Chapter 7.5 - Roof Dripline Filters

The runoff from a peaked roof without gutters may be detained at the drip line, be filtered through the foundation backfill and be discharged via a foundation underdrain pipe or equivalent. The roof dripline filtration BMP needs to be designed with the following criteria:

BMP Components: The roof dripline filtration BMP consists of the following layers in ascending depth order: a reservoir layer of crushed stone, a drainage layer of sand, a filter layer of mineral soil with 4 to 7% fines, and an underdrain layer with perforated underdrain pipe to gravity outlet. The BMP extends the length of the building or area of roof to be treated.

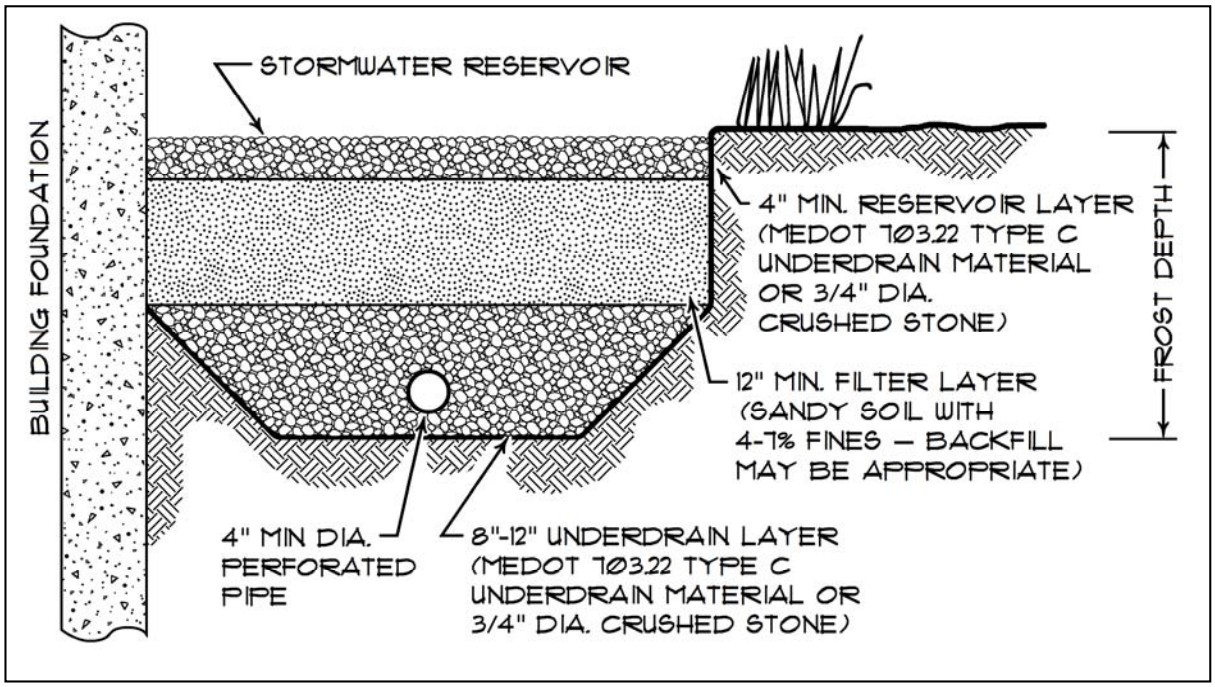

Figure 7.5.1 – Roof Dripline Cross-Section

Capacity for large storm: To meet the Chapter 500 Flooding Standards requirements, the reservoir needs to provide a minimum storage capacity for the direct entry of the rain precipitation from a 24-hour, 25-year storm (5 + inches) or an overflow may be needed or provided for.
Treatment Storage: The reservoir layer at the drip line must consist of crushed stone with a porosity of 40%. Its width and depth (4" min to 12" max) is sized based on the runoff volume from the roof. For example, a 30 foot wide roof panel will need a 6.3 foot wide by 1 foot deep reservoir to store the first 1-inch of runoff for treatment.
Drip line edge: The drip line trench should extend the length of the building or area of roof.
Treatment Storage: The reservoir bed at the drip line should be sized based on the runoff volume from the roof (For example, a 30 foot wide roof panel will need a 4 foot wide by 1.5 foot deep rock storage bed.
Reservoir Layer: The reservoir layer should consist of clean washed stone meeting the requirements of MaineDOT Standard Specification 703.22 Type C Underdrain Stone. The depth of the reservoir course shall be based on the desired storage volume.
Drainage Layer: The drainage layer should consist of a free draining sand meeting the requirements of MaineDOT Standard Specification 703.22 Type B Underdrain Backfill as necessary to provide frost protection for the foundation. Crushed stone may not be substituted.

Filter Layer: The backfill for the foundation may be used as the filter media as long as the material is a mineral soil with between 4 and 7% fines (passing #200 sieve) and is at least 4 inches thick.
Underdrain Layer: An underdrain layer consisting of a 4" diameter slotted underdrain pipe bedded in 8 to 12 inches of underdrain backfill material (MaineDOT Specification 703.22 Type B Underdrain Sand or Type C Underdrain Stone wrapped in filter fabric).
Frost Protection: Frost depth is measured from the bottom of the porous stone of the reservoir layer.
Basement Waterproofing: To prevent the penetration of water into a basement, the basement wall should be waterproofed.
Filter Sizing: A minimum storage capacity within a porous reservoir layer is needed to allow for the treatment of one inch or more of runoff and should have a minimum storage capacity for the direct entry of the rain precipitation from a 24-hour, 25-year storm (5 + inches) or an overflow needs to be provided.
Detention Time: Stored volume needs to fully drain within 24 to 48 hours. An orifice may be needed to regulate the outflow.
Additional Storage: The reservoir layer may be increased and the drainage layer may be used to store runoff after the first 1-inch of runoff assuming a porosity of 20% for Underdrain Sand. For example, a 3 foot thick drainage layer that is 6.3 feet wide at the top and 3 feet wide at the bottom can store 1.1 inches of runoff from a 30 foot wide roof panel.
Overflow: An overflow should be provided for runoff above the combined capacity of the reservoir and drainage layers.
Maintenance: A dripline filter bed needs to be maintained like any other filter basin. The maintenance activities for filtration BMPs listed in Chapter 7.2 of the BMP manual apply equally to this type of structure. Any debris must be removed from the reservoir course. The Maintenance plan needs to address that these structures are part of the stormwater management plan for the project, cannot be paved over or altered in anyway. No gutter may be installed on the roof line.