



Stormwater Sizing & Design Guidelines

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<http://www.skagitcounty.net/stormwaterpermitting>

This worksheet is to assist you in designing your stormwater facilities. The items listed below are some basic sizing and use criteria, and are subject to additional requirements found in:

- Skagit County Code Sections 14.32 and 14.34
- Department of Ecology (DOE) Stormwater Management Manual for Western Washington
- Skagit County's NPDES Permit Requirements
- Low Impact Development Technical Guidance Manual for Puget Sound
- Rain Garden Handbook for Western Washington

Based on your project site location, you may have specific rules and/or additional criteria that may affect your project site. A licensed engineer and/or other qualified professional may be required to assist with the project design.

General items to consider when laying out your project site:

- Generally, stormwater facilities shall be setback a minimum of 10 feet from property lines, structures, or sensitive areas. Setbacks may vary by type of stormwater facility.
- Stormwater facilities may not discharge across a septic drainfield.
- Stormwater infiltration facilities may not be installed\constructed in a well protection zone.
- Generally, a stormwater facility shall not be installed on a slope greater than 15 percent, unless evaluated by a geotechnical engineer.
- Stormwater facilities may not impact neighboring properties, and flow paths may not encroach onto neighboring properties.
- Dispersion flowpaths may not overlap each other.

Below are some of the most common methods for addressing stormwater runoff in order of priority:

- Infiltration Trench..... See SD 1
- Drywell..... See SD 2
- Rain Garden..... See SD 3
- Dispersion Trench..... See SD 4
- Permeable Pavement..... See SD 5
- Sheet Flow Dispersion..... See SD 6
- Downspouts To Splashblocks..... See SD 7

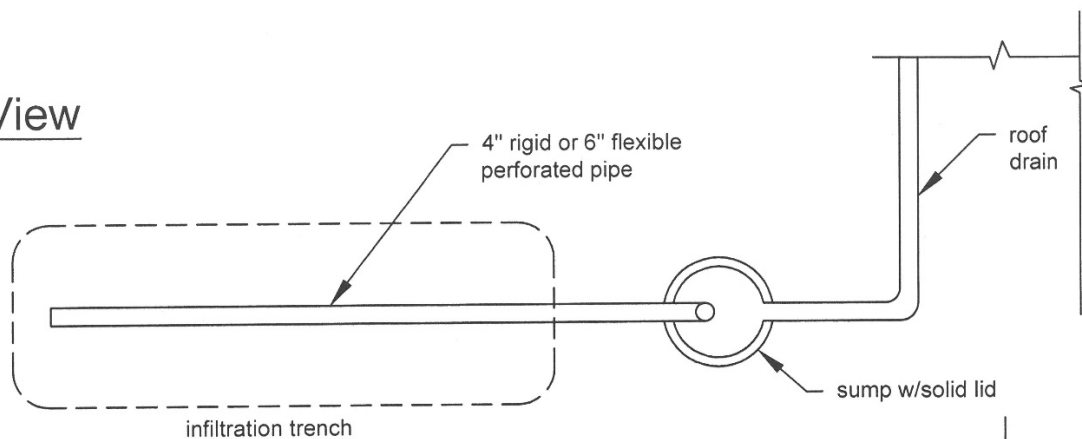
Refer to items such as geotechnical reports, septic soil logs, and the USDA Soil Survey to help determine soil types, and depth to water table information.

USDA Soil Survey <https://websoilsurvey.nrcs.usda.gov/app/>

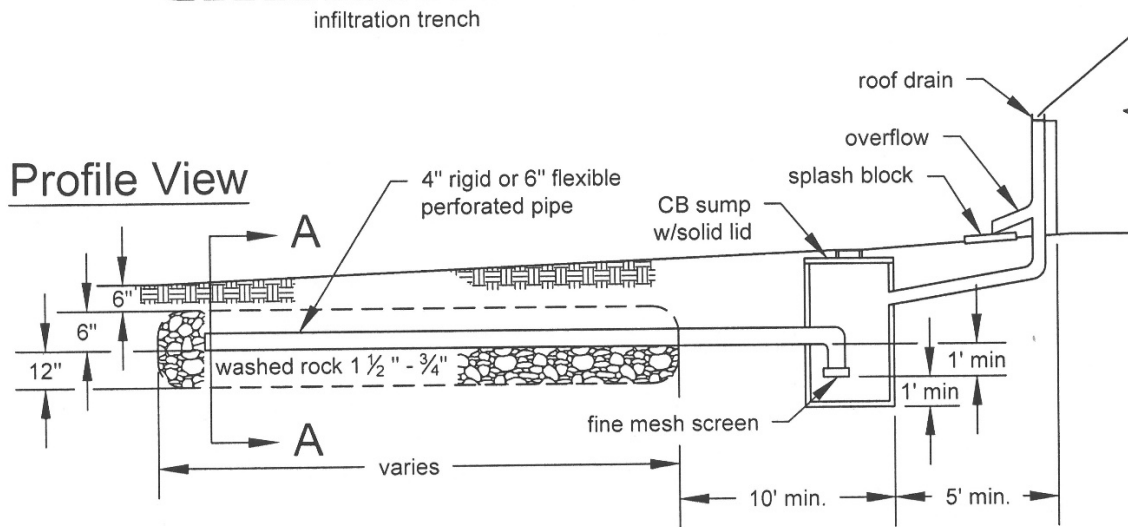
SD 1 Infiltration Trench (BMP T5.10A)

- To be used in good, well draining, permeable soils. See Skagit County's **Infiltration Test Worksheet**.
- Must have a minimum of 1 foot vertical separation between the bottom of the infiltration trench, and the water table or other impermeable layer.
- Maximum length of trench shall not exceed 100 feet from the inlet sump.
- Minimum spacing between trench centerlines shall be 6 feet.
- General sizing criteria: minimum trench length in lineal feet (LF) per 1,000 square feet of roof area
 - Coarse sands and cobbles: 20 LF
 - Medium sand: 30 LF
 - Fine sand, loamy sand: 75 LF
 - Sandy loam: 125 LF
 - Loam: 190 LF

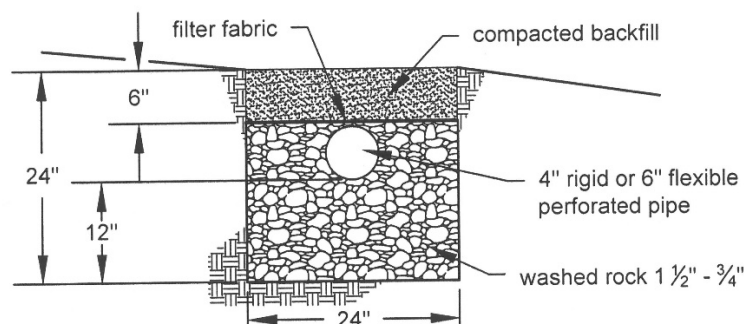
Plan View



Profile View



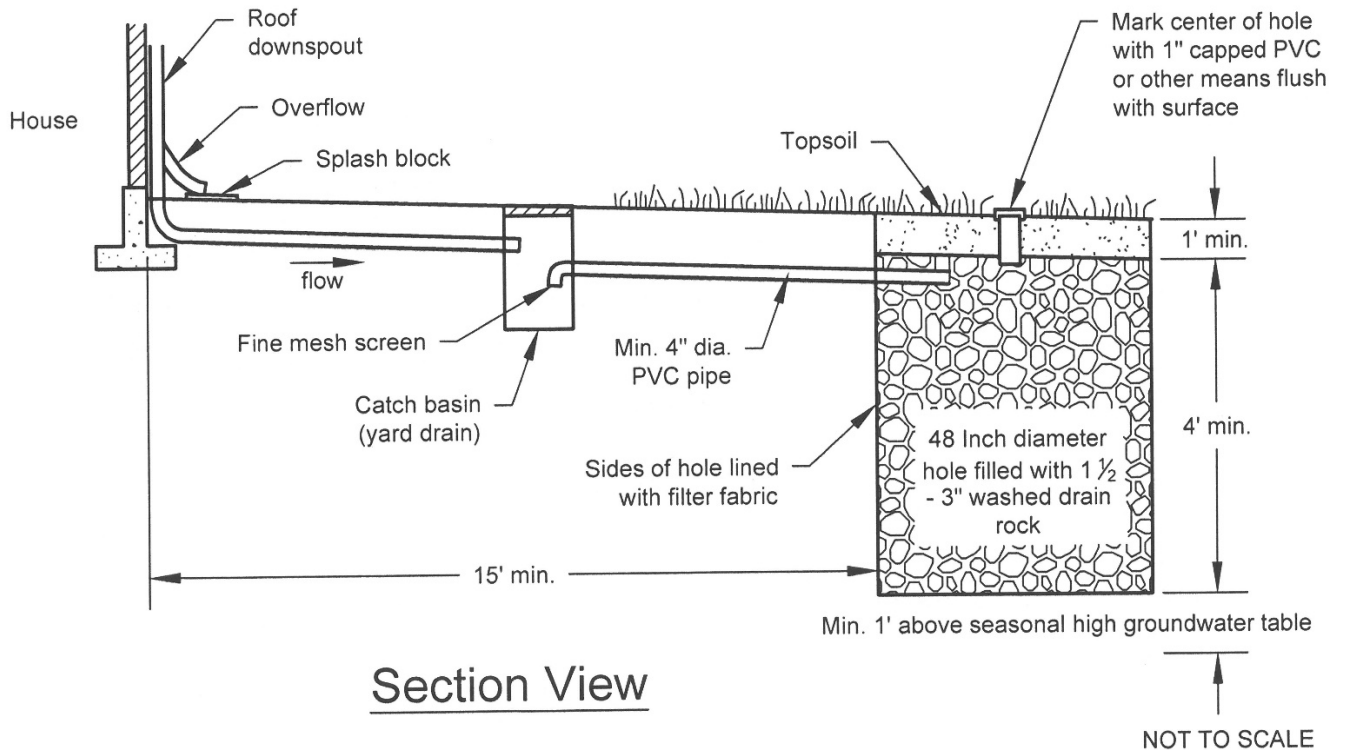
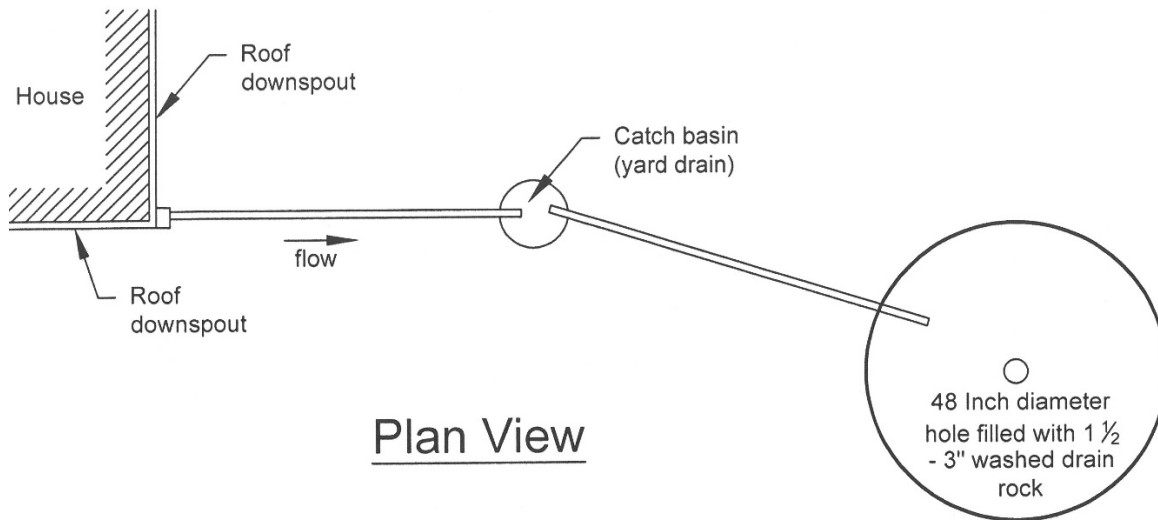
Section A-A



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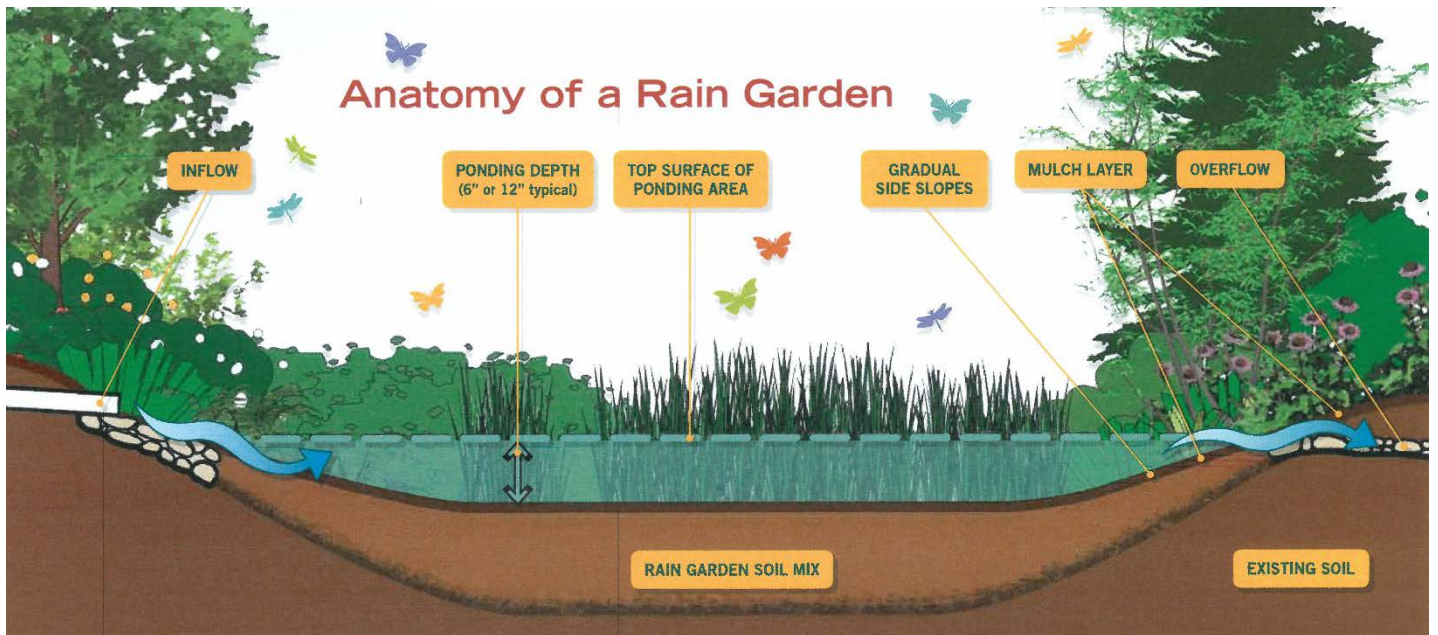
SD 2 Drywell (BMP T5.10A)

- To be used in good, well draining, permeable soils
- Must have a minimum of 1 foot vertical separation between the bottom of the drywell, and the water table or other impermeable layer.
- Maximum of 1,000 square feet of impervious\hard surface per drywell
- Minimum of 10 feet between drywells
- Minimum 48 inch diameter
- Minimum 4 feet deep, and deep enough to contain the volume of:
 - 60 cubic feet gravel when located in coarse sands and cobbles
 - 90 cubic feet of gravel when located in medium sands



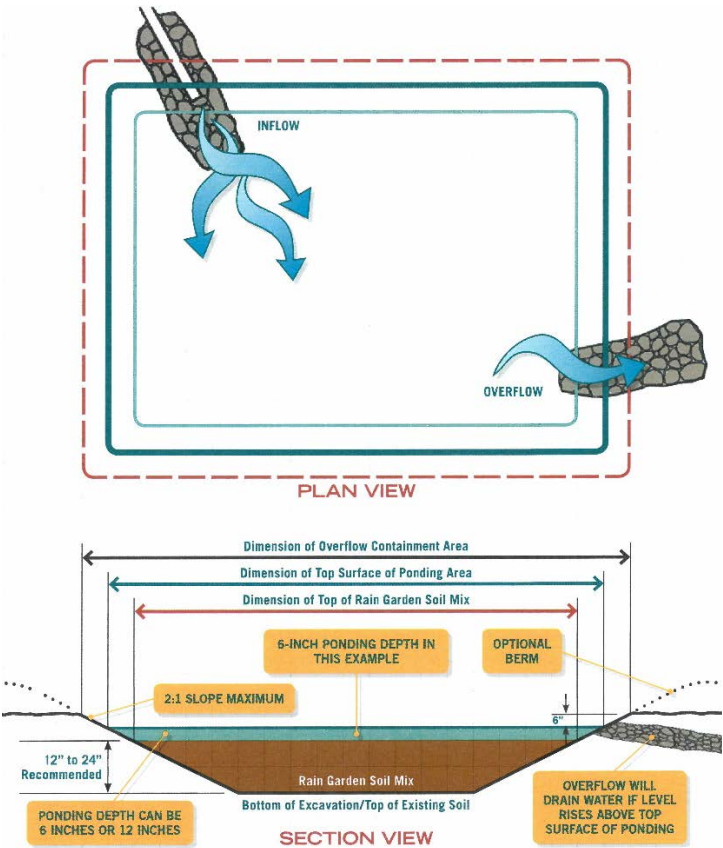
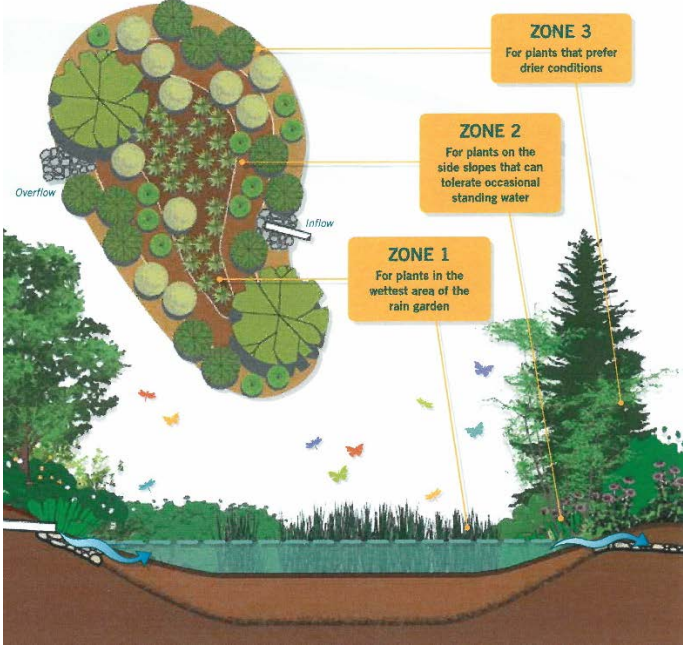
SD 3 Rain Garden (BMP T5.14A)

- Refer to the Rain Garden Handbook for Western Washington for specifications and construction guidance.
- To be used in good, well draining, permeable soils but can be used with an infiltration rate as low as 0.3 inches per hour with an underdrain. See Skagit County's **Infiltration Test Worksheet**.
- Must have a minimum of 1 foot vertical separation between the bottom of the rain garden, and the water table or other impermeable layer.
- Water ponding depth shall be between 6 and 12 inches
- Rain garden soil mix depth shall be a minimum of 18 inches for water quality
- A rain garden will have a variety of plants, and three plant zones.
- Rain gardens shall not be used within one-quarter mile of a phosphorus sensitive waterbody. Big Lake is considered a phosphorus sensitive waterbody.



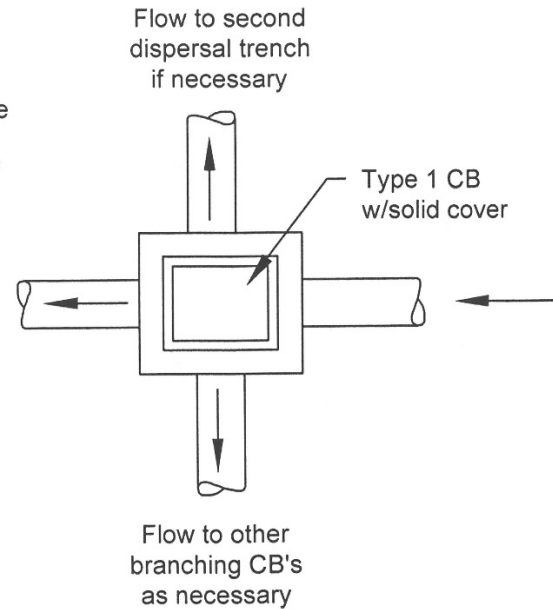
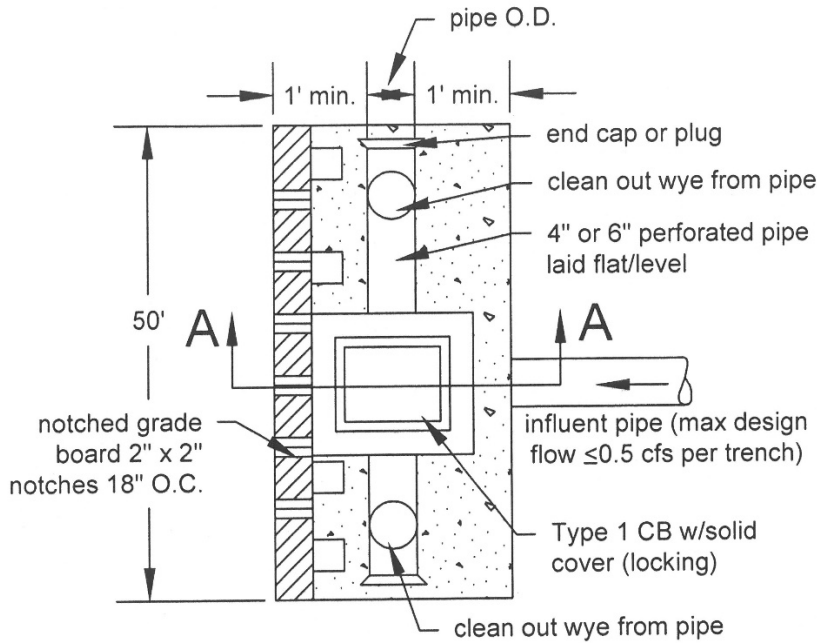
Planting Zones

Rain gardens have three planting zones. Zone 1 is the bottom of the rain garden—the wettest area. Zone 2 covers the side slopes, which occasionally may become wet. This zone requires plants to help stabilize the slopes. Zone 3 covers the area around the perimeter of the rain garden and/or on the berm, where plants will grow in drier soil.

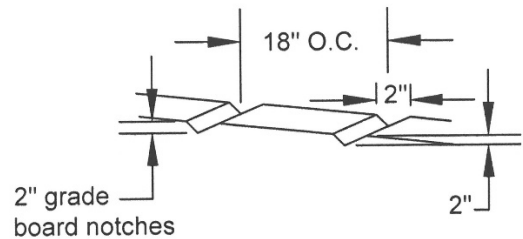
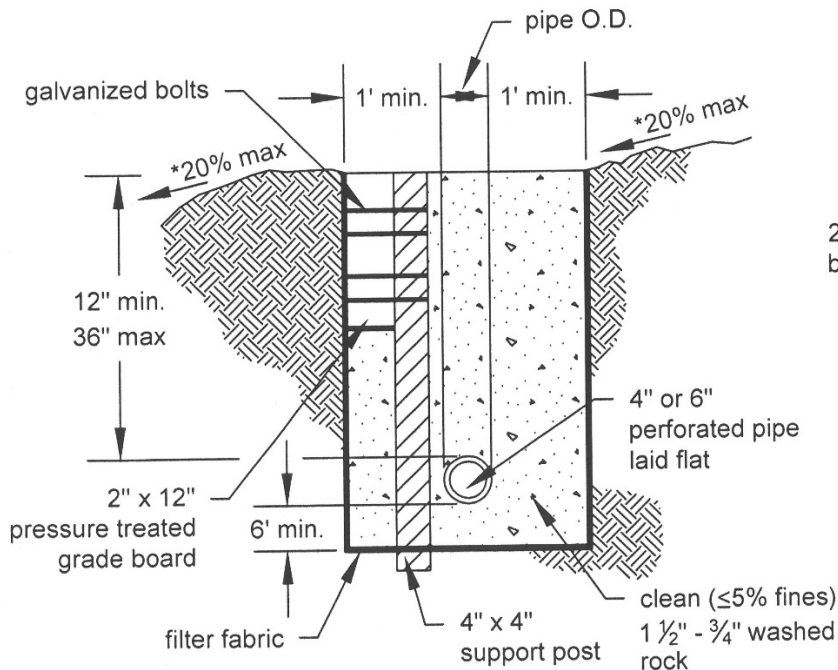


SD 4 Dispersion Trench (BMP T5.10B)

- To be used in poor, impermeable soils and/or sites with high groundwater.
- Maximum length of trench shall not exceed 50 feet from the inlet sump.
- General sizing criteria: 10 feet of trench for every 700 square feet of roof area.
- Minimum 25 foot vegetated flow path from discharge point.



Plan



Notes:

1. This trench shall be constructed so as to prevent point discharge and/or erosion.
2. Trenches may be placed no closer than 50 feet to one another. (100 feet along flowline)
3. Trench and grade board must be level. Align to follow contours of site.
4. Support post spacing as required by soil conditions to ensure grade board remains level.

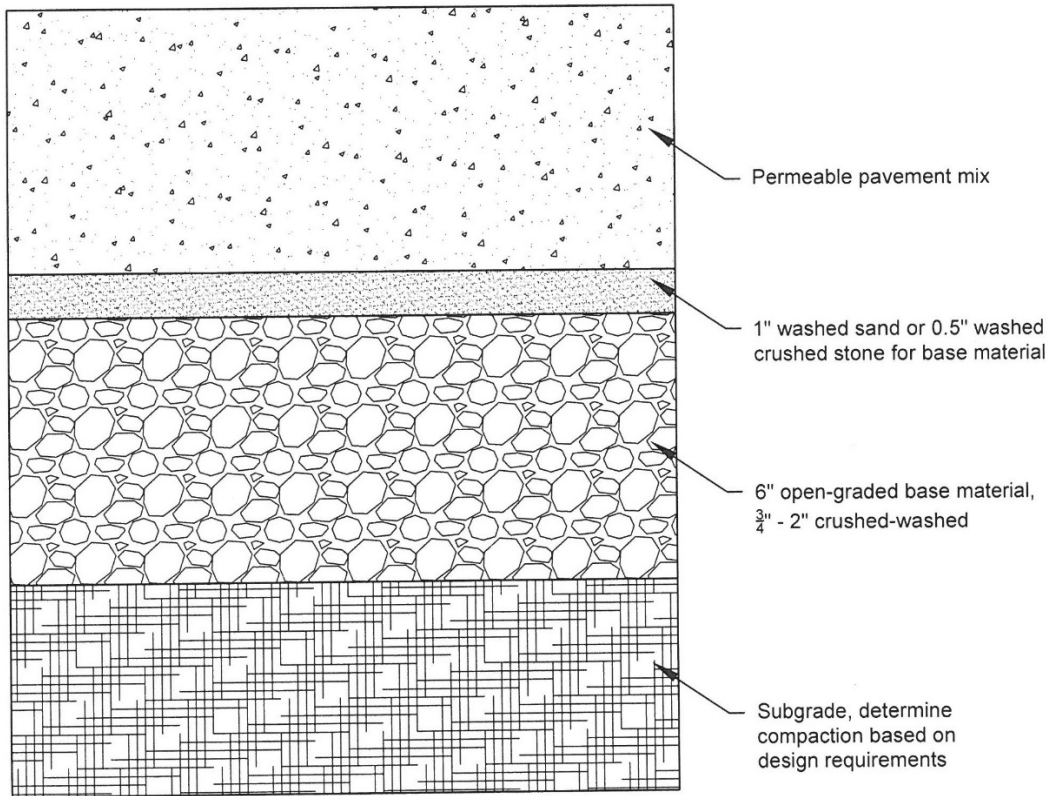
Section A-A

*15% max for flow control/water quality treatment in rural areas.

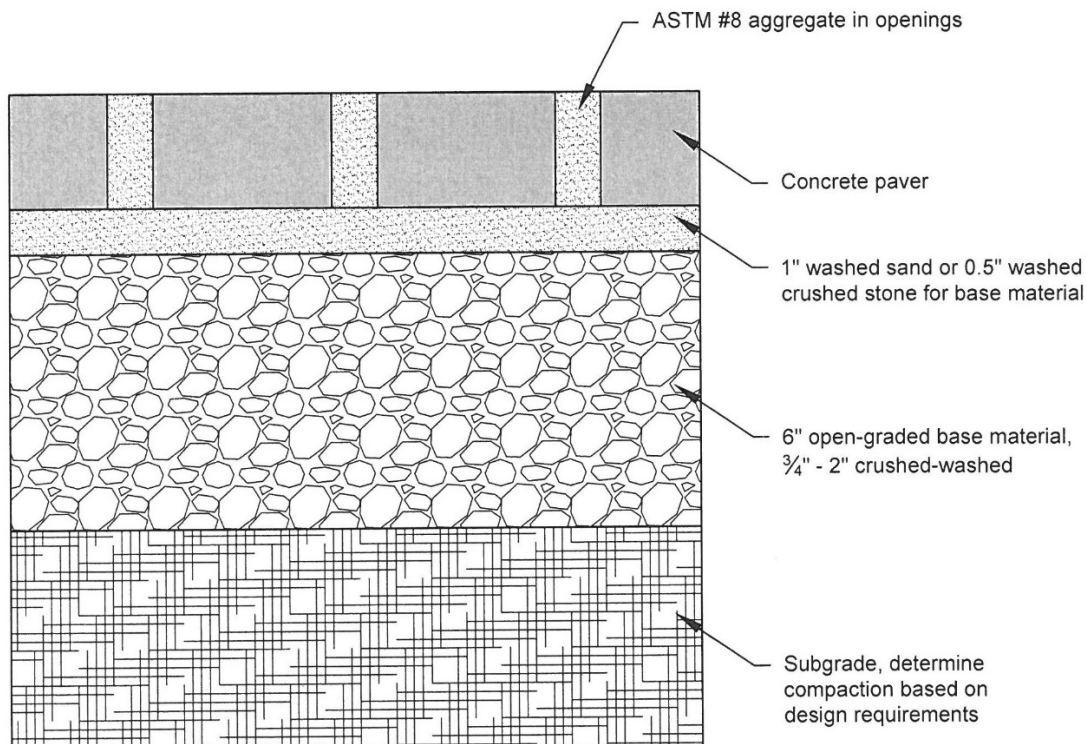
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SD 5 Permeable Pavements (BMP T5.15)

- Best for good, well draining, permeable soils
- Must have a minimum of 1 foot vertical separation between the bottom of the lowest gravel base course, and the water table or other impermeable layer.



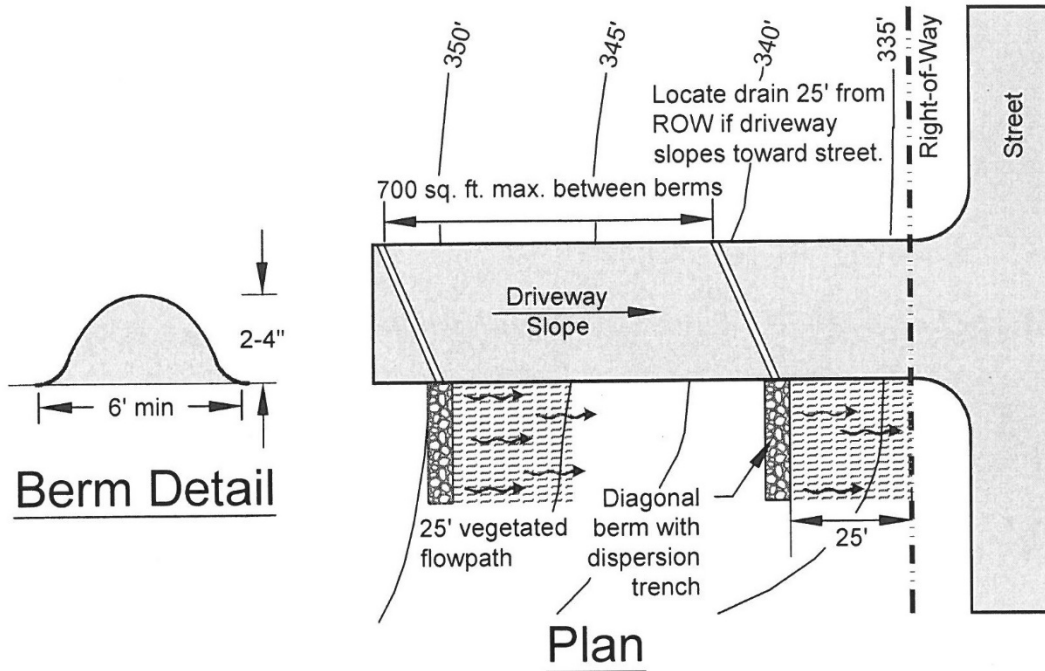
Asphalt or Concrete Permeable Pavement



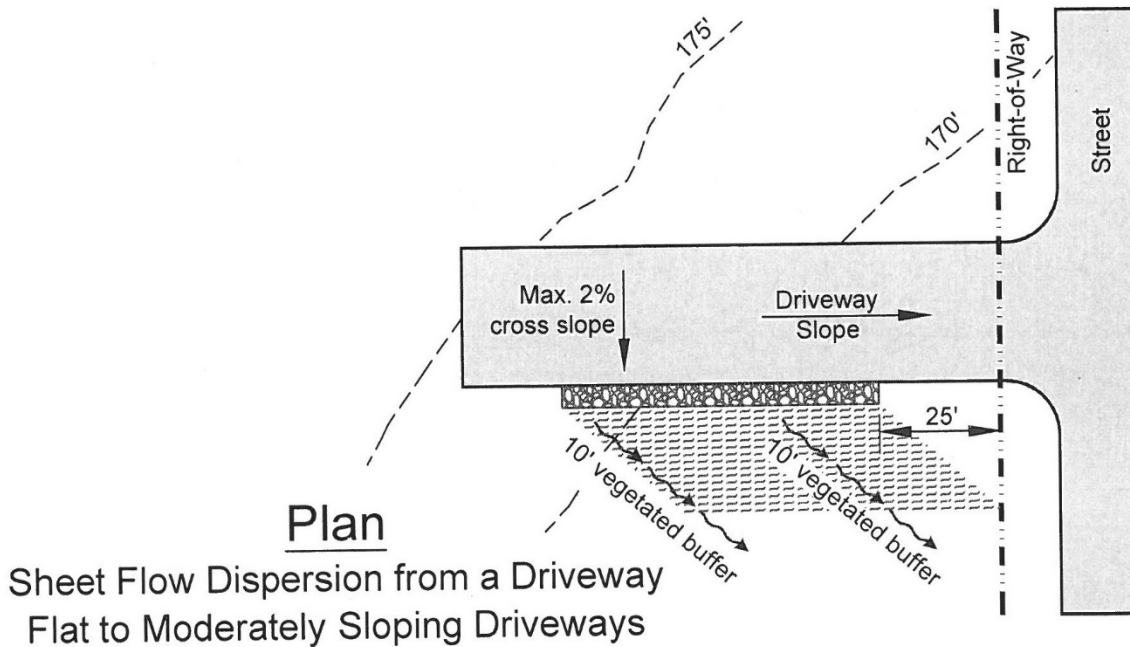
Paver Block Pavement

SD 6 Sheet Flow Dispersion (BMP T5.12)

- 2 foot wide transition zone along edge of impervious\hard surface.
- Provide 10 foot wide vegetated buffer for every 20 feet of impervious\hard surface width.



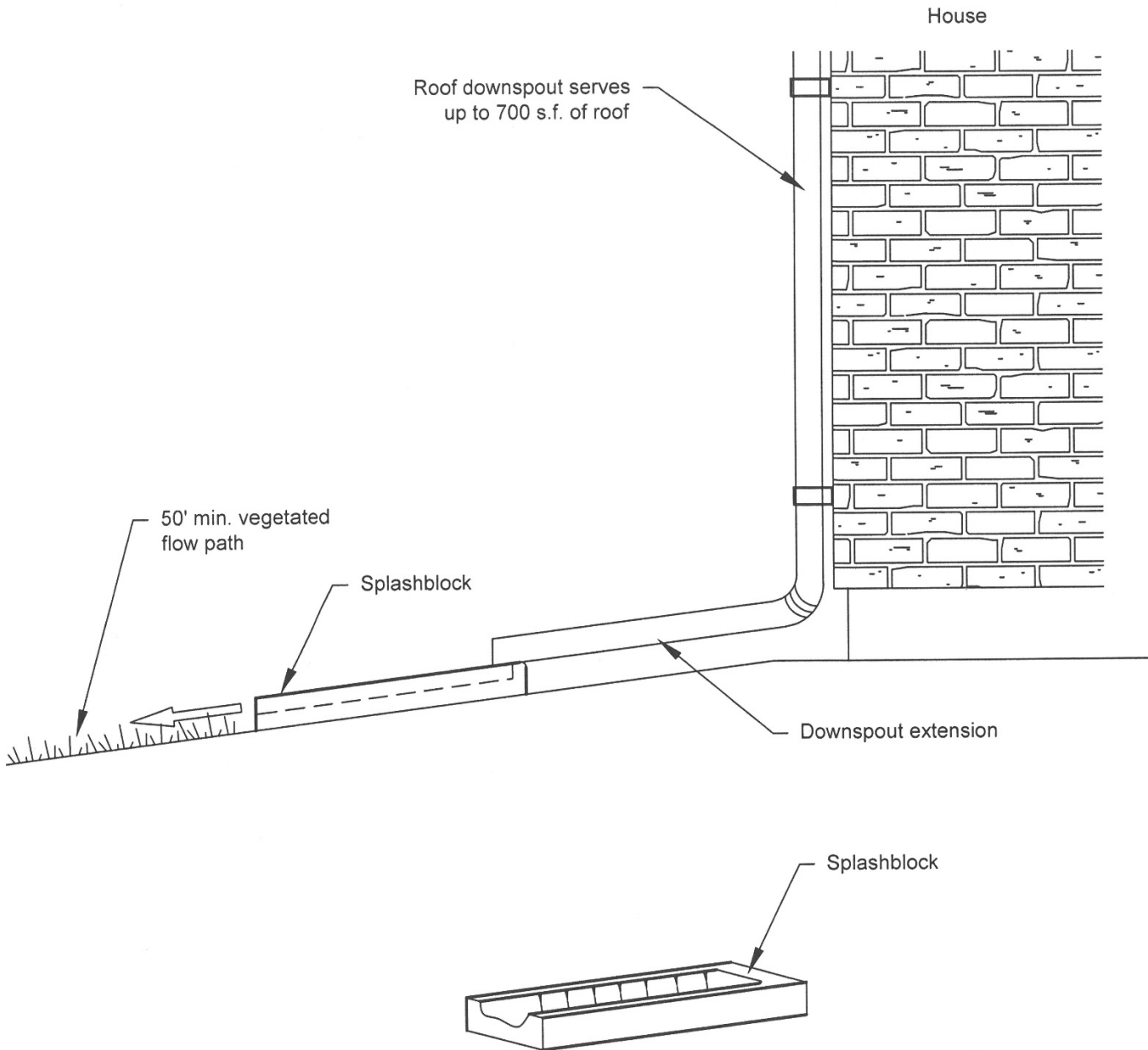
Driveway Dispersion Trench
 Driveway Slope Varies and Slopes Toward Street



Sheet Flow Dispersion from a Driveway
 Flat to Moderately Sloping Driveways

SD 7 Downspouts to splashblocks (BMP T5.10B)

- Minimum 50 foot vegetated flow path from discharge point.
- Positive slope away from the structure.
- Must have outlet protection such as a splashblock or outlet pad.
- A maximum of 700 square feet of roof area may drain to each splashblock



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