11.0 Post Construction BMPs Standards and Specifications

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11.3 Permeable Pavement Systems

11.3.1 Permeable Pavement Systems are defined as paving surfaces that capture and temporarily store stormwater by filtering runoff through voids int eh pavement surface into an underlying reservoir. Design variants include:

11.3.1.1 Porous Asphalt (PA)

11.3.1.2 Pervious Concrete (PC)

11.3.1.3 Permeable interlocking concrete Pavers (PP) or Concrete grid Pavers (CP)

11.3.1.4 Plastic Grid Pavers (GP)

11.3.2 Permeable Pavement Systems receive 100% retention volume credit (Rv) for the volume stored and infiltrated by the practice.

11.3.2.1 The RPv runoff reduction performance credit for permeable pavement is 100% of the retention storage.

11.3.2.2 The Cv runoff reduction performance credit for permeable pavement is 100% of the retention storage.

11.3.2.3 The Fv runoff reduction performance credit for permeable pavement is 100% of the retention storage.

11.3.2.4 The total nitrogen pollutant reduction performance credit for permeable pavement is 100% of the load reduction.

11.3.2.5 The total phosphorus pollutant reduction performance credit for permeable pavement is 100% of the load reduction.

11.3.2.6 The total suspended solids pollutant reduction performance credit for permeable pavement is 100% of the load reduction.

11.3.3 Permeable Pavement Feasibility Criteria

11.3.3.1 Drainage Area.

11.3.3.1.1 The contributing drainage area to permeable pavement shall not exceed five times the surface area of the permeable pavement.

11.3.3.1.2 Pervious areas shall be diverted from the permeable pavement area such that the total contributing drainage area is at least 90% impervious.

11.3.3.1.3 Infiltration testing in accordance with Soil Investigation Procedures shall be required if the contributing drainage area exceeds 1.5 times the permeable pavement surface area.

11.3.3.2 Soils and Overdrains.

11.3.3.2.1 Overdrains are required if the permeability of the underlying soils does not have a minimum infiltration rate of 1 inch per hour.

11.3.3.2.2 In cases where infiltration testing is not required an overdrain shall be required for HSG C or D soils.

11.3.3.3 The surface slope shall be no greater than 5 percent.

11.3.3.4 The bottom slope of a permeable pavement installation shall be no greater than 1 percent.

11.3.3.5 If an overdrain is not provided, a separation distance of 2 feet is required between the bottom of the reservoir layer and the seasonal high water table as determined in accordance with Soil Investigation Procedures.

11.3.3.6 Permeable pavements shall not be used to treat hotspot runoff.

11.3.4 Permeable pavement designs shall include methods to safely convey the Cv and Fv.

11.3.5 Permeable Pavement Design Criteria

11.3.5.1 Permeable pavement shall be designed according to DelDOT specifications or the product manufacturer's recommendations as applicable.

11.3.5.2 Internal Geometry and Drawdown

11.3.5.2.1 For design purposes, the field verified infiltration rate shall have a factor of safety applied in accordance with Soil Investigation Procedures to account for potential compaction during construction and to approximate long term infiltration rates.

11.3.5.2.2 Permeable pavement practices shall be designed so that the RPv infiltrates within 48 hours.

11.3.5.2.3 Permeable pavement practices shall be designed so that they will

11.3.5.2.3.1 Infiltrate the Fv within 72 hours, or

11.3.5.2.3.2 Dewater the Fv within 72 hours, or

11.3.5.2.3.3 Manage the Fv on site with no adverse impact.

11.3.5.3 Reservoir layer

11.3.5.3.1 The suitability of the soil subgrade shall be determined by a qualified geotechnical engineer.

11.3.5.3.2 The reservoir layer shall be composed of clean, washed gravel with a maximum of 2.0 percent passing the #200 sieve and sized for both the maximum storm event to be managed and the structural requirements of the expected traffic loading.

11.3.5.3.3 The depth of the reservoir layer shall be a minimum of 6 inches.

11.3.5.3.4 If an overdrain is not provided, a separation distance of 2 feet is required between the bottom of the reservoir layer and the seasonal high water table as determined in accordance with Soil Investigation Procedures.

11.3.5.3.5 Overdrains shall be a minimum of 4 inches in diameter.

11.3.5.4 All permeable pavement systems shall include inspection ports.

11.3.5.5 The permeable pavement shall be designed to support the maximum anticipated traffic load.

11.3.5.6 The reservoir layer shall be sized to temporarily store and then infiltrate the RPv.

11.3.6 Permeable Pavement Construction

11.3.6.1 All permeable pavement areas shall be fully protected from sediment intrusion by silt fence or construction fencing to prevent construction traffic tracking.

11.3.6.2 During site construction, steps shall be taken to prevent compaction of the underlying soil and sedimentation of the permeable pavement practice.

11.3.6.3 The infiltration rate and separation from groundwater of the constructed permeable pavement practice shall be verified prior to completion of construction in accordance with the Soil Investigation Procedures. The results shall be included with the Post Construction Verification Documentation upon project completion.

11.3.6.4 During construction, care shall be taken to avoid tracking sediments onto any permeable pavement surface to avoid clogging.

11.3.6.5 When locating a sediment basin on an area intended for permeable pavement is unavoidable, the invert of the sediment basin must be a minimum of 1 foot above the final design elevation of the bottom of the reservoir course.

11.3.6.6 Permeable pavement shall be installed according to DelDOT specifications or the product manufacturer's recommendations as applicable.

11.3.6.7 Construction of the permeable pavement shall only begin after the entire contributing drainage area has been stabilized.

11.3.6.8 The proposed permeable pavement area shall be kept free from sediment during the entire construction process.

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

11.3.6.9.1 Pre-construction meeting

11.3.6.9.2 Initial site preparation including installation of erosion and sediment controls, sensitive area protection surrounding permeable pavement locations.

11.3.6.9.3 Excavation and grading including interim and final elevations. Observation of infiltrating surface and permeable pavement practice verification must be completed prior to gravel placement.

11.3.6.9.4 Construction of the overdrain, including inspection ports and installation of the overflow structure, as applicable

11.3.6.9.5 Installation of gravel

11.3.6.9.6 Implementation of required stabilization

11.3.6.9.7 Final construction review including development of a punch list for facility acceptance

11.3.6.10 Upon project completion, the owner shall submit Post Construction verification documents to demonstrate that the permeable pavement 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 permeable pavement are as follows:

11.3.6.10.1 The constructed permeable pavement surface area shall be no less than the design permeable pavement surface area.

11.3.6.10.2 The contributing drainage area as constructed shall be no greater than the design contributing drainage area.

11.3.6.10.3 The allowable tolerance from the design volume of the reservoir layer storage is ten percent less than the design volume.

11.3.6.10.4 The allowable tolerance for elevations of the overdrain or any structure is 0.1 foot.

11.3.6.11 When the allowable tolerances are exceeded for permeable pavement surface area or volume or structure elevations, supplemental calculations must be submitted to the approval agency to determine if the permeable pavement, as constructed, meets the design requirements.

11.3.7 Permeable Pavement Maintenance Criteria

11.3.7.1 Activities that have the potential to clog the permeable pavement surface, including but not limited to sanding, re-sealing, re-surfacing, storage of snow piles containing sand, storage of mulch or soil material, or construction staging, shall be prohibited.

11.3.7.2 An Operation and Maintenance Plan for the project shall be approved by DNREC or the Delegated Agency prior to project closeout. The Operation and Maintenance Plan shall specify the property owner’s primary maintenance responsibilities and authorize DNREC or Delegated Agency staff to access the property for maintenance review or corrective action in the event that proper maintenance is not performed.