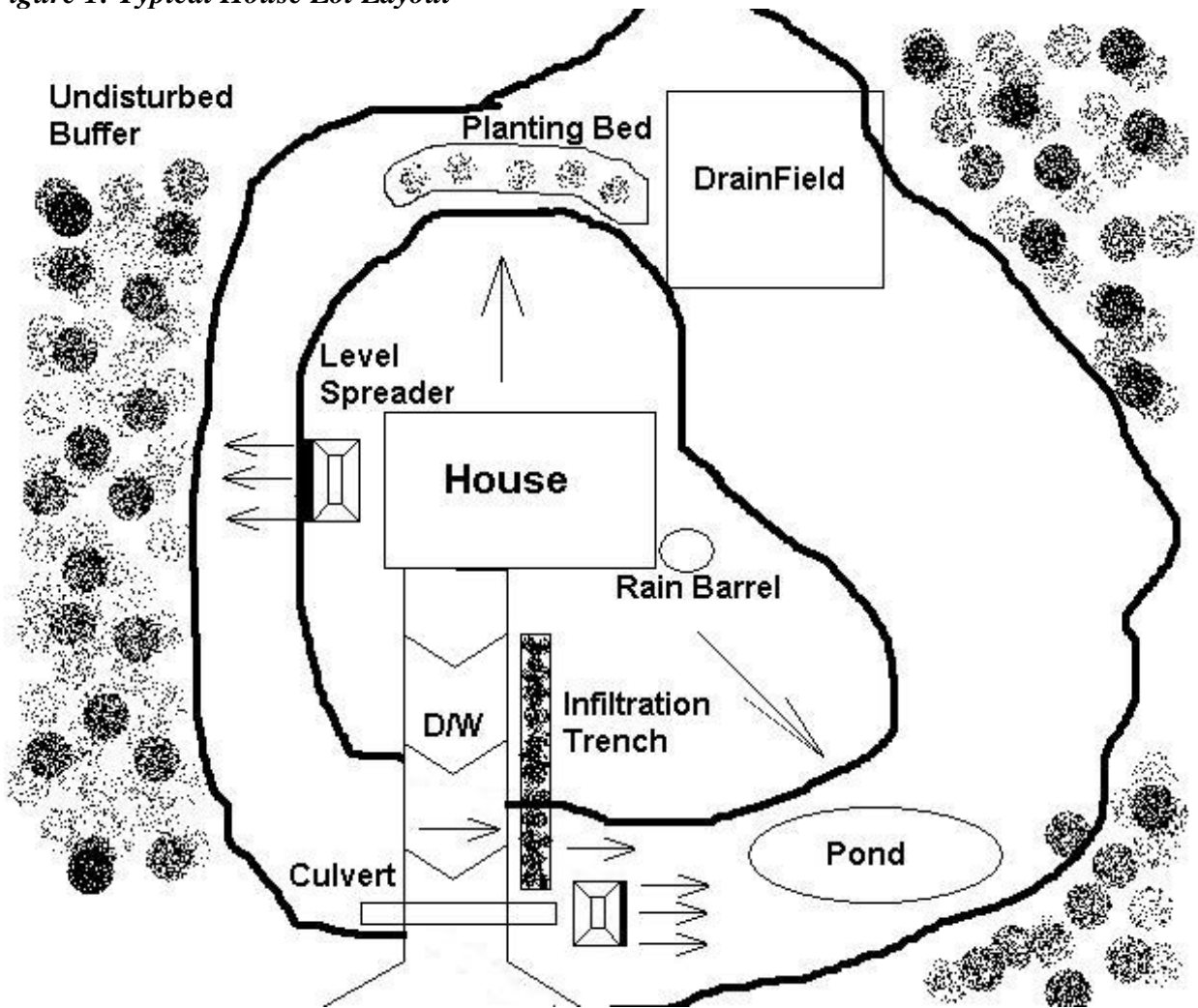


Suggested Stormwater Management Practices For Individual House Lots

These practices are necessary to satisfy the water quantity and water quality criteria of the Rappahannock Stormwater Ordinance. These practices maintain dispersed flows and prevent environmental damage due to erosion and increased runoff from development. These practices may be used for in-lieu-of agreements or residential site plan submissions.

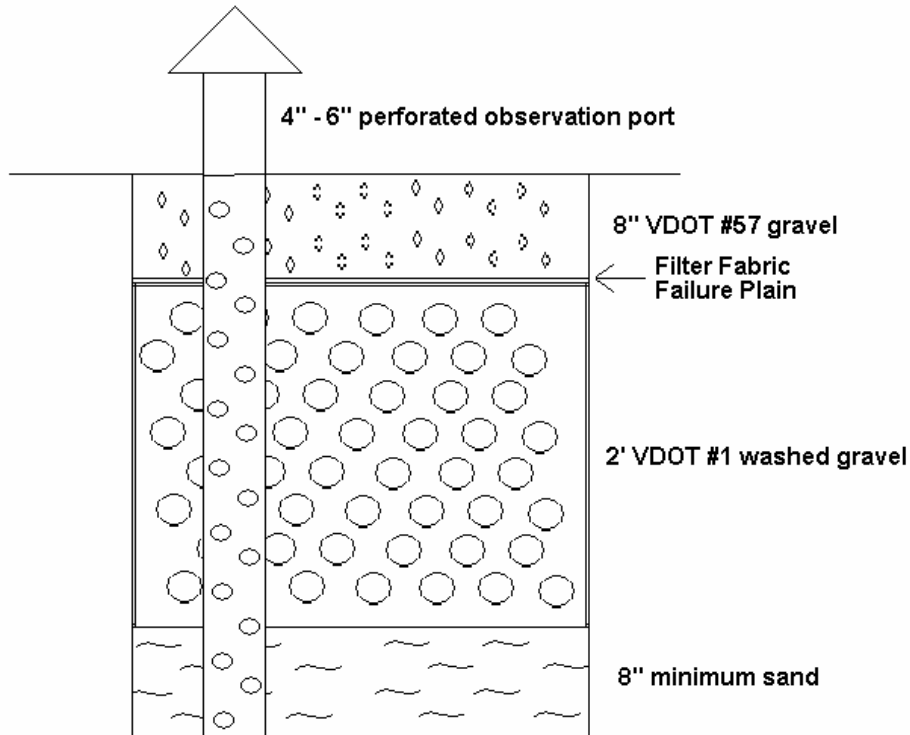
The practices listed here are not comprehensive, and alternative practices may be appropriate for the site. Consult the Virginia Stormwater Management Handbook or the County for additional design options.

http://www.dcr.virginia.gov/soil_&_water/stormwat.shtml

Figure 1: Typical House Lot Layout**House lot practices:**

- ❖ Infiltration Trench
- ❖ Dry Well
- ❖ Bioretention Planting Beds (Rain Garden)
- ❖ Rain Barrel or Cistern
- ❖ Splash Block with Level Spreader at Downspouts
- ❖ Level Spreader at end of culvert
- ❖ Pond (Wet and Dry)
- ❖ Filter Strip
- ❖ Undisturbed Buffer
- ❖ Grading Practices – disperse stormwater flow with positive grading

Infiltration Rock Trench



*Not To Scale

1. Filter Fabric around top and sides of the VDOT #1 gravel layer.
2. Scarify Bottom with Excavator Teeth.

What is it? An excavated trench or basin filled with layers of rocks to provide runoff storage and groundwater recharge.

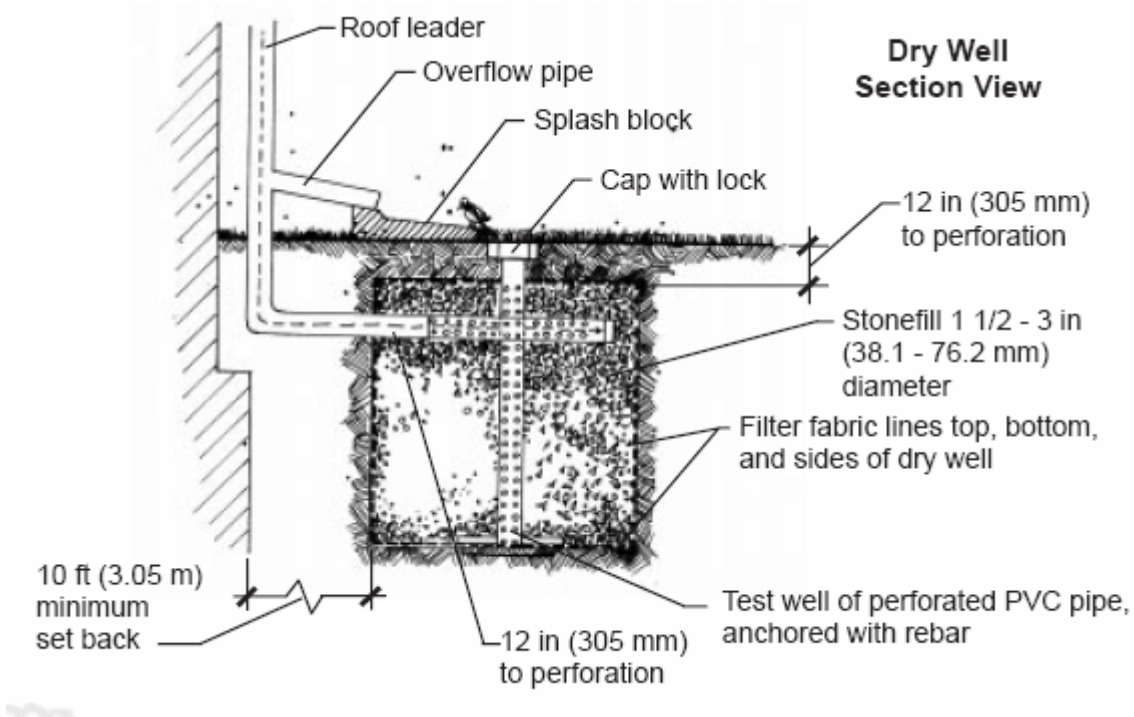
Purpose: To infiltrate stormwater runoff into the surrounding soil layers. Reduces runoff volume and filters pollutants.

Limitations: Water Table, Bedrock, and subsoil permeability. Distance to septic fields, and structures.

Materials: As noted in the above diagram. Cubic foot quantities of VDOT #57 ($\frac{3}{4}$ inch), VDOT #1 (1-3 inch), and construction sand. Linear foot quantities of PVC perforated pipes.

Installation:

- Permeability of soils and slope are important for determining size and location. Soils good enough for septic fields are good enough for this practice. Slopes should be flat, less than 7 percent.
- Trench should be a minimum of 3 feet wide and a minimum of 2 feet deep.
- A linear practice installed along the perimeter of driveways or buildings, and located 10 feet from building foundation.
- Sized for 5 acres or less of drainage area, and is dependent on slopes. Minimum surface area should be 150 square feet or 5 percent of drainage area.



What is it? An excavated underground pit filled with gravel.

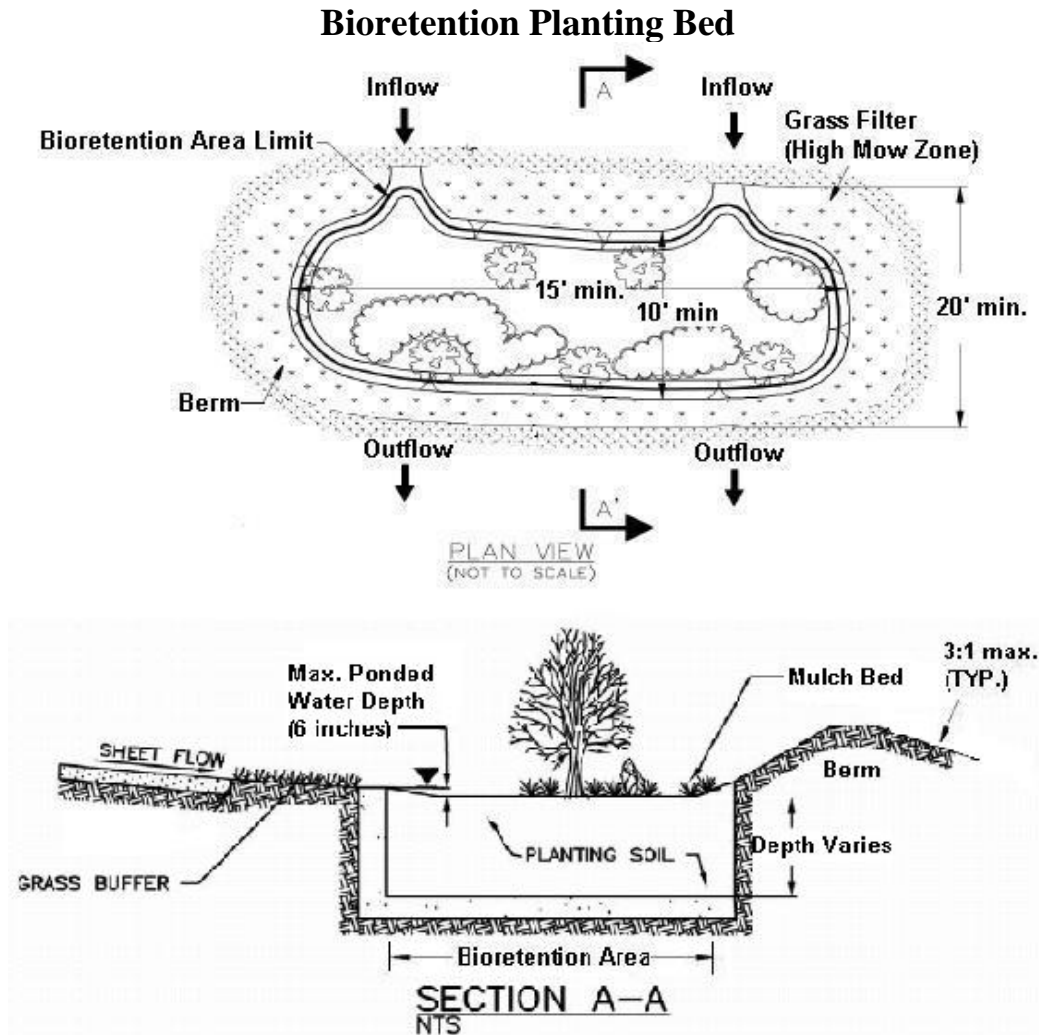
Purpose: To infiltrate stormwater runoff into the surrounding soil layers. Reduces runoff volume and filters pollutants.

Limitations: Water Table, Bedrock, and subsoil permeability. Distance to septic fields, and structures.

Materials: As noted in the above diagram. Cubic foot quantities of stonefill (1 1/2 -3 inch), and construction sand. Linear foot quantities of PVC perforated pipes, and filter fabric.

Installation:

- Permeability of soils and slope are important for determining size and location. Soils good enough for septic fields are good enough for this practice. Slopes should be flat, less than 7 percent.
- Minimum setback from building foundation is 10 feet.
- The dry well accepts runoff from roof downspouts and other stormwater pipes.
- Install an overflow mechanism for higher storm events.
- Screen the downspout inlets to reduce debris and mosquitoes.
- Sod covers the top of the gravel pit.



What is it? The use of a graded or natural depression that can be improved with soil amendments and native plants.

Purpose: To filter stormwater runoff with the use of plants and soil infiltration. Reduces runoff volume and filters pollutants.

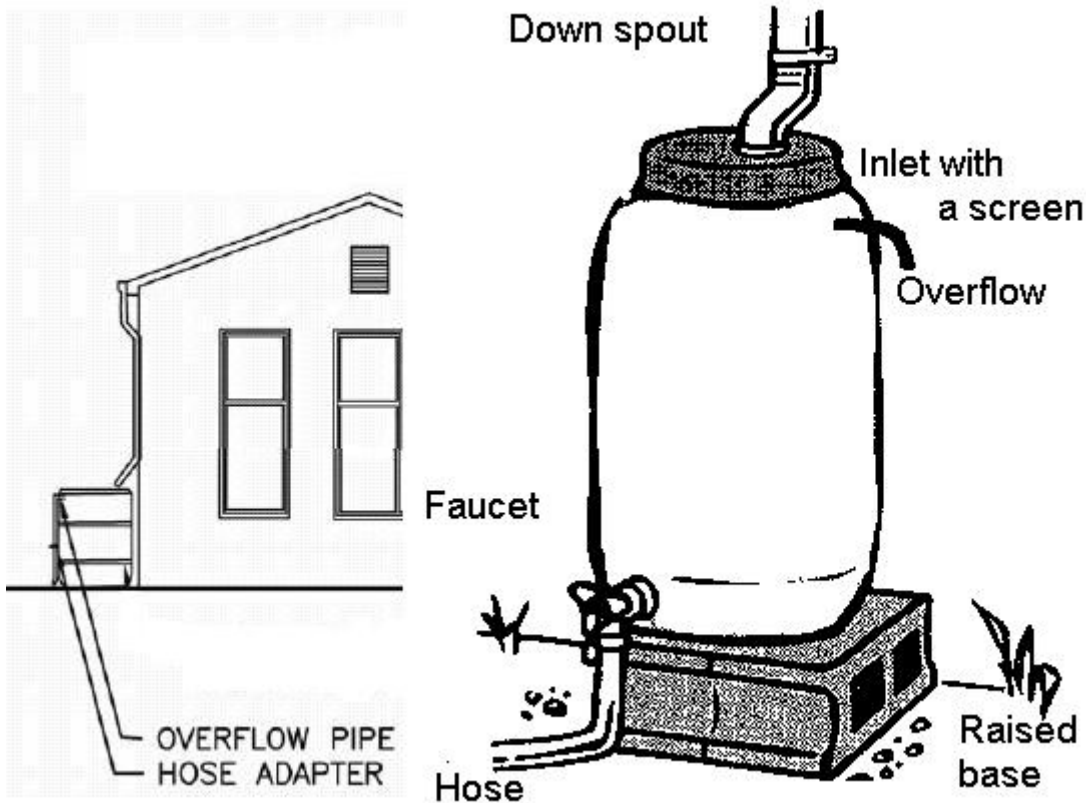
Limitations: Water Table, Bedrock, and subsoil permeability. Distance to septic fields, and structures.

Materials: As noted in the above diagram. Cubic foot quantities of soil amendments, and mulch, and native plants.

Installation:

- Permeability of soils and slope are important for determining size and location. Soils good enough for septic fields are good enough for this practice. Slopes should be flat, less than 7 percent.
- Minimum setback from building foundation is 10 feet.
- The berm needs an overflow opening at least 6 inches above the planting bed with the top of berm being one-foot above the planting bed.
- Sized for 1 acre or less of drainage area. Minimum surface area should be 150 square feet or 5 percent of drainage area.
- Prevent compaction of the Bioretention Area and grass filter.

Rain Barrel Cistern System



What is it? A system connected to a downspout for collecting rainwater for use either as wash water or irrigation.

Purpose: To collect rainwater for onsite use. Reduces runoff volume.

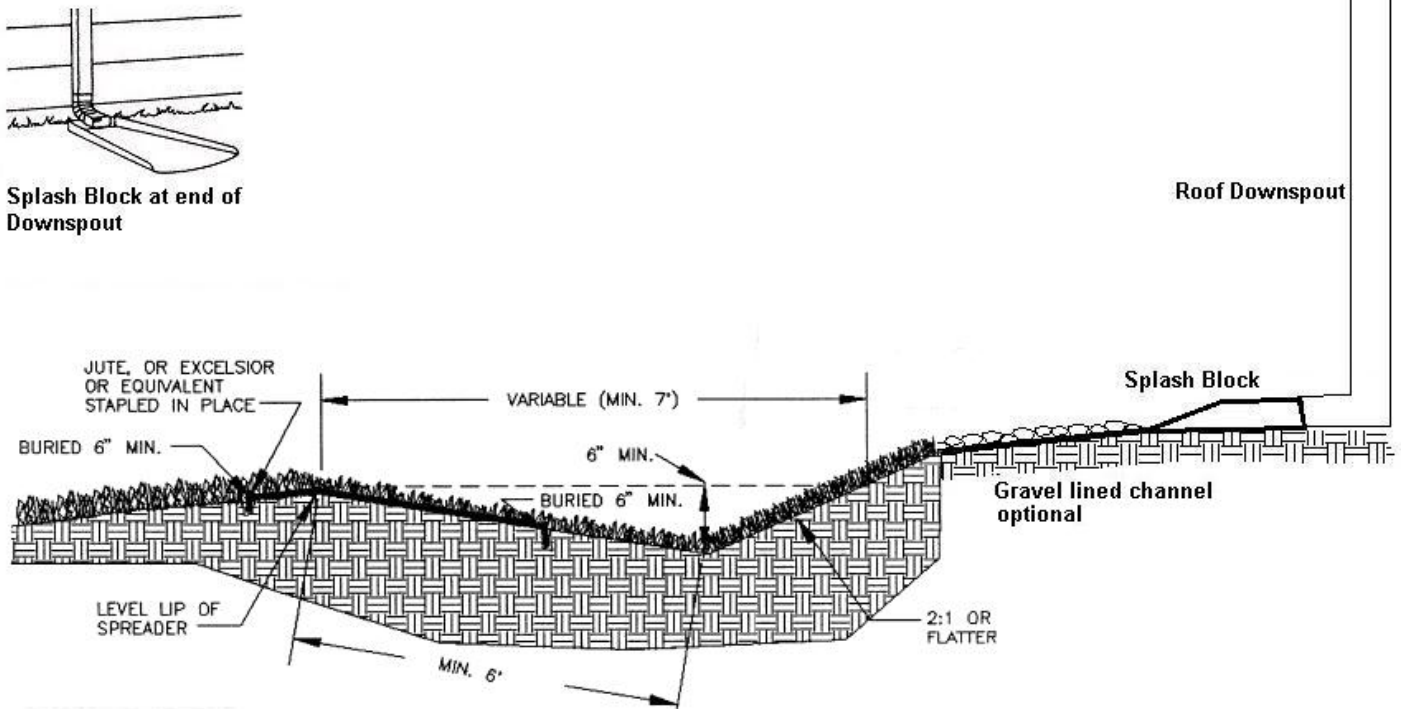
Limitations: Storage capacity is limiting. A larger system can be integrated with a well system.

Materials: As noted in the above diagram: Barrel, faucet, screening, and downspout connection.

Installation:

- Elevate to increase gravity flow.
- Provide a filter or diverter box on the downspout to aid in reducing debris within the barrel.
- Provide an adequate overflow. Ensure that the overflow will not scour the foundation of the structure or erode the adjacent yard. A splash block or routing the overflow hose into another practice can reduce the flow velocity.
- Collected water should be used between storm events.
- Disconnect the system during the winter when freezing is likely.

Splash Block with Level Spreader



What is it? A dispersion technique to reduce flow velocities from roof downspouts.

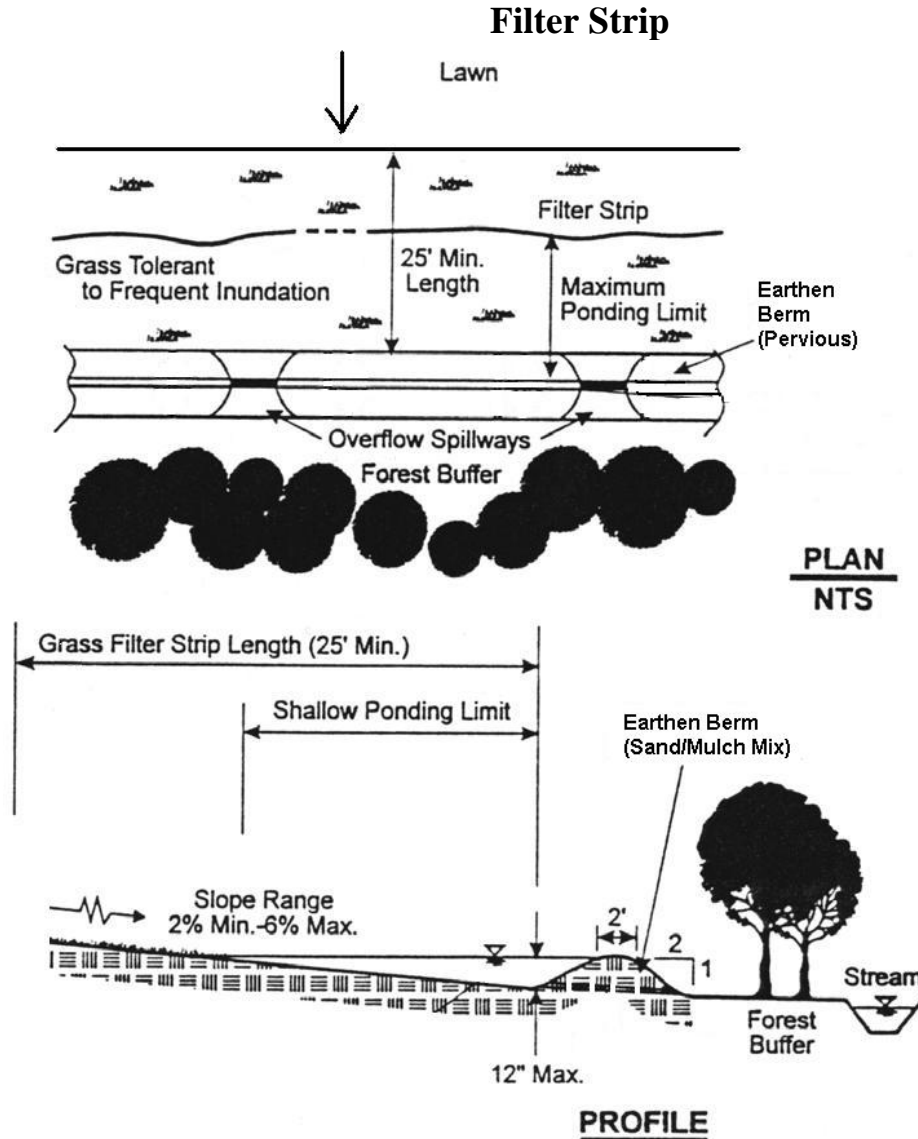
Purpose: To disconnect pipe runoff and disperse runoff into sheet flow. Decreases scour and velocity.

Limitations: Slope and the location of other structures in the yard.

Materials: As noted in the above diagram: Splash Block, Erosion Control netting, and rip rap (optional).

Installation:

- Determine the location of the level spreader. Locate in a natural depression, if possible, and along an undisturbed slope with established vegetation.
- Construct the lip at a 0 % grade to insure uniform spreading.
- Erosion control netting should extend 6 inches over the lip and buried 6 inches.
- For a rigid lip design see Level Spreader detail for driveways.
- Level Spreader pool and lip should be 10 to 20 feet long depending on expected flows.
- Seed and Stabilize upon completion.
- Clean out gutters and install splash block.



What is it? A dispersion technique to reduce flow velocities prior to entering a natural stream channel.

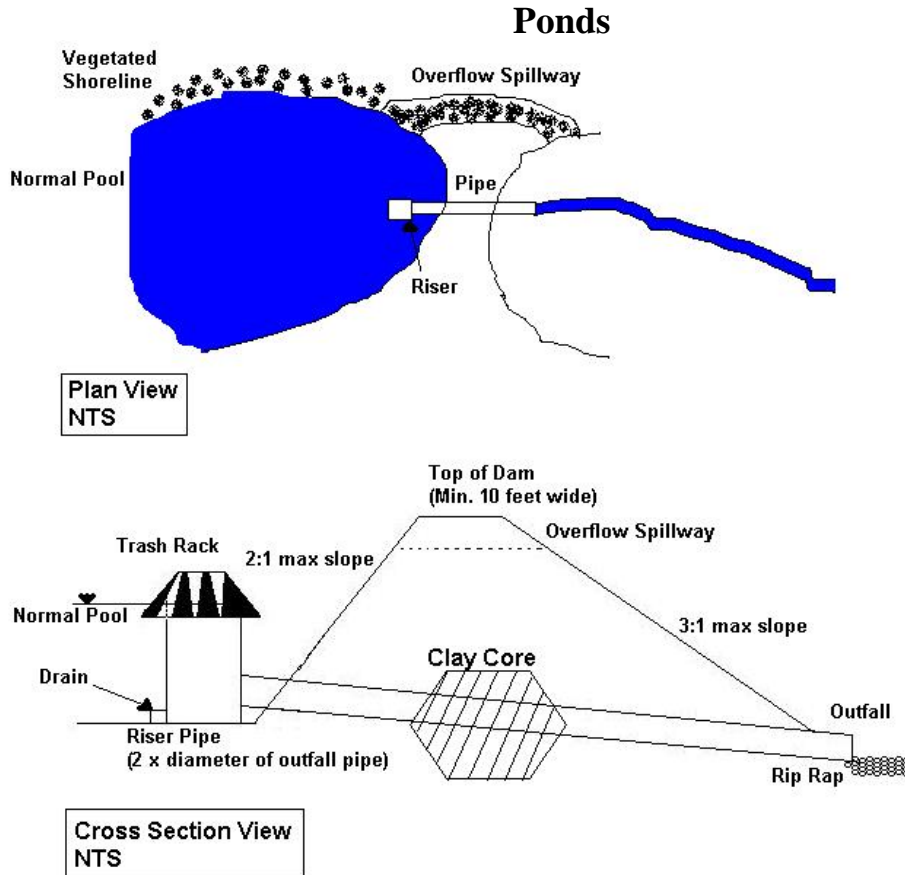
Purpose: To disperse runoff into sheet flow and to prevent erosion of the established buffer. Increase filtering capacity of the buffer. This practice recommended where concentrated runoff could not be dispersed.

Limitations: Slope and the location of other structures in the yard.

Materials: None. Use natural materials onsite.

Installation:

- Most effective if implemented at the edge of the cleared lot.
- Disturbance of the buffer to achieve this design is not recommended.
- Earthen berm constructed of natural materials onsite (mulch/sand/earth).
- Build the overflow spillways similar to level spreaders with a long level lip cut into the berm.
- Any encroachment on the flood plain may cause flooding upstream.



What is it? Open storage basin.

Purpose: To detain runoff for the purpose of reducing the runoff rate.

Limitations: Slope, available water source, and available fill material. The limits of the normal pool, and outfall should not lie on property lines.

Materials: As noted in the diagram above. Concrete and HDPE piping is recommended. Use natural fill materials from an onsite location.

Installation:

- Determine the location. The location needs to have an adequate water source (runoff or spring-fed), slopes less than 7 percent, and adequate soils to prevent seepage. The outfall and normal pool should not interfere with adjacent property lines.
- Contact the Army Corp of Engineers if the pond location is either in a stream channel or adjacent to a stream. Contact the Virginia Department of Conservation and Recreation (DCR) if the embankment height to the downstream stream is over 25 feet and 15 acre-feet of water is impounded.
- Excavate a core trench and fill with compacted Clay. Fill and compact the embankment in lifts with a maximum of 2:1 slope on the upstream side and 3:1 slope on the downstream side.
- Anchor the riser with concrete.
- Install the pipe at a minimum slope of 0.5 percent. Anti-seep collar may be needed to prevent piping.
- Seed and stabilize. Apply erosion control netting on the upstream slope.