11.0 Post Construction BMPs Standards and Specifications

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11.11 Stormwater Filtering Systems

11.11.1 Stormwater Filter Systems are practices that capture and temporarily store the design storm volume and pass it through a filter media or material. Filtered runoff may be collected and returned to the conveyance system, or allowed to partially infiltrate into the soil. Design variants include:

11.11.1.1 Non-Structural Sand Filter

11.11.1.2 Surface Sand Filter

11.11.1.3 Three-Chamber Underground Sand Filter

11.11.1.4 Perimeter Sand Filter

11.11.2 Stormwater Filtering Systems shall be combined with a separate facility to provide stormwater detention.

11.11.3 Proprietary stormwater filtering systems shall be verified by the Department for adequate performance, sizing, and longevity.

11.11.4 Stormwater Filtering Systems Stormwater Credits

11.11.4.1 Stormwater Filtering Systems receive no runoff reduction performance credit.

11.11.4.2 Stormwater Filtering Systems sized in accordance with the design criteria shall receive the following pollutant reduction performance credits:

11.11.4.2.1 The total nitrogen pollutant reduction performance credit for Stormwater Filtering Systems is 40% removal efficiency.

11.11.4.2.2 The total phosphorus pollutant reduction performance credit for Stormwater Filtering Systems is 60% removal efficiency.

11.11.4.2.3 The total suspended solids pollutant reduction performance credit for Stormwater Filtering Systems is 80% removal efficiency.

11.11.5 Stormwater Filtering Systems Feasibility Criteria

11.11.5.1 Depth to Water Table and Bedrock

11.11.5.1.1 A minimum vertical distance of 2 feet must be provided between the bottom of the non-structural sand filter or surface sand filter and the seasonal high water table as determined by the soil investigation procedures or bedrock layer.

11.11.5.1.2 The minimum vertical distance of 2 feet may be relaxed if a groundwater mounding analysis or piezometer testing has been performed by a qualified professional.

11.11.5.1.3 Three-chamber underground sand filter and perimeter sand filter require no minimum separation to seasonal high water table or bedrock.

11.11.5.2 Stormwater Filtering Systems shall not be located on slopes greater than 6%.

11.11.6 Stormwater Filtering Systems Conveyance Criteria

11.11.6.1 On-line stormwater filtering systems' designs, shall demonstrate that the filter will safely pass the largest design storm event to a stabilized water course without resuspending or flushing previously trapped material.

11.11.6.2 All Stormwater Filtering Systems shall be designed to drain or dewater within 48 hours after a storm event.

11.11.7 Every inlet into a Stormwater Filtering System shall have a pretreatment mechanism to trap sediment, preserve the capacity of the main treatment area, and protect the long term integrity of the practice.

11.11.8 Stormwater Filtering Systems Design Criteria

11.11.8.1 Stormwater Filtering Systems shall be designed to drain the design storm volume from the filter chamber within 48 hours after each rainfall event.

11.11.8.2 Filter

11.11.8.2.1 The filter media shall consist of clean, washed AASHTO M-6/ASTM C-33 medium aggregate concrete sand with individual grains between 0.02 and 0.04 inches in diameter.

11.11.8.2.2 A minimum filter bed depth of 12" is required.

11.11.8.3 Underdrain

11.11.8.3.1 The underdrain shall be a minimum of 4-inch perforated corrugated polyethylene pipe (CPP).

11.11.8.3.2 The underdrain shall be encased in a layer of clean, washed nominal 1/4" gravel with a maximum of 2.0 percent passing the #200 sieve with a minimum of 3" of cover.

11.11.8.3.3 When an underdrain is specified a needled, non-woven, polypropylene geotextile having a flow rate (ASTM D4491) ≥110 gpm/sq. ft. and an apparent opening size (ASTM D4751) of US #70 or #80 sieve shall be placed beneath the filter media and above the underdrain gravel layer.

11.11.8.4 All Stormwater Filtering Systems must be designed so as to be accessible for maintenance.

11.11.8.4.1 A maintenance right-of-way or easement must extend to the Stormwater Filtering System from a public or private road.

11.11.8.4.2 Adequate maintenance access must extend to the perimeter of the Stormwater Filtering System pretreatment area and the filter bed

11.11.8.4.3 Maintenance access must meet the following criteria:

11.11.8.4.3.1 Minimum width of fifteen feet.

11.11.8.4.3.2 Profile grade that does not exceed 10H:1V.

11.11.8.4.3.3 Minimum 10H:1V cross slope.

11.11.8.4.4 Access to Underground Sand Filters must be provided by manholes at least 30 inches in diameter, along with steps to the areas where maintenance will occur.

11.11.8.5 The Stormwater Filtering System including pretreatment shall be sized to contain a minimum of 75% of the RPv prior to filtration.

11.11.9 Vegetative cover shall be established over the contributing pervious drainage areas before runoff can be accepted into the Stormwater Filtering System.

11.11.10 Stormwater Filtering Systems Construction Criteria

11.11.10.1 Erosion and Sediment Control.

11.11.10.1.1 No runoff shall be allowed to enter the Stormwater Filtering System prior to completion of all construction activities, including revegetation and final site stabilization.

11.11.10.1.2 Construction runoff shall be treated in separate sedimentation basins and routed to bypass the filter system. Should construction runoff enter the filter system prior to final site stabilization, all contaminated materials shall be removed and replaced with new clean filter materials before a regulatory inspector approves its completion.

11.11.10.1.3 The approved Sediment & Stormwater Plan shall include specific measures to provide for the protection of the filter system before the final stabilization of the site.

11.11.10.2 Construction reviews are required during the following stages of construction, and shall be noted on the plan in the sequence of construction:

11.11.10.2.1 Pre-construction meeting.

11.11.10.2.2 Initial site preparation including installation of erosion and sediment controls, sensitive area protection, and blockage of inlets to stormwater filtering system locations.

11.11.10.2.3 Excavation and grading to design dimensions and elevations.

11.11.10.2.4 Installation of the filter structure, including the water tightness test as applicable.

11.11.10.2.5 Installation of the underdrain and filter bed.

11.11.10.2.6 Check that stabilization in contributing area is adequate to bring the stormwater filtering system online.

11.11.10.2.7 Final construction review after a rainfall event to ensure that it drains properly and all pipe connections are watertight. Develop a punch list for facility acceptance.

11.11.10.3 Upon facility completion, the owner shall submit post construction verification documents to demonstrate that the stormwater filtering system has been constructed within allowable tolerances in accordance with the approved Sediment and Stormwater Management Plan and accepted by the approving agency. Allowable tolerances for stormwater filtering systems are as follows:

11.11.10.3.1 The constructed surface area of the filter bed shall be no less than 90% of the design surface area.

11.11.10.3.2 The constructed volume of the surface storage shall be no less than 90% of the design volume.

11.11.10.3.3 Depth of filter media shall be no less than 12 inches.

11.11.10.3.4 The constructed elevation of any structure shall be within 0.15 foot of the design.