Assistance Bulletin

# Post-construction Soil Standard

# #94

Effective Date September 30, 2010
Rev. 10/11

**Snohomish County**
*Planning and Development Services*

**WWW.SNOCO.ORG** **Keyword: Assistance Bulletins**

Visit us at :

2nd Floor Robert J. Drewel Bldg.
3000 Rockefeller Avenue
Everett, WA 98201

425-388-3311
1-800-562-4367, ext. 3311

PERMIT SUBMITTAL
Appointment
425.388.3311
Ext. 2790

This Assistance Bulletin only applies to property within unincorporated Snohomish County and does not apply to property within incorporated city limits.

## SCC 30.63A.525 Minimum Requirement (MR) 5 On-Site Soils Management and BMP T5.13

### *Preserving and Restoring Healthy Soils on Site Developments in Snohomish County*

Pursuant to the County's Phase I Municipal Stormwater Management Permit requirements, land disturbing activity project applications vested on or after September 30, 2010, must control stormwater on-site.

SCC 30.63A.525 ensures that projects will be designed to infiltrate, disperse, and retain stormwater runoff on-site to the maximum extent feasible without causing flooding or erosion impacts, and to reduce the hydrologic disruption of developed sites. Engineering analysis will generally be required to comply with this requirement and other stormwater control requirements in MRs 1 through 5.

Compliance with MR 5 – On-site Soils Management in the Snohomish County Drainage Manual Volume 5, Chapter 5 is achieved by implementing best management practice (BMP) T 5.13. The purpose of BMP T5.13 Post-Construction Soil Quality and Depth is to establish soil quality and depth to improve stormwater functions in the post development landscape. Implementation of this BMP provides increased treatment of pollutants and sediments that result from development and habitation. It will minimize the need for some landscaping chemicals, thus reducing pollution through prevention.

Naturally occurring (undisturbed) soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Not only are these important stormwater functions lost, but also such landscapes themselves become pollution-generating pervious surfaces due to increased use of pesticides, fertilizers and other landscaping chemicals, and the concentration of pet wastes.

*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*

**This bulletin is intended only as an information guide. The information may not be complete and is subject to change. For complete legal information, refer to Snohomish County Code.**

## Soil Treatment Options

### *There are four Soil Treatment Options that can be used to meet the post-construction soil standard.*

These options can be used individually, or in combination (more than one may be used in different areas of a single site), so that they work best for the situation. The most convenient and economical methods for achieving the standards depend on site soil conditions, grading and subgrade compaction, practicality of stockpiling site topsoil during grading, and site access issues. Choose Options 1, 2, 3 and/or 4 in areas where grading and soil disturbance are unavoidable, and follow the attached design guidelines :

### Option 1:

**Leave native soil undisturbed, and protect from compaction during construction.**

***NOTE:*** *Option 1 is only applicable to sites that have the original, undisturbed soil native to the site. This will most often be forested land that is being left undisturbed in the current project.*

This option is the most economical and best for the environment, but is not always feasible.

- Plan site development to leave areas where native vegetation does not need to be disturbed.
- Fence off areas of native vegetation on the site that will not be stripped, logged, or graded to protect them from disturbance during construction.
- Undisturbed areas do not require soil amendment.

### Option 2:

**Amend disturbed soil according to the following procedures:**

a. Scarify subsoil to a depth of one foot.

b. In planting beds, place three inches of compost and till in to an eight-inch depth.

c. In turf areas, place two inches of compost and till in to an eight-inch depth.

d. Apply two to four inches of arborist wood chip, coarse bark mulch, or compost mulch to planting beds after final planting.

Alternatively, disturbed soil can be amended on a site-customized manner so that it meets the soil quality criteria set forth above, as determined by a licensed engineer, geologist, landscape architect, or other person as approved by Snohomish County.

*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*

## Option 3:

**Disturbed Soil.**

Stockpile existing topsoil during grading and replace it prior to planting.

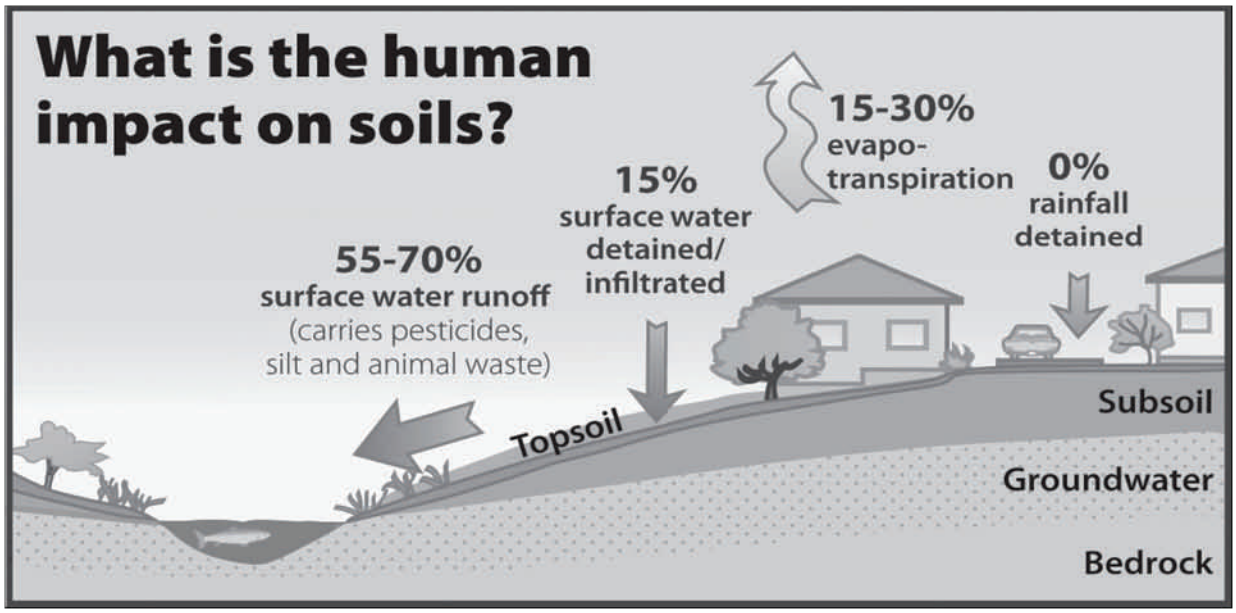
Stockpiled topsoil must be amended if needed to meet the organic matter and depth requirements by following the procedures in option (2).

Remove forest duff layer and topsoil and stockpile separately, in an approved location prior to grading. Cover soil and duff piles with woven weed barrier (available from nursery supply stores) that sheds moisture yet allows airflow.

## Option 4:

**Import topsoil mix with 8-13% soil organic matter content.**

Import topsoil mix of sufficient organic content and depth to meet the organic matter and depth requirements.




*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*

# Figuring Compost, Stockpiling and/or Imported Topsoil Needs

## Step 1.
### Review site conditions, landscape and grading plans.

- Examine site plans and soils. Use a shovel to dig in several areas that have been or will be graded to determine if the newly exposed grades can be easily amended, or if compaction will require plowing/tilling of the subsoil or topsoil import. Determine if there are areas where soil could be stockpiled on-site.
- Identify areas where soil can be: left undisturbed (Option1), amended in place with compost (Option 2), removed and replaced with imported purchased topsoil (Option 4), or stockpiled and later reapplied (Option 3).

## Step 2.
### Select soil treatment option and suitable pH for each planting area.

Amending with compost is often the most economical way to bring poor soils up to the required soil organic matter content. On sites with the original, undisturbed, native soil, and where space permits, stockpiling and reapplying topsoil may be less costly. Importing topsoil usually costs more than amending existing soil, though it may be easier where subsoil conditions make cultivation difficult.

- To determine a custom compost amendment rate for Options 2 and/or 3, use an accredited soil-testing laboratory (website provided) to sample and test the site soil to determine the soil bulk density (lbs/cubic yard dry weight) and soil organic matter percentage. These values will be used to calculate the custom compost amendment rate in inches (see BMP T 5.13(3)).
- Identify the areas where the selected Soil Treatment Option(s) will be applied. Outline those areas on the site plan with a dark, thick-line pen.
- Assign each area an identifying letter (A, B, C…) on the site drawing.
- Determine desired pH for each lettered area, based on suitability for proposed plants.
- Include required information on the Soil Management Plan Summary Form.

## Step 3.
### Calculate compost and/or topsoil volumes for each area.

- Calculate the square footage of each lettered area on the Soil Management Site plan.
- If using the pre-approved amendment rate, complete the attached Compost and Topsoil Calculation Worksheet to calculate the quantities of compost and/or topsoil needed.

## Step 4.
### Identify compost and/or topsoils to be applied and retain records.

- Contact a compost or topsoil facility permitted by Washington state and select products that meet the requirements.
- If preparing to use a custom compost amendment rate for Options 2 and/or 3:
  - Determine the target percentage of soil organic matter you wish to achieve. Note: 8% is better for grassy areas and lawns and 10-13% is better for planting beds.
  - Request copies of **compost test result reports** that include the compost (lbs/cubic yard dry weight) and the percentage compost organic matter. These values will be used to calculate the custom amendment rate in inches.
- Complete the Soil Management Plan Summary form in this bulletin, with required attachments. These will become part of your stormwater site plan documenting how you intend to comply with SCC 30.63A.*525 Minimum Requirement 5, On Site Stormwater Management*. Retain original delivery tickets for compost and/or topsoil products for verification purposes.

## Questions?

For questions related to Snohomish County's post-construction soil standards, please contact:

Planning and Development Services
Phone: (425) 388-3311

## Soil pH

Use an accredited soil-testing laboratory to test the pH of the soil and ask the laboratory to provide information on how to adjust the soil pH, should that be necessary. To find accredited soil testing laboratories, see *attachments*.

A nursery can provide specific information about suitable pH for landscape plants. Here are optimal soil pH ranges for various plant types:
**Lawns** – 5.5 to 7.5 pH
**Shrubs (except acid-tolerant plants)** – 5.5 to 7.0 pH
**Acid-Tolerant Shrubs (Rhododendrons, Azaleas, Mountain Laurels, Camellias, Blueberries, native plants)** – 4.5 to 5.5 pH
**Annual Flower and Vegetable Gardens** – 6.0 to 7.0 pH

## Compost and Topsoil Calculation Worksheet for the Pre-approved Amendment Rate

***Compost sold in Washington must comply with state standards for compost quality found in the state solid waste rule (WAC 173-350-220).***

Compost sources include both permitted compost facilities and facilities that do not require permits because they are exempt under the state rule. Some compost facilities produce compost and topsoil mixes, and topsoil supply companies may use compost produced elsewhere to create topsoil mix products. To achieve the post-construction soil standard, topsoil mixes must contain organic matter content of ten percent dry weight in planting beds, and 5% organic matter content (based on a losson-ignition test) in turf areas, and a pH from 6.0 to 8.0 or matching the pH of the original undisturbed soil. The topsoil layer shall have a minimum depth of eight inches except where tree roots limit the depth of incorporation of amendments needed to meet the criteria. Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.

Permit applicants that compost their own material at a maximum of 250 cubic yards of compost on site at any one time, may use that material for a project, provided the appropriate tests are conducted and documented. In addition to the annual testing required by WAC 173-350-220, tests must include: 1) organic matter content (range: 35 -65%); and, if using a custom compost amendment rate, compost bulk density (lbs./cubic yard dry weight).

## Resources

**Permitted Compost Facilities**
For a list of permitted compost facilities, see the Washington State Department of Ecology Web site, and click on "Permitted Compost Facilities": http://www.ecy.wa.gov/programs/swfa/compost/

**Soil Testing Laboratories**
For a list of accredited soil testing laboratories and guidance on obtaining soil tests: http://www.SoilsforSalmon.org

## Compost and Topsoil Calculation Worksheet for the Pre-approved Amendment Rate

**NOTE:** For Options 2 and 3, use this worksheet if you plan to use the pre-approved compost amendment rate of 2 inches. This worksheet should not be used if a custom compost amendment rate is selected for Options 2 and/or 3.

**Option 1**

**Leave native soil undisturbed, and protect from compaction during construction.**

- Enter lettered areas from site plan where this option will be used:

_____ _____ _____ _____ _____ _____

*No calculations for compost or topsoil are necessary for this option.*

**Option 2**

**Amend existing soil in-place (2-inch layer of compost).**

- Enter lettered areas from site plan where this option will be used:

_____ _____ _____ _____ _____ _____

- Enter combined square footage of lettered areas in thousands _____ _____ (example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)
- Multiply combined square footage by **6.2** and enter product in box A

| A | =Cubic Yards |
|---|---|

AMOUNT OF COMPOST NEEDED FOR THESE AREAS

*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*

Option 3

**Native Soil – stockpile site duff and topsoil and reapply after grading and construction.**

- Enter lettered areas from site plan where this option will be used:

_____ _____ _____ _____ _____ _____

- Enter combined square footage of lettered areas in thousands _____
  (example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)

Multiply **combined square footage** by **25** and enter product in box B:

| **B** | =Cubic Yards |
|---|---|

AMOUNT OF TOPSOIL TO BE STOCKPILED AND REAPPLIED IN THESE AREAS

Option 4

**Import topsoil.**

- Enter lettered areas from site plan where this option will be used:

_____ _____ _____ _____ _____ _____

- Enter combined square footage of lettered areas in thousands _____
  (example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)

- Multiply **combined square footage** by **25** and enter product in box C:

| **C** | =Cubic Yards |
|---|---|

AMOUNT OF IMPORTED TOPSOITHESE NEEDED FOR THESE AREAS

Order

**Order These Amounts:**

Enter amount in Box **A:** _____**Cubic Yards of Compost**

Enter amount in Box **C :** _____**Cubic Yards of Topsoil**

*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*

## Design Guidelines (see BMP T5.13)

**Soil retention.** The duff layer and native topsoil should be retained in an undisturbed state to the maximum extent practicable. In any areas requiring grading remove and stockpile the duff layer and topsoil on site in a designated, controlled area, not adjacent to public resources and critical areas, to be reapplied to other portions of the site where feasible.

**Soil quality.** All areas subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structural fill or slope shall, at project completion, demonstrate the following:

1. A topsoil layer with a minimum organic matter content of ten percent dry weight in planting beds, and 5% organic matter content (based on a loss on- ignition test) in turf areas, and a pH from 6.0 to 8.0 or matching the pH of the original undisturbed soil. The topsoil layer shall have a minimum depth of eight inches except where tree roots limit the depth of incorporation of amendments needed to meet the criteria. Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.
2. Planting beds must be mulched with 2 inches of organic material.
3. Quality of compost and other materials used to meet the organic content requirements:
    a. The organic content for "pre-approved" amendment rates can be met only using compost that meets the definition of "composted materials" in WAC 173-350-220. This code is available online at: http://www.ecy.wa.gov/programs/swfa/facilities/350.html. Compost used in bioretention areas should be stable, mature and derived from yard debris, wood waste, or other organic materials that meet the intent of the organic soil amendment specification. Biosolids and manure composts can be higher in bio-available phosphorus than compost derived from yard or plant waste and therefore are not allowed in bioretention areas due to the possibility of exporting bio-available phosphorus in effluent. The compost must also have an organic matter content of 35% to 65%, and a carbon to nitrogen ratio below 25:1. The carbon to nitrogen ratio may be as high as 35:1 for plantings composed entirely of plants native to the Puget Sound Lowlands region.
    b. Calculated amendment rates may be met through use of composted materials as defined above; or other organic materials amended to meet the carbon to nitrogen ratio requirements, and meeting the contaminant standards of Grade A Compost.

*Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.*