

11.0 Post Construction BMPs Standards and Specifications

11.14 Soil Amendments

11.14.1 Soil Amendment, also called soil restoration, is a technique applied after construction to till compacted soils and restore their porosity by amending them with compost. Soil amendments reduce the generation of runoff from compacted urban lawns and may also enhance the performance of impervious cover disconnections and grass channels.

11.14.2 Soil Amendment Stormwater Credit Calculations

11.14.2.1 Soil Amendments receive the following runoff reduction performance credits. Runoff reduction allowances are applied to the amendment area only.

11.14.2.1.1 The RPv runoff reduction performance credit for Soil Amendments is based upon the hydrologic soil group (HSG) of the existing soil:

11.14.2.1.1.1 HSG A receives 38% annual runoff reduction credit.

11.14.2.1.1.2 HSG B receives 50% annual runoff reduction credit.

11.14.2.1.1.3 HSG C receives 29% annual runoff reduction credit.

11.14.2.1.1.4 HSG D receives 13% annual runoff reduction credit.

11.14.2.1.2 The Cv runoff reduction performance credit for soil amendments is 10% of the RPv allowance.

11.14.2.1.3 The Fv runoff reduction performance credit for soil amendments is 1% of the RPv allowance.

11.14.2.2 The total nitrogen, total phosphorus, and total suspended solids pollutant reduction performance credit for soil amendments is 100% of the load reduction.

11.14.3 Soil Amendments shall not be applied where:

11.14.3.1 The water table or bedrock is located within 2.0 feet of the soil surface. Soil Investigation Procedures shall be followed for determination of depth to the limiting layer.

11.14.3.2 Slope of soil to be amended exceeds 10%.

11.14.3.3 Soil to be amended is saturated or seasonally wet.

11.14.4 Soil Amendment Design Criteria

11.14.4.1 Soil testing shall be conducted during two stages of the Soil Amendment process.

11.14.4.1.1 The first test shall be performed to determine soil properties to a depth 1 foot below the proposed soil amendment area, with respect to saturation, bulk density, pH, salts, and soil nutrients. The initial test shall determine what soil amendments are needed.

11.14.4.1.2 The second soil test shall be conducted at least one week after compost has been incorporated into the soils to determine whether any further nutritional requirements, pH adjustment, and organic matter adjustments are necessary for plant growth.

11.14.4.2 When Soil Amendments are used to either adjust the hydrologic soil group of the amended area to lower the curve number of the site, or receive the annual runoff reduction performance credits for the amendment area, the soil amendment area shall receive no impervious cover runoff and shall place 3 inches of compost into the soil amendment area to a minimum incorporation depth of 6 inches using a tiller.

11.14.4.3 When Soil Amendments are used within the footprint of a BMP such as sheet flow to filter strip, sheet flow to open space, or vegetated channels to adjust the hydrologic soil group of the amended area and receive the runoff reduction performance credits for those BMPs, the following criteria apply:

11.14.4.3.1 Soil amendment areas having a contributing impervious cover (square feet) to surface area of compost amendment (square feet) ratio of up to 0.5 shall place 4 inches of compost into the soil amendment area to a minimum incorporation depth of 8 inches using a tiller.

11.14.4.3.2 Soil amendment areas having a contributing impervious cover (square feet) to surface area of compost amendment (square feet) ratio of 0.51 to 0.75 shall place 6 inches of compost into the soil amendment area to a minimum incorporation depth of 15 inches using an excavation and mixing method.

11.14.4.3.3 Soil amendment areas having a contributing impervious cover (square feet) to surface area of compost amendment (square feet) ratio greater than 0.75 shall place 8 inches of compost into the soil amendment area to a minimum incorporation depth of 20 inches using an excavation and mixing method.

11.14.4.4 Compost incorporation depths greater than 12" require removal of the existing soil down to the incorporation depth and physically mixing existing soil with compost.

11.14.4.5 Compost used for soil amendment shall be STA certified compost, meeting the requirements of Delaware Erosion and Sediment Control Handbook Appendix A-6 Compost Material Properties.

11.14.5 Soil Amendment Construction Criteria

11.14.5.1 For compost incorporation depths up to 12":

11.14.5.1.1 The proposed incorporation area shall be deep tilled to a depth of 2 to 3 feet using a tractor and sub-soiler. This deep-tilling step may

be omitted when soil amendment is used for filter strip widths of 20 feet or less in the direction of flow.

11.14.5.1.2 Existing soils shall be in dry condition prior to incorporating compost.

11.14.5.1.3 The compost layer shall be placed on surface of proposed amendment area to the depth specified and then incorporated into the soil using a roto-tiller or similar equipment.

11.14.5.1.4 Conduct soil test to determine whether any further nutritional requirements, pH adjustment, and organic matter adjustments are necessary for plant growth.

11.14.5.2 For compost incorporation depths 12" or greater:

11.14.5.2.1 The proposed amendment area shall be excavated to the required incorporation depth, as follows:

11.14.5.2.1.1 Remove topsoil and stockpile for later use.

11.14.5.2.1.2 Excavate subsoil working in strips perpendicular to the slope/flowpath, using multiple lifts.

11.14.5.2.1.3 Separate and remove a minimum of 25% of the subsoil, taking the most densely compacted soils for removal. Stockpile remaining subsoil next to excavated area, separately from topsoil.

11.14.5.2.1.4 Scarify bottom of excavated area.

11.14.5.2.2 Amended soil shall be returned to the soil amendment area as follows. The number of lifts may vary depending on the capabilities of the equipment being used, but a minimum of 2 lifts is required.

11.14.5.2.2.1 Replace subsoils by loosening, aerating, and mixing subsoil.

11.14.5.2.2.2 Replace stockpiled topsoil.

11.14.5.2.2.3 Incorporate required layer of compost, such that compost is uniformly incorporated throughout. Existing soils shall be in dry condition prior to incorporating compost.

11.14.5.2.2.4 Repeat above steps for each lift.

11.14.5.2.3 Rake to level and remove surface woody debris and rocks larger than 1"

11.14.5.2.4 The finished grade of the combination of replaced subsoil, topsoil and compost shall be a minimum of 4" above the existing grade to account for settlement, but must be adjusted to account for field conditions and soil texture, such that a final settled grade at three months post-installation matches the original grade.

11.14.5.2.5 Conduct soil test to determine whether any further nutritional requirements, pH adjustment, and organic matter adjustments are necessary for plant growth.

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

11.14.5.3.1 Pre-construction meeting

11.14.5.3.2 Initial site preparation including installation of erosion and sediment controls,

11.14.5.3.3 Deep tillage using subsoiler or excavation of existing subsoil.

11.14.5.3.4 Incorporation of compost amendment into existing soil including verification of the depth of compost amendment.

11.14.5.3.5 Implementation of required stabilization and planting plan.

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

11.14.5.4 Upon project completion, the owner shall submit Post Construction verification documents, including but not limited to compost delivery tickets and photo documentation of construction, to demonstrate that the soil amendment has been constructed within in accordance with the approved Sediment and Stormwater Management Plan and accepted by the approving agency.