CEDAR GROVE

LANDSCAPE & CONSTRUCTION SERVICES

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"Your Northwest resource for erosion control and soil requirements"

Construction Services

solutions@cgcompost.com

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7343 E. MARGINAL WAY S.
SEATTLE, WA 98108

GORE® COVER SYSTEMS

Cedar Grove uses state of the art technology for composting.

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CONSTRUCTION SERVICES

CEDAR GROVE SOLUTIONS

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CONSULTING & MATERIAL SOLUTIONS

Cedar Grove employs a team of technical personnel specifically for handling your most complex jobs. From helping with specifications to Low Impact Development, Cedar Grove is your partner for custom soil solutions.

Cities, developers, engineers and architects rely on our materials and leadership to meet ever-changing regulations.

Consulting Services

- Remediation and Erosion Control
- Site Soils, Planning, and Stormwater BMP's
- Public Works – Topsoil Specifications
- Meeting Soil Quality & Depth BMP's
- Post-Construction Soil Regulations

Construction Services

- Trucking & Coordination
- Export & Import Materials
- Clean Wood Waste
- Material Placement
- Conveyor Truck Placement
- Blower Truck Placement

Construction Materials

- Bioretention Soil Mix
- Green Roof & Rooftop Planting Mixes
- Compost Filter Berms & Socks
- WSDOT approved Cedar Grove Compost
- Living Walls
- Cedar Grove Mulches
- Compost Erosion Control Blankets
- Custom and Ready-to-Use topsoil mixes to meet Stormwater BMPs

Cedar Grove Also Features Roll Off Containers and Storage Containers

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COMPOST, TOPSOIL, MULCH

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SCIENTIFIC VERIFICATION: BENEFITS OF COMPOST USE IN LANDSCAPES, FARMING, REMEDIATION & EROSION CONTROL

Below is a partial list of scientifically verified horticultural and environmental benefits of compost use, with citations for published documentation.

Scientifically Verified Compost Benefits (citations below)

1. Improves soil structure and porosity – for better plant root growth, reduced runoff and erosion
2. Reduces density of clay soils – increasing moisture infiltration, reducing erosion and runoff
3. Improves moisture-holding capacity of sandy soils – reducing water loss and nutrient leaching.
4. Supplies and supports proliferation of beneficial microorganisms in soils and growing media
5. Supplies organic matter and humus – aiding soil aggregation and plant nutrient uptake
6. Improves soils cation-exchange capacity (CEC) – improving nutrient retention
7. Helps plants to more effectively utilize nutrients
8. Buffers soil pH – improves nutrient availability and soil aggregation
9. Binds and degrades specific pollutants

1. Improves soil structure and porosity – for better plant root growth, reduced runoff and erosion

- Avnimelech, Shkedy, Kochva, and Yotal. The Use of Compost For Reclamation of Saline and Alkaline Soils.
- Compost Science and Utilization, Summer 1994.
- Biocycle. 2002. Water savings From Compost Use. Biocycle (October). .JG Press, Emmaus PA.
- Chen, McConnell, Robinson, Caldwell and Huang. 2003. Rooting Foliage Plant Cuttings in Compost-formulated
- Substrates. Hort. Technology, 13:110-114.
- Darst and Murphy. 1990. Soil Organic Matter: An Integral Ingredient in Crop Production. Better Crops, 74(1):4-5.
- Landschoot and McNitt. 1995. Improving Turf with Compost. Green Industry Composting. JG Press, Emmaus PA.
- Logsdon, G. 1995. Using Compost for Plant Disease Control. Farm Scale Composting. JG Press, Emmaus PA.
- Ozores-Hampton, Bryan, and McMilan. 1994. Suppressing Disease in Field Crops. Biocycle, Vol. 35 No. 7:60-61.

2. Reduces density of clay soils– increasing moisture infiltration, reducing erosion and runoff

- Avnimelech, Shkedy, Kochva, and Yotal. The Use of Compost For Reclamation of Saline and Alkaline Soils.

BENEFITS OF COMPOST CONT.

Compost Science and Utilization, Summer, 1994.

- Darst and Murphy. 1990. Soil Organic Matter: An integral Ingredient in Crop Production. Better Crops 74 (1):4-5.
- Maynard and Hill. 1994. Impact of Compost on Vegetable Yields. Biocycle, 35 (3):66-67.
- Mays, Terman and Duggan. 1973. Municipal Compost: Effects on Crop Yield and Soil Properties. Journal of Environmental Quality 2:89-92.
- McConnell, Shiralipour, and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63.
- Porter. 1999. California Wineries Take Major Steps to Improve Vineyards. Biocycle, 40 (1):59-62.
- USEPA. 1998. An Analysis of Composting as an Environmental Remediation Technology. Solid Waste and Emergency Response (5305W) EPA530-R-98-008.

3. Improves moisture-holding capacity of sandy soils – reducing water loss and nutrient leaching.

- Cisar and Snyder. 1995. Amending Turfgrass Sand Soils to Improve Water Retention and Reduce Agrichemical Leaching. Florida Water Conservation/Compost Utilization Program Final Report.
- Epstein, Taylor and Chaney. 1976. Effects of Sewage Sludge and Sludge Compost Applied to Soil on Some Soil Physical and Chemical Properties. Journal of Environmental Quality, 5:422-426.
- Maynard. 1995. Protecting Groundwater While Recycling Nutrients. Farm Scale Composting. JG Press. Emmaus PA.
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- McConnell, Shiralipour and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63

4. Supplies and supports proliferation of beneficial microorganisms in soil and growing media

- Cole, Zhang and Liu. 1995. Remediation of Pesticides Contaminated Soil by Planting and Compost Addition. Compost Science and Utilization, 34(4):20-30.
- Dick and McCoy. 1993. Enhancing Soil Fertility by Addition of Compost. In. Science and Engineering of Composting. Hoitink and Keener (Ed), 622-644. Renaissance Publications, Worthington, OH.
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- Hoitink and Boehm. 1993. Mechanisms of Suppression of Soilborne Plant Pathogens in Compost-Amended Substrates. Science and Engineering of Composting, Renaissance Publications, Worthington, OH.
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5. Supplies organic matter and humus – aiding soil aggregation and plant nutrient uptake

- Albrecht. 1938. Loss of Soil Organic Matter and Its Restoration, pp. 347-360. Soils and Men, 1938 Yearbook of Agriculture, US Govt. Printing Office, Washington, DC.
- Avnimelech and Cohen. 1988. On the Use of Organic Manures for Amendment of Compacted Clay Soils: Effects of Aerobic and Anaerobic Conditions. Biological Wastes 26:331-339.
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- McConnell, Shiralipour, and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63.
- USEPA. 1998. An Analysis of Composting as an Environmental Remediation Technology. Solid Waste and Emergency Response (5305W) EPA530-R-98-008.

6. Improves soil cation-exchange capacity (CEC) – improving nutrient retention

- Brady, N.C. 1974. The Nature and Properties of Soils, 8th Edition. Cation Exchange Capacity (p.99-104).
- Darst and Murphy. 1990. Soil Organic Matter: An integral Ingredient in Crop Production. Better Crops, 74(1):4-5.
- Epstein, Taylor and Chaney. 1976. Effects of Sewage Sludge and Sludge Compost Applied to Soil on Some Soil Physical and Chemical Properties. Journal of Environmental Quality, 5:422-426.
- McConnell, Shiralipour and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63.

BENEFITS OF COMPOST CONT.

- Soil & Water Conservation Society. 2000. Soil Biology Primer (p.5-8, 15).

7. Helps plants to more effectively utilize nutrients

- Cisar and Snyder. 1995. Amending Turfgrass Sand soils to Improve Water Retention and Reduce Agrichemical Leaching. Florida Water Conservation/Compost Utilization Program - Final Report.
- Darst and Murphy. 1990. Soil Organic Matter: An integral Ingredient in Crop Production. Better Crops, 74(1):4-5.
- Goldstein. 2002. A Compost-Based Budget for Sustainable Farming. Biocycle, 43(8):59-62.
- Maynard. 1995. Protecting Groundwater While Recycling Nutrients. Farm Scale Composting. JG Press, Emmaus, PA.
- McConnell, Shiralipour and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63.
- National Research Council. 1989. Alternative Agriculture Research and Science, (p.141-144). National Academy Press, Washington, D.C.

8. Buffers soil pH –improves nutrient availability and soil aggregation

- Brady. 1974. The Nature and Properties of Soils, 8th Edition. Buffer Capacity of Soils (p.385-387).
- Darst and Murphy. 1990. Soil organic matter: An integral ingredient in crop Production. Better Crops 74(1):4-5.
- Dick and McCoy. 1993. Enhancing Soil Fertility by Addition of Compost. In. Science and Engineering of Composting. H. Hoitink and H.M. Keener (Ed), 622-644. Renaissance Publications, Worthington, OH.
- Maynard and Hill. 1994. Impact of Compost on Vegetable Yields. Biocycle, Vol. 35, No. 3:66-67.
- McConnell, Shiralipour, and Smith. 1993. Compost Application Improves Soil Properties. Biocycle, 34 (4):61-63.

9. Binds and degrades specific pollutants

- Cole, Zhang and Liu. 1995. Remediation of Pesticides Contaminated Soil by Planting and Compost Addition. Compost Science and Utilization, 34(4):20-30.
- Ettlin and Stewart. 1993.Yard Debris Compost for Erosion Control. BioCycle, 34(12): 46-47.
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- Maynard 1995. Protecting Groundwater While Recycling Nutrients. Farm Scale Composting. JG Press. Emmaus PA.
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- USEPA. 1997. Innovative Uses of Compost: Bioremediation and Pollution Prevention. Solid Waste and Emergency Response (5306W). EPA530-F-97-0421.
- USEPA. 1998. An Analysis of Composting as an Environmental Remediation Technology. Solid Waste and Emergency Response (5305W) EPA530-R-98-008.

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QUALITY TOPSOIL MIXES

Clean topsoil mixes are an efficient way to restore disturbed soils for new plantings, and to remedy problems such as poor drainage or compaction. However topsoil is not regulated or defined by industry standards; so many mixes contain sawdust, clay or contaminated soils that drain poorly, introduce weeds and inhibit plant growth. Cedar Grove topsoils are made with only quality compost and clean, graded sand or sandy loam—no subsoil, sawdust or peat or fillers. Buy topsoils only from a trusted source like Cedar Grove to ensure a successful project with excellent drainage and healthy plants.

CEDAR GROVE TOPSOIL PRODUCTS

3-WAY TOPSOIL: A premium, all-purpose topsoil made with fine compost, clean mined sand/screened sandy loam topsoil from select sources. Meets requirements for planting areas in WDOE Stormwater Manual Post-Construction Soil Quality & Depth BMP.

2-WAY TOPSOIL: A high organic-content blend of fine compost and sand. Perfect for creating annual and perennial beds, and improving disturbed soils.

PLANTING SOIL: A mix of fine compost and screened sandy loam from select sources. Suitable for quality turf and planting beds. Meets requirements for Planting Bed Soil in Post-Construction Soil Quality & Depth BMP in WDOE Stormwater Manual.

TURF MIX: A mix of fine compost and coarse washed sand. Suitable for high quality turf. Meets requirements for turf in Post- Construction Soil Quality & Depth BMP in WDOE Stormwater Manual.

WINTER MIX: 3-Way Topsoil mixed with coarse washed sand to improve drainage and handling in wet conditions. Meets requirements for turf areas in WDOE Stormwater Manual Post-Construction Soil Quality & Depth BMP.

US Composting Council
Seal of Testing Assurance

Topsoil Import Is The Solution:

- To ensure consistent, clean, weed-free planting media
- Where compaction prevents amendment and tilling of subsoil
- To adjust low or uneven grades
- For improved drainage in low-lying areas or on heavy clay soils
- To establish high quality turf with firm surfaces for year-round use

Cedar Grove topsoil mixes are all made exclusively from compost that is US Composting Council Seal of Testing Assurance (STA) certified.

MAPLE VALLEY — 17825 CEDAR GROVE RD SE
EVERETT — 3260 36TH PL NE
WOODINVILLE — 6100 238TH ST SE
BELLEVUE — 969 118TH AVE SE
SEATTLE — 7343 E MARGINAL WAY S

CEDAR GROVE TOPSOIL MIX SPECIFICATIONS

I. TOPSOIL MIXES

A. Topsoil for high-performance turf shall be a mixture of approximately 30%-40% compost and 60-70% sand, each meeting the requirements below.

1. Sand shall meet the requirements for Washed Sand in Table 2; and be free of phyto-toxic materials, viable seeds, roots or rhizomes.
2. Mix shall contain 2% to 5% organic matter, by weight (Loss on Ignition method).
3. pH shall be between 6.0 and 7.5pH
5. Soluble salt contents shall be less than 3.0 mmhos/cm.
6. **Approved products include Cedar Grove Turf Mix.**

B. Topsoil for planting beds and ornamental turf shall be a mixture of approximately 33-50% compost and 50-65% sand or sandy loam, each meeting the requirements below.

1. 1. Loam shall be Sandy Loam per USDA gradation, meeting the requirements Table 2; and be free of phyto-toxic materials, and viable seeds, rhizomes or roots of State-listed noxious weeds.
2. Sand shall meet the requirements in Table 2; and be free of phyto-toxic materials; viable seeds, rhizomes or roots of State-listed noxious weeds.
3. Mix shall contain 10 to 20% organic matter, by weight (Loss on Ignition).
4. pH shall be between 6.0 and 7.5
5. Soluble salt contents shall be less than 3.0 mmhos/cm.
6. **Approved products include Cedar Grove 3-Way Topsoil, Cedar Grove Planting Soil, and Cedar Grove 2-Way Topsoil.**

II. COMPOST

A. Compost shall be the result of the biological degradation of Type I or III Feedstocks, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220, and meet the requirements below.

1. Compost shall certified in compliance with U.S. Composting Council STA program.
2. Compost shall have 40%-60% organic matter, by weight (Loss on Ignition method).
3. Compost Maturity shall be greater than 80% in accordance with TMECC 04.10-A.
4. Compost Stability shall be 7 or below in accordance with TMECC 05.08-B.
5. Carbon to nitrogen ratio shall be 15:1 to 25:1, as determined using TMECC 04.01 “Total Carbon” and TMECC 04.02D “Total Kjeldhal Nitrogen”.
6. Feedstocks shall originate from local recycling collection programs, and contain a minimum of 10% post-consumer food waste as defined in WAC 173-550.
7. Compost shall meet the particle size gradations in Table 3.
8. **Approved products include Cedar Grove Compost.**

Table 1. Cedar Grove Topsoil Horticultural Values (Call to request current results)

	Cedar Grove 3-Way Topsoil	Cedar Grove Planting Soil	Cedar Grove 2-Way Topsoil	Cedar Grove Turf Mix	Cedar Grove Builder’s Blend
Mix	Compost-Sandy Loam	Sandy Loam-Compost	Sand-Compost	Sand-Compost	Compost-Sand-Sandy Loam
Organic Matter dry wt	15-20%	10-15%	12-18%	2-5%	8-12%
Conductivity mmhs/cm	<3	<2	<4	<2	<3
pH	6.0-7.5	6.0-7.5	6.0-7.5	6.0-7.5	6.0-7.5
CEC	>10 meg/100g	>10 meq/100g	>10 meq/100g	5-10 meq/100g	>10 meq/100g
USDA Texture	Sandy Loam	Sandy Loam	Loamy Sand	Sand	Loamy Sand
WAC Metals	Pass	Pass	Pass	Pass	Pass

CEDAR GROVE TOPSOIL MIX SPECIFICATIONS CONTINUED

Table 2. Particle Size Analyses for Washed Sand & Loam Used in Cedar Grove Topsoils (Call to request current results)

Loam	
Sieve size	**Percent Passing**
3/4”	100%
1/2”	98%
1/4”	85%
#10	70%
#18	50%
#30	40%
#60	30%
#100	25%
#200	<30%
#270	<25%
2 um	<20%

Washed Sand	
Sieve size	**Percent Passing**
1/43/8”	100%
#46	99%
#10	65%
#20 #18	35%
#40 #20 + #35	<30%
#40 + #60	<15%
#100	2-10%
#200	1-5%

Table 3. Particle Size Analyses for Compost(Call to request current results)

Sieve size	Percent Passing
2”	100%
1”	99%
5/8”	90-100%
1/4”	70-100%

III. SUBMITALS

A. At least 10 Working Days prior to placement of any soils, the Contractor shall submit the following test results from accredited soil laboratories, for samples gathered and tested less than 90 days prior.

1. Grain size analysis results for Washed Sand and Sandy Loam.
2. STA / Washington State Department or Transportation Technical Data Sheet for Compost, from a STA accredited lab.
3. Test results from an accredited soil laboratory for all soil mixes, including the following parameters:
    - i. Total and Soluble Nitrogen (NO3 + NH3)
    - ii. Phosphorous
    - iii. Potassium
    - iv. pH
    - v. Organic Matter % (Loss on Ignition method)
    - vi. Conductivity
    - vii. Calcium
    - viii. Sulfur
    - ix. Boron
    - x. Weed seed (for Turf Mixes)
4. **Recommendations**. Fertilizer and amendment recommendations from accredited Soil Scientist or Agronomist; for the specified plant type and soil application depth.
5. **Mix Samples**. Two one (1) gallon samples of each soil mix.

IV. ACCEPTANCE OF SOILS PRIOR TO PLACEMENT

A. Contractor shall not place any soils until the Engineer has reviewed and confirmed the following:

1. Delivery tickets must show that the full delivered amount of soil matches the product type, volume and Manufacturer named in the submittals.
2. Delivered product shall be compared to the submitted sample to verify that it matches the submitted sample.

B. The Engineer may inspect any loads of soil and/or delivery tickets on delivery, and stop placement if the delivered soil does not appear to match the submittals; and require sampling and testing of the delivered soil before authorizing soil placement. All testing costs shall be the responsibility of the contractor.

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CEDAR GROVE COMPOST MEETS WSDOT SPECIFICATIONS

Cedar Grove Compost is tested monthly to provide a continuous, ready-to-use supply of product meeting Washington State Department of Transportation specifications for "fine," "medium" and "coarse" compost. Recent test results for all grades are provided at the end of this specification.

(2012 Standard Specification for Road, Bridge and Municipal Construction)
9-14 EROSION CONTROL AND ROADSIDE PLANTING
9-14.4(8) Compost

Compost products shall be the result of the biological degradation and transformation of plant-derived materials under controlled conditions designed to promote aerobic decomposition. Compost shall be stable with regard to oxygen consumption and carbon dioxide generation. Compost shall be mature with regard to its suitability for serving as a soil amendment or an erosion control BMP as defined below. The compost shall have a moisture content that has no visible free water or dust produced when handling the material.
Compost production and quality shall comply with Chapter 173-350 WAC.
Compost products shall meet the following physical criteria:

1. Compost material shall be tested in accordance with Testing Methods for the Examination of Compost and Composting (TMECC) Test Method 02.02-B, "Sample Sieving for Aggregate Size Classification".

Compost shall meet the following:

	Fine Compost		Medium Compost		Coarse Compost	
	Min.	Max.	Min.	Max.	Min.	Max.
Percent passing 2"	100%		100%		100%	
Percent passing 1"	100%		100%		90%	100%
Percent passing 5/8"	90%	100%	85%	100%	70%	100%
Percent passing 1/4"	75%	100%	70%	85%	40%	60%

2. Maximum particle length shall 4 inches be for Fine Compost and Medium Compost, 6 inches for Coarse Compost.
3. The carbon to nitrogen ratio (C:N) of shall be between 15:1 and 25:1 for Fine Compost, 18:1 and 30:1 for Medium compost, and 25:1 and 35:1 for Coarse compost; calculated using the dry weight of "Organic Carbon" using TMECC 04.01A divided by the "Total N" using TMECC 04.02D.
4. pH shall be between 6.0 - 8.5 determined by TMECC 04.11-A, "1:5 Slurry pH".
5. Physical contaminants, defined in WAC 173-330 (plastic, concrete, ceramics, metal, etc.) shall be less than 0.5 percent by weight as determined by TMECC 03.08-A "Classification of Inerts by Sieve Sizes". Plastic Film shall be less than 0,25 by weight.
6. Minimum organic matter shall be 40 percent dry weight basis as determined by TMECC 05.07A, "Loss-On-

CEDAR GROVE COMPOST MEETS WSDOT SPECIFICATIONS CONTINUED

Ignition Organic Matter Method (LOI)".

7. Soluble salt contents shall be less than 4.0 mmhos/cm tested in accordance with TMECC 04.10-A, "Electrical Conductivity".
8. Maturity shall be greater than 80% in accordance with TMECC 05.05A, "Germination and Root Elongation".
9. Stability shall be 7 mg CO2-C/g OM/day or below, in accordance with TMECC 05.08-B, Carbon Dioxide Evolution Rate".
10. The compost product must originate from recycled plant waste as defined in WAC 173-350 as "Wood waste", "Yard debris", "Post-consumer food waste", "Pre-consumer animal-based wastes, and/or "Pre-consumer vegetative waste". The supplier shall provide list of feedstock sources by percentage in the final compost product.
11. Samples may also be evaluated using the Solvita Compost Maturity Test by the Contracting Agency at the Engineer's discretion. Fine Compost shall score a number 6 or above on the Solvita Compost Maturity Test. Coarse Compost shall score a 5 or above on the Solvita Compost Maturity Test.

9-14.4(8) A. Compost Sumbittal Requirements

The Contractor shall submit the following information to the Engineer for approval:

1. The Qualified Products List printed page or a Request for Approval of Material (WSDOT Form 350-071).
2. A copy of the Solid Waste Handling Permit issued to the manufacturer by the Jurisdictional Health Department in accordance with WAC 173-350.
3. The Contractor shall verify in writing and provide lab analyses from an STA Program certified laboratory that the material complies with processes, testing, and standards specified in WAC 173-350 and these Specifications.
4. A copy of the producer's Seal of Testing Assurance STA certification as issued by the U.S. composting Council.

9-14.4(8) B. Compost Acceptance

1. Fourteen days prior to application, the Contractor shall submit a sample of the compost approved for use, an STA test report dated within 90 calendar days of the application, and the list of feed stocks by volume for each compost type to the Engineer for review.
2. The Contractor shall use only compost that has been tested within 90 calendar days of application and meets the requirements in Section 9-14.4(8). Compost not conforming to the above requirements or taken from a source other than those tested and accepted shall not be used.

Table on next page.

CEDAR GROVE COMPOST MEETS WSDOT SPECIFICATIONS CONTINUED

WAC 173-350-220 Standard		Cedar Grove Fine Compost		Cedar Grove Medium Compost		Cedar Grove Coarse Compost	
Metals	Parts per million (mg/kg), dry wt.						
Arsenic	<=20	6.8		6.8		13	
Cadmium	<=10	<1		< 1		< 1	
Copper	<=750	51		64		90	
Lead	<=150	49		24		21	
Mercury	<=8	< 1		< 1		< 1	
Molybdenum	<=9	2.7		3.5		2.7	
Nickel	<=210	16		20		19	
Selenium	<=18	< 1		< 1		< 1	
Zinc	<=1400	170		130		91	
Salmonella	< 3 / 4 gr	Pass		Pass		Pass	
Sharps	0 percent	None Detected		None Detected		None Detected	
Manufactured Inerts	< 0.5%	<0.5%		<0.5%		<0.5%	
Film Plastics*	<0.25%	<0.25 percent		<0.25 percent		<0.25%	
WSDOT Standard							
Organic Matter	>40%	44%		47.8%		65%	
pH	6.0 – 8.5	7.79		8.14		7.47	
Conductivity	<4 mmhos/cm	3.4 mmhos/cm		3.1 mmhos/cm		2.6 mmhos/cm	
Seed Emerg / Vigor	>80%	100% / 90%		100% / 90%		100% / 100%	
Compost Stability	<7	1.2 “Very Stable”		2.9 “Stable”		3.0 “Stable”	
Feedstock	100% recycled plant waste as defined in WAC 173-350 as “Wood waste”, “Yard debris”, “Post-consumer food waste”, “Pre-consumer animal-based wastes, and/or “Pre-consumer vegetative waste”						
C:N		No std.	14:1	18-30:1	20:1	25-35:1	35:1
Sieve Size		WDOT	Cedar Grove	WDOT	Cedar Grove	WDOT	Cedar Grove
2”		100%	100%	100%	100%	100%	100%
1”		95-100%	100%	95-100%	100%	90-100%	100%
3/4”						70-100%	98.6%
5/8”		90-100%	97.2%	85-100%	90%		
¼”		75-100%	94.5%	70-85%	82.1%	40-60%	59.5%
Current results available on request.							

All tests performed using TMECC/STA specified methods; by Control Labs, Watsonville, CA.
* Film Plastics must be <0.1% for use as surface mulch.

CEDAR GROVE SOLUTIONS

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BIORETENTION SOIL MIX

Bioretention Swales and Rain Gardens are attractive landscape features that filter and infiltrate storm run-off. Properly designed swales include 18”-24” depth of Biorentention Soil Mix to allow almost 100% of run-off to infiltrate.

Cedar Grove cooperated with WSU scientists to develop a Bioretention Soil Mix providing:

- High porosity for rapid infiltration.
- A balance of fine particles to filter pollutants and retain moisture for plants.
- Organic matter to promote vigorous plant growth and soil life that decompose pollutants.

CEDAR GROVE BIORETENTION & RAIN GARDEN SOIL MIX
A mix of compost and well-graded aggregate to meet regulations and public agencies’ specifications.
Compost: 35-40% volume
Aggregate: 60-65% volume
Infiltration Rate: Meets WDOE requirements of 1-12 inches/hour (ASTM D-2434)

CEDAR GROVE COMPOST
Feedstocks:
80-90% yard waste
10-20% post-consumer food waste
Meets ‘Composted Material’ requirements in WAC 173-350-220, and US Composting Council Seal of Testing Approval (STA)
Organic Content: 40-60% dry weight basis

Dispersed Bioretention Swales can be a cost-effective alternative to storm sewers or large detention ponds

Bioretention Swales can include diverse plants, depending on site conditions.

Soil and vegetation remove most sediment and contaminants.

LEED Credits from Bioretention Swales:
SS 6.1 – Stormwater Quantity Control
SS 6.2 – Stormwater Quality
WE 1.1 – Water Efficient Landscaping
MR 4: Recycled Content Materials
MR 5: Regional Materials

MAPLE VALLEY – 17825 CEDAR GROVE RD SE
EVERETT – 3260 36TH PL NE
WOODINVILLE – 6100 238TH ST SE
BELLEVUE – 969 118TH AVE SE
SEATTLE – 7343 E MARGINAL WAY S

CEDAR GROVE BIORETENTION SOIL MIX SPECIFICATIONS

BIORETENTION MIX MEETS SEATTLE PUBLIC UTILITIES AND WSU SPECIFICATIONS

Bioretention Soil shall consist of a homogeneous mixture of approximately 2 parts by volume (approximately 65 percent) mineral aggregate to 1 part (approximately 35 percent) fine compost meeting the requirements below. The mixture shall have an organic matter content of 4% to 8% determined using the Loss on Ignition method. **Approved products include Cedar Grove Bioretention Mix.**

MINERAL AGGREGATE FOR BIORETENTION SOIL

Mineral aggregate shall be analyzed by an accredited lab using the sieve sizes noted below; and meet the following gradation:

Sieve Size	Percent Passing
1” inch	100
No. 4	60 - 100
No. 10	40 - 100
No. 40	15 - 50
No. 200	2 - 5

COMPOSTED MATERIAL FOR BIORETENTION SOIL

Compost shall be the result of the biological degradation of recycled plant materials under controlled conditions designed to promote aerobic decomposition, in accordance with WAC 173-350-220; and meet the following physical criteria.

1. Compost shall be tested within 90 days prior to application by an independent laboratory certified by the U.S. Composting Council Seal of Testing Assurance program, using Testing Methods for the Examination of Compost and Composting (TMECC) methods.
2. Compost shall meet the following particle size gradation, using TMECC 02.02-B:

Sieve Size	Percent Passing
1”	100
5/8”	90-100
¼”	75-100

US Composting Council Seal of Testing Assurance

3. pH shall be between 6.0 - 8.5, using TMECC 04.11-A.
4. Manufactured inert material (concrete, ceramics, metal, etc.) shall be less than 0.5 percent by dry weight, per TMECC 03.08-A.
5. Minimum organic matter content shall be 40 percent by dry weight, using TMECC 05.07A “Loss on Ignition Organic Matter Method”.
6. Soluble salt content less than 4.0 mmhos/cm, tested per TMECC 04.10-A.
7. Maturity shall be over 80% per TMECC method 05.05-A, “Germination & Vigor”.
8. Stability shall be 7 or below, per TMECC method 05.08-B “Carbon dioxide Evolution Rate”.
9. Contain a minimum of 65% by volume recycled plant waste as defined in WAC 173-350-100 as “Yard Waste”, Crop residues” and “Bulking agents”; and 5% to 35% by volume ”post-consumer food waste”. Composts containing biosolids or manures shall not be used in Bioretention Soils.
10. Carbon to nitrogen ratio shall be less than 25:1 determined using TMECC 04.01 “Total Carbon” and TMECC 04.02D “Total Kjeldhal Nitrogen”.

SUBMITTALS

At least 10 Working Days prior to placement of Bioretention Soil, Contractor shall submit to the Engineer the following:

1. Grain size analysis from the past 90 days of the Mineral Aggregate used in Bioretention Soil.
2. STA analysis from the past 90 days for compost used in Bioretention Soil.
3. Organic content test results of the Bioretention Soil.
4. A copy of the compost producer’s current STA certification from the U.S. Composting Council.
5. A written statement from the compost producer listing feedstocks by percentage.
6. Two, 5-gallon samples of Bioretention Soil.

CEDAR GROVE BIORETENTION SOIL MIX SPECIFICATIONS CONT.

GRADING AND EXCAVATION

1. No heavy equipment shall operate in Bioretention cell once excavation begins.
2. No excavation shall be permitted within 6-inches of final sub grade if Engineer determines soil is frozen, excessively wet, or has been subjected to more than ½ inch of precipitation within 48 hours.
3. Contractor shall provide Engineer opportunity to inspect excavated Bioretention cell prior to placement of any soil.
4. Scarify subgrade surface a minimum of 3 inches deep prior to Bioretention soil placement.
5. Any sediment deposited in excavated area by runoff prior to Bioretention soil placement shall be removed by 3-inch minimum over-excavation, and replaced by 3-inches of Bioretention soil at Contractor's expense.
6. No materials or substances shall be placed within the Bioretention cell that may inhibit plant growth, drainage or maintenance.

BIORETENTION SOIL PLACEMENT

1. Bioretention soil shall not be placed until all areas draining to the cell have been stabilized and Engineer gives authorization.
2. Soil placement and consolidation shall not occur when Engineer determines the area receiving Bioretention soil is frozen, excessively wet, or has been subjected to more than ½-inch of precipitation within 48-hours prior.
3. The Contractor shall not place Bioretention Soil until the Engineer has reviewed and confirmed the following:
   - Soil mix delivery tickets show that the full delivered amount of Bioretention Soil matches the product type, volume and Manufacturer named in the submittals.
   - Delivered product visually matches submitted 5-gallon sample.
4. Engineer may inspect any loads of Bioretention soil on delivery, and stop placement if (s)he determines that the soil does not appear to match submittals. The Engineer may require Contractor to test delivered soil to demonstrate that it has organic matter content of 4-8% and approximately equal to submitted samples. All testeing costs shall be the responsibility of the contractor.
5. If Engineer determines that delivered Bioretention Soil meets specifications, the soil manufacturer shall be held harmless for any failure of Bioretention systems.
6. Place Bioretention soil in loose lifts using a conveyor belt. Rake soil to final grade.
7. Final soil depth shall be verified only after soil has been consolidated, where Engineer determines slopes allow, to relative compaction of 85-90% of modified maximum dry density (ASTM D 1557) by irrigating each cell to field capacity with water applied using rotary sprinklers, without creating any scour or erosion.

MULCH

1. Bioretention Soil shall be covered with 2 inches of clean wood chip meeting the following particle size specification in all areas where slopes are less than 20%.

Sieve Size	Percent Passing
2"	
1"	70 - 100
5/8"	0 - 50
1/4"	0 - 40

2. Contractor shall notify the Engineer to inspect each Bioretention cell prior to placement of wood chip mulch. If any sediment-laden runoff has entered the cell, the Contractor shall remove the top 3 inches of Bioretention soil and replace with Bioretention soil at the Contractor's expense.

CEDAR GROVE SOLUTIONS

LANDSCAPE & CONSTRUCTION SERVICES

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GREEN ROOF & ROOFTOP PLANTING MIXES

Green Roofs can provide valuable environmental benefits and attractive landscapes. Lightweight, well-drained soil mixes are critical to successful green roofs—and compost is a vital component that helps provide nutrients, water storage, and soil life for successful plants.

Green roofs provide a variety of benefits:

- Reduce stormwater runoff—by 70 to 90% !
- Filter stormwater runoff.
- Reduce building heating and cooling needs; and can allow equipment downsizing.
- Reduce reflected heat and glare.
- Provide recreational space and wildlife habitat.
- Can earn Stormwater Flow-Control Credits.
- Can help earn up to 7 LEED credits.

Optimal soil mixes and depths for green roofs depend on site-specific factors including planting type, microclimate and structural support. Green roof plantings are commonly divided into two types: “Extensive” and “Intensive”. Examples of each are shown at right.

Cedar Grove provides three green roof soil mixes, plus custom blends. Cedar Grove Green Roof Mix is frequently used for extensive green roofs. Cedar Grove Lightweight Rooftop Mix and Cedar Grove Rooftop Landscape Mix are often used for intensive planters on structures.

Extensive Green Roofs are limited to low-growing, drought–tolerant plants. They typically use just 1 - 6 inches of soil, and often include a coarse drainage layer.

Intensive Green Roofs can include large shrubs and trees. Soil for intensive roofs may be 6 inches to over 2 feet deep.

LEED Credits from Green Roofs:
SS 6.1 – Stormwater Quantity Control
SS 6.2 – Stormwater Quality
SS 7.2 – Heat Island Effect—Roof
MR 4: Recycled Content Materials
MR 5: Regional Materials

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CEDAR GROVE GREEN ROOF AND ROOFTOP PLANTER SOIL MIX PERFORMANCE SPECIFICATIONS

Soil mix components and depth for green roofs should be determined based on site-specific conditions and management goals, including:

- Planting type, density and ultimate size.
- Roof microclimate and rainfall intensity.
- Type and thickness of drainage layers.
- Roof structure and pitch.
- Outlet drain quantity and quality requirements.

Cedar Grove Green Roof Mix and Cedar Grove Rooftop Mixes are designed to meet the specifications of regional designers, and have been used on numerous successful projects. A Civil Engineer, Landscape Architect or green roof system vendor should be consulted to specify soil requirements for new and retrofitted structures. The local stormwater utility should also be consulted when planning new projects that drain to sewers or surface waters.

Performance Parameters for Green Roofs and Planters on Structures

	Cedar Grove Lightweight Rooftop[1]	Cedar Grove Green Roof Mix[1]	Cedar Grove Rooftop Landscape Mix[1]	Suggested Values[2] for Extensive Multi-course / Single-Coarse Roof	Suggested Values[2] for Intensive Roofs
Bulk Density (dry)	17 – 22 lbs/cu. ft.	25-35 lbs/cu. ft.	55-65 lbs/cu. ft.		
Saturated Density	55-65 lbs/cu. ft.	45-65 lbs/cu. ft.	75-95 lbs/cu. ft.		
Void Space (air at saturation)	15-25% (vol)	22-32% (vol)	30-40% (vol)	>25 / >30%	>45%
Fines (silt + clay)	<0.5%	<0.5%	<1.0%	<15% / <7%	<20%
Saturated Water Holding Capacity	60-65% (vol)	35-50% (vol)	33-43% (vol)	>35% / >20%	>45%
Total Porosity	80-85%	55-75%	65-85%	>10%	>10%
Saturated Hydraulic Conductivity	15-25 mm/min	2.5-5.5 mm/min	45-75 mm/min	>0.6 mm/min / >60 mm/min	>0.3 mm/min
Primary Nutrients - Nitrogen (NO3 + NH4) - Phosphorous (P2O5) - Potassium (K20)	 15-80 mg/l 5-20 mg/l 150-1200 mg/l	 20-60 mg/l 20-25 mg/l 230-900 mg/l	 41-66 mg/l 40-200 mg/l 20-1100 mg/l	 <80 mg/l <200mg/l <700mg/l	
Organic Matter	55-60%	7-12%	9-11%		
ph	6.5-7.7	7-7.8	7.5-7.8	6.5-8.0	5.5-8.0
Conductivity	1.0-1.5 mmhos/cm	1.0-1.5 mmhos/cm	1.0-2.8 mmhos/cm		

1 – Ranges based on 2012-2015 results. Current results available on request.
2 – From “Guidelines for the Planning, Execution and Upkeep of Green Roof Sites-2002 Edition”. The Landscaping and Landscape Development Research Society E.V.

US Composting Council
Seal of Testing Assurance

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CEDAR GROVE MULCHES

Cedar Grove mulches are cost-effective erosion control and runoff filtration tools that enhance plant establishment and growth. They can be applied with seed or planted into, and meet the requirements of King County Surface Water Design Manual temporary erosion and sedimentation control BMP D.4.2.

Cedar Grove Mulches

- Reduce plant water use by up to 50%
- Are hot-composted to destroy weed seeds and propagules
- Smother weed seedlings and make weeds easier to pull.
- Keep soil loose and absorbent so water doesn't run off
- Prevent erosion that depletes nutrients and pollutes lakes and streams
- Feed plants and beneficial soil life that keep plants healthy.

See *Why Compost-Based Erosion Controls Are the Best Tools to Meet NPDES Phase II* **for research citations.**

Composted woody mulches are typically applied 2- 3 inches deep. They are easy and economical to install using blower trucks—even on steep slopes. Beneficial fungi thrive in compost, knitting particles together to prevent erosion of the mulch.

Cedar Grove mulches are clean and attractive too!

CEDAR GROVE MULCHES

Combine the fertility of compost with the erosion-control, weed suppression and longevity of coarse, woody materials.

LANDSCAPE MULCH: An all-purpose, premium mulch made with fine compost & medium-fine ground hemlock / fir bark.

PRO MULCH: A premium mulch made with fine compost, aged manure & sawdust.

WSDOT MEDIUM MULCH: A blend combining the fertility and moisture retention of fine compost with the porosity and longevity of coarse mulch.

ARBOR CHIPS: Clean wood chips sourced from selected Arborists.

US Composting Council
Seal of Testing Assurance

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CEDAR GROVE MULCH SPECIFICATIONS

MEETS WDOT EROSION CONTROL BLANKET SPECIFICATIONS

1. Mulch type shall be as specified by Project Engineer. **Approved products include mulches made from Cedar Grove Compost.**
2. Mulch shall be applied 2-3 inches thick, using a pneumatic blower device or equivalent method that does not disturb the surface to be protected, followed by hand raking to obtain uniform coverage and 6-8" clearance around tree trunks.
3. Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220, and meet the following criteria:
    4. Compost shall be certified in compliance with U.S. Composting Council Seal of Testing Assurance (STA) program. **Approved products include Cedar Grove Landscape Mulch, Cedar Grove Coarse Screen Mulch, and Cedar Grove Pro Mulch**.
    5. Mulch shall meet the following texture requirements:

Sieve Size	Fine Mulch	Medium Mulch
2"	100%	100%
1"	100%	100%
5/8"	90-100%	85-100%
1/4"	75-100%	70-85%

6. pH of mulch shall be between 5.5 and 8.0
7. Manufactured inert material in mulch shall be less than 0.5 percent dry weight basis.
8. Physical contaminants, defined in WAC 173-330 (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight as determined by TMECC 03.08-A "Classification of Inerts by Sieve Sizes". Plastic Film shall be less than 0.1 by weight.
9. Soluble salt content of mulch shall be less than 5.0 mmhos/cm.
10. Maturity of mulch shall be over 80% per TMECC 05.05-A, "Germination and Vigor".
11. Stability of mulch shall be 7 or below per TMECC 05.08-B, "CO_2 Evolution Rate"
12. Carbon to nitrogen ratio of mulch shall be between 25:1 and 35:1.
13. Mulch shall be free of viable weed seeds, per TMECC 05.09-A Shields Rinse Method.
14. Compost feedstocks shall originate from local recycling collection programs and contain a minimum of 10% post-consumer food waste as defined in WAC 173-550.

ARBOR CHIPS

1. Arbor Chips shall be coarse ground wood chips derived from grinding or shredding the above-ground portions of trees; including wood, bark, branches and leaves.
2. Arbor Chips shall be free of visible amounts of soil, weeds and weed seeds of plants on the King County Noxious Weed List; and invasive plant parts capable of resprouting, including but not limited to horsetail, ivy, clematis and knotweed.knotweed.
3. Arbor Chips shall meet the following loose volume gradation.

Sieve Size	Percent Passing
2"	95-100
1"	70 - 100
1/2"	0 - 50
1/4"	0 - 40

EROSION/ STORMWATER BMP'S

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COMPOST-BASED EROSION CONTROLS ARE THE BEST TOOLS TO MEET NPDES PHASE II

Compost Filter Socks and Blankets provide superior erosion control and runoff filtration using locally-recycled and reusable materials. These effective, economical tools should be the preferred methods of communities and developers committed to sustainability.

Research Shows Compost-Based Erosion Controls Are More Effective Than Traditional Tools (citations on back):

Compost Socks and Berms Produce Cleaner Runoff

- Remove more sediment than silt fencing, for runoff with reduced turbidity. (1, 2, 9)
- Remove higher percentages of metals, nutrients and petrochemicals from runoff than silt fencing. (3,6)

Compost Socks Are More Resistant to Washouts

- Allow more rapid flow-through of sediment-laden water than silt fencing, reducing failures by over-topping or washouts. (6)
- Ease of installation makes proper application more likely than sediment fencing.

Compost Blankets Produce Quicker and Denser Vegetation Establishment, and Cleaner Runoff

- Support quicker and denser vegetation coverage than hydroseeding. (5)
- Produce cleaner runoff than hydroseeding with silt fencing; with less sediment, nutrients and metals.
- (4, 7, 8)

Compost Blankets Delay and Reduce Runoff

- Delays runoff from storms 2-3 times longer than hydroseeding, upon application and a year later. (4)
- Reduce total runoff volumes. (4)

Compost-Based Erosion Controls Approved on USEPA Menu:

Compost Filter Socks Replace:

- Bio bags
- Waddles / fiber rolls
- Ditch Checks
- Storm drain inserts
- Reinforced silt fence

Compost Blankets Replace:

- Jute netting / blankets
- Wood fiber blankets
- Straw mulch / blankets
- Coconut Fiber blankets / netting
- Plastic netting / mesh
- Synthetic fiber with netting
- Bonded synthetic fibers

Seed Injected Blankets Replace:

- Hydroseeding
- Hydroseeding with straw mulch
- Bonded fiber matrix

Compost Berms Replace:

- Silt Fence
- Straw bales
- Waddles / fiber rolls
- Other synthetic barriers

LEED Credits from Compost Based Erosion Controls:
Prerequisite 1 – Construction Activity Pollution Prevention
SS 6.1 – Stormwater Quantity
SS 6.2 – Stormwater Quality
MR 4 – Recycled Materials
MR 5 – Regional Materials

COMPOST-BASED EROSION CONTROL STUDIES

1. Caine. Quilceda-Allen Watershed Erosion Control Program – Water Quality Monitoring Report. Snohomish County Dept. of Planning and Development Services. 2001. Filter berms reduced turibidity in simulated rainfall event by 67%, while adjacent silt fence and coir treatments provided no reductions.
2. Demars, Long and Ives. New England Transportation Consortium. Use of Wood Waste for Erosion Control. (2000) Filter berms reduced total sediment by 80% relative to silt fence and 97% relative to hay bales after a ¾-inch storm event, and 91% and 92% respectively after a 4.4-inch storm.
3. Faucette, Cardoso-Gendreau, Codling, Sadeghi, Pachepsky and Shelton. Storm Water Pollutant Removal Performance of Compost Filter Socks. 2008. Compost filter socks placed on bare concrete reduced concentrations in runoff of motor oil by 84%, diesel fuel by 99% and gasoline by 43%. Filter socks also reduced levels of Cadmium, Chrome, Copper, Nickel, Lead and Zinc by 37% to 71%.
4. Faucette, Jordan, Risse, Cabrera, Coleman, and West. Evaluation of Stormwater from Compost and Conventional Erosion Control Practices in Construction Activities. Journal of Soil and Water Conservation. Vol. 60, No. 6. 2005. Seeded compost blankets generated 75% less runoff than hydroseeded plots with silt fence during a simulated 3 inch in an hour rain three months after application. After one year, compost blankets generated 10% less runoff in a similar event. Initiation of runoff took twice as long for compost blankets then for hydroseed/silt fence at application, four times as long three months after application, and 1.4 times longer after one year. Total solid loads averaged 3.5 times greater from hydroseed/ silt fence than from compost blanket during the first storm, and 16 times greater at 3 months. Runoff from hydroseeded plots contained over twice as much total nitrogen and six times the soluble nitrogen initially, five times as much of both forms at 3 months, and about 20% more at one year. Phosphorous and dissolved-reactive phosphorous levels in runoff were 2 and 7 times higher respectively from the hydroseed/silt fence treatment at day one, 4 and 3.3 times higher at three months, and 1.6 and 1.3 times higher after one year.
5. Faucette, Risse, Jordan, Cabrera, Coleman, and West. Vegetation and Soil Quality Effects from Hydroseed and Compost Blankets Used for Erosion Control in Construction Activities. Journal of Soil and Water conservation. Vol 61, No 6. 2006. Yardwaste compost blankets applied with grass seed provided an average of 2.75 times more vegetative cover than hydroseed after three months. After one year, the treatments had similar grass biomass, but the hydorseeded area had almost seven times as much weed biomass.
6. Keener, Faucette and Klingman. Flow-Through Rates And Evaluation Of Solids Separation Of Compost Filter Media Vs. Silt Fence In Sediment Control Applications. 2006. Presentation for American society of Agricultural and Biological Engineers. Runoff ponding behind silt fence was 75% higher than for compost filter socks after 30 minutes at 5 gallons per minute for each foot of length. Runoff quality was similar despite the faster flow rate through filter socks.
7. Mukhtar, McFarland, Gerngross and Mazac. Efficacy of Using Dairy Manure Compost as Erosion Control and Revegetation Material. 2004. American Society of Agricultural Engineers. Compost erosion control blankets relative to seed + fertilizer reduced total nitrogen by 88%, nitrate-nitrogen by 45%, and total and soluble phosphorus by 87%.
8. Richard, Persyn and Glanville. Cover Crop Production and Weed Control on Highway Right-of-Ways Using Composted Organics. 2002. Compost erosion control blankets used for slope stabilization on highway embankments reduced total nitrogen, total phosphorus, and soluble phosphorus by 99% relative to seed and topsoil applications.
9. Stewart, Pommier, Lenhart, Faha, Collins and Ettlin. Demonstration Project Using Yard Debris Compost for Erosion Control – Final Report: Portland Metropolitan Services District. 1993. Compost filter berms reduced total solids concentrations by 72% and suspended solids by 91%, relative to silt fence on a 34% slope, over 5 rainfall events.

COMPOST-BASED EROSION CONTROL STUDIES CONTINUED

Summary of Sediment Removal Efficiency Studies for Various Sediment Control Devices

Silt Fence	3% turbidity	Horner, 1990
Silt Fence	0% turbidity	Barrett et al, 1998
Silt Fence	0-20% clay, 50% silt, 80+ % sand	US EPA, 1993
Compost Filter Sock	98% total solids, 70% suspended solids, 55% turbidity	Faucette & Tyler, 2006
Compost Berm vs Silt Fence	35% less total solids	Faucette et al, 2005
Compost Berm vs Silt Fence	91% less total solids	Demars & Long, 2000
Compost Berm vs Straw Bale	92% less total solids	Demars & Long, 2000
Compost Berm vs Silt Fence	72% less total solids, 91% less suspended solids	Ettlin & Stewart, 1993

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MEETING SOIL QUALITY & DEPTH BMP T5.13

Healthy soils absorb and filter stormwater, and grow vigorous plants that prevent erosion. BMP T5.13 Post-Construction Soil Quality and Depth in WDOE's Stormwater Management Manual for Western Washington requires compost amendments to restore soils disturbed during development.

BMP T5.13 Soil Quality & Depth BMP:

- Restore disturbed soils to 8" depth
- Mix compost into disturbed soil; or import topsoil amended with compost.
- Restore turf areas to 5% organic content and planting beds to 10%; using 1.75" compost for turf and 3" in beds, or custom rates based on tests.

Cedar Grove can help you find economical ways to restore soils at each site:

- Standard & custom topsoil mixes meeting BMP requirements
- Compost for amending & mulching
- Assistance with determining custom amendment rates to save you money
- Screening and mixing of graded soil
- Clean fill soils to adjust grades
- Compost-based erosion controls that can be reused on site as soil amendment

LEED Credits from BMP T5.13:
SS 6.1 – Stormwater Quantity Control
SS 6.2 – Stormwater Quality
WE 1.1 – Water Efficient Landscaping
MR 4: Recycled Content Materials
MR 5: Regional Materials

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CEDAR GROVE SPECIFICATIONS TO MEET SOIL QUALITY & DEPTH BMP

MEETS WDOE BMP T5.13, KING COUNTY KC16.82 AND CITY OF SEATTLE SMC 22.805.020.E
Disturbed soils not covered by impervious surfaces or developed as stormwater structures shall be restored to 8 inches deep, using one of the options below:

OPTION 1: Mix a pre-approved volume of compost 8 inches deep into site soil. Graded soils may be stockpiled, amended and reapplied.
A. Turf areas: Mix 1.75 inches of compost into soil.
B. Planting beds: Mix 3 inches of compost into soil.
OPTION 2: Mix into site soil a volume of compost calculated based on tests of the soil and compost dry bulk density and organic matter content by Loss on Ignition method (LOI). Use test results to figure volume of compost required using Soil Amendment Calculator at: (http://your.kingcounty.gov/solidwaste/compost_calculator.htm)
A. Turf area soils shall be restored to 5% organic content by weight.
B. Planting bed soils shall be restored to 10% organic content by weight.
OPTION 3: Import topsoil containing adequate organic matter.
A. Turf area topsoil shall contain 5% organic content by weight.
B. Planting bed soil shall contain 10% organic content by weight.

COMPOST
Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220, and meet the following criteria. **Approved products meeting the specification include Cedar Grove Compost**.
1. Compost shall be certified in compliance with U.S. Composting Council Seal of Testing Assurance (STA) program.
2. Compost shall have an organic matter content of 40% to 65% as determined by “Loss on Ignition” test method.
3. Carbon to nitrogen ratio shall be less than 25:1. May be up to 35:1 for plantings composed entirely of plants native to Puget Sound lowlands region.
4. Feedstocks shall originate from local recycling collection programs, and contain a minimum of 10% post-consumer food waste as defined in WAC 173-550.

TOPSOIL
Topsoil shall be a mixture of compost meeting requirements above, and sand or sandy loam per USDA soil texture classification.
1. Topsoil for turf areas shall contain approximately 5% organic matter by weight, measured by Loss on Ignition method. **Approved products meeting the specification include Cedar Grove Turf Mix and Cedar Grove Winter Mix.**
2. Topsoil for planting beds shall contain approximately 10% organic matter by weight, measured by Loss on Ignition method. A**pproved products meeting the specification include Cedar Grove Topsoil, Cedar Grove 3-Way Topsoil, and Cedar Grove Planting Mix**.
3. Sand or sandy loam shall be free of weeds, rocks and deleterious materials.
4. 100% of topsoil (by weight) shall pass through a 3/4” screen, 90% through a 1/2” screen, and less than 10% shall pass through a #200 sieve.

SCARIFICATION
Scarify compacted sub grades a minimum of 4 inches deep before placing topsoil. Throughly loosen surface in all areas, except within drip line of trees to be retained.

MULCH
Planting beds shall be mulched with 2 inches of approved mulch.

CEDAR GROVE SOLUTIONS

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COMPOST EROSION CONTROL BLANKETS

Compost Blankets are cost-effective erosion control and runoff filtration tools that enhance plant establishment. They can be applied with seed or planted into, and meet the requirements of King County Surface Water Design Manual temporary erosion and sedimentation control BMP D.4.2.

One month after seeded with compost blanket.

One year after hydro-seeded

Compost Blankets are typically 2- 4 inches deep. They are easy and economical to install even on steep slopes. Beneficial fungi thrive in compost, knitting particles together to prevent erosion of the blanket.

Compost Blanket Advantages

- Can be blown onto slopes up to 1:1.
- Low installation costs.
- Absorb large volume of water before runoff.
- Speed of seed germination and plant growth.
- 100% ground contact provides superior soil protection and runoff filtration.
- Compost left in place meets Soil Quality and Depth BMP requirement.

Seeds germinate and grow rapidly in the compost, even in cold weather

Seed Injected Blanket and Restoration Planting
Compost Blankets can be blown in place with seeds or transplanted into without tilling, providing a practical way to prepare slopes for restoration planting. The compost enhances germination and growth by conserving moisture, holding seed in place, providing nutrients and moderating soil temperatures.

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CEDAR GROVE COMPOST BLANKET & SEED
INJECTED BLANKET SPECIFICATIONS

MEETS WDOT EROSION CONTROL BLANKET SPECIFICATIONS

1. Compost blankets shall be applied 1-3 inches thick as needed to create a uniform coverage and density, using a pneumatic blower device or equivalent.
2. Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220.
3. Compost shall be certified in compliance with U.S. Composting Council Seal of Testing Assurance (STA) program. **Approved products include Coarse Cedar Grove Compost**.
4. Compost shall meet the following texture requirements:

Sieve Size	WSDOT "Fine" Percent Passing	WSDOT "Medium" Percent Passing	WSDOT "Coarse" Percent Passing
2"	100%	100%	100%
1"	100%	100%	90-100%
3/4"			70-100%
5/8"	90-100%	85-100%	
1/4"	75-100%	70-85%	40-60%

US Composting Council
Seal of Testing Assurance

5. pH shall be between 5.5 and 8.0
6. Physical contaminants, defined in WAC 173-330 (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0percent by weight as determined by TMECC 03.08-A "Classification of Inerts by Sieve Sizes". Plastic Film shall be less than 0.1 by weight.
7. Organic matter content shall be between 45 and 65 percent by Loss-On-Ignition Organic Matter Method.
8. Soluble salt content shall be less than 4.0 mmhos/cm.
9. Maturity shall be over 80% per TMECC 05.05-A, "Germination and Vigor".
10. Stability shall be 7 or below per TMECC 05.08-B, "CO2 Evolution Rate"
11. Carbon to nitrogen ratio shall be less than 25:1. May be 35:1 for plantings composed entirely of plants native to Puget Sound lowlands region.
12. Feedstocks shall originate from local recycling collection programs, and contain a minimum or 10% post consumer waste as defined in WAC 173-350.

SEED INJECTED COMPOST BLANKET

1. Seed and compost mixture shall be applied using a pneumatic blower device equipped with a computer-calibrated seed injection system and capable of uniformly and simultaneously applying growing medium and seed.
2. Deliver seed in original unopened containers showing seed name, net weight; and percentages of species and varieties included, purity, germination, weed seed and inert material. Seed shall conform to the requirements of the Washington State seed law and when applicable the Federal Seed Act, and shall be "certified" grade or better. Seed that has become wet, moldy, or otherwise damaged will not be accepted.
3. Erosion control seed mix shall be as follows, unless otherwise specified by project designer: Seed mix shall contain, by weight, 50% perennial ryegrass (Lolium perenne), 50% red fescue (Festuca rubra) or mix of red fescue and sheep fescue (F. ovina). Up to 5% Strawberry Clover (Trifolium dubium) or White Clover (T. repens), or up to 2% Common Yarrow (achillea millefolium) may be included if approved by designer.
4. Seeding rate for recommended mix shall be 14 lbs. per 1,000 sq. ft. Other seed mixes specified by designer shall be applied at 200% of standard hydroseeding recommendation.
5. Prior to the application of the growing medium and seed, the Contractor shall ensure that the pneumatic blower has been properly calibrated to provide the specified amounts of seed.
6. Seeding shall not be done during windy weather (above 20 mph) or when the ground is overly wet (saturated) or frozen. Contractor shall give the Owner 48 hours notice prior to seeding operations.

CEDAR GROVE SOLUTIONS

LANDSCAPE & CONSTRUCTION SERVICES

www.cedar-grove.com/landscape-construction

COMPOST FILTER BERMS & SOCKS

Cost-effective tools that provide control of sediment and soluble pollutants. Compost Filter Berms & Socks meet King County Surface Water Design Manual temporary erosion and sedimentation control BMP D.4.3 requirements.

Compost Socks & Berms Advantages Over Silt Fence

- No trenching required. Easy to place anywhere.
- Superior sediment filtration, without clogging.
- Trap nutrients and chemical contaminants.
- High flow-through rates reduce wash-outs.
- Wildlife friendly.
- Minimal disposal costs. Biodegradable sock option.
- Compost reusable on-site as soil amendment to comply with Soil Quality and Depth BMP.

See Why Compost-Based Erosion Controls Are the Best Tools to Meet NPDES Phase II for supporting research citations.

Cedar Grove works with blower trucks that apply compost, soil, bark, filter berms and filter socks. Products and services include:

- Installing Compost Filter Socks.
- Delivery of pre-filled Filter Socks.
- Compost berm installation.
- Compost blankets installation.
- Erosion control design and calculations.

Compost Filter Socks contain compost in mesh tubes for stability and precise placement on varied terrain. They can be blown in place, or delivered in sections.

Compost Filter Berms are uncontained rows of coarse compost blown in place.

LEED Credits:
Compost Socks & Berms:
Prerequisite 1 – Construction Activity Pollution Prevention
SS 6.2 – Stormwater Quality
MR 4 – Recycled Materials
MR 5 – Regional Materials

MAPLE VALLEY – 17825 CEDAR GROVE RD SE
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WOODINVILLE – 6100 238TH ST SE
BELLEVUE – 969 118TH AVE SE
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CEDAR GROVE COMPOST FILTER SOCKS & BERMS SPECIFICATIONS

COMPOST BERM DESIGN AND INSTALLATION SPECIFICATIONS

1. Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220.
2. Compost shall be certified in compliance with U.S. Composting Council Seal of Testing Assurance (STA) program. **Approved products include Cedar Grove Compost.**
3. Compost shall be meet WSDOT "Coarse" or "Medium" specifications, as determined by the Project Engineer, and meet the corresponding particle size gradation in Table 2.
4. Compost berms shall be sized and spaced as indicated in Table 1.
5. Compost berms shall be applied using a pneumatic blower device or equivalent, to create a uniform cross-section and berm density.
6. Compost berms shall be triangular in cross-section. The ratio of base to height dimensions shall be 2:1.
7. Compost berms shall not be used on slopes greater than 2H:1V without additional engineering or securing as specified by Project Engineer.
8. Berms shall be placed on level contours to dissipate flows. Ends of berms shall be constructed angling upslope to prevent water flowing around them.
9. When possible, berms shall be placed 5 feet or more from the toe of slopes.
10. Feedstocks shall originate from local recycling collection programs, and contain a minimum of 10% post-consumer food waste as defined in WAC 173-550.

COMPOST FILTER SOCK DESIGN AND INSTALLATION SPECIFICATIONS

1. Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220.
2. Compost shall be certified in compliance with U.S. Composting Council (STA) program. **Approved products include Cedar Grove Compost**.
3. Compost shall be meet WSDOT "Coarse" or "Medium" specifications, as determined by the Project Engineer, and meet the corresponding particle size gradation in Table 2.
4. Socks shall be filled using a pneumatic blower hose or equivalent, to be firmly packed yet flexible.
5. Once placed on the ground, apply weight to the sock by walking on or rolling to improve contact between the sock and the ground surface.
6. Compost socks shall be a minimum 8 inches in diameter. Larger diameter socks are recommended for areas where ponding is expected behind the compost sock.
7. Compost socks shall not be used on slopes greater than 2:1 without additional engineering or securing as specified by Project Engineer.
8. Compost socks shall be spaced as indicated in Table 1
9. Filter socks shall be placed on level contours to dissipate flows. Ends of socks shall be constructed pointing upslope to prevent water flowing around.
10. Feedstocks shall originate from local recycling collection programs, and contain a minimum of 10% post-consumer food waste as defined in WAC 173-550.

Tables on next page.

CEDAR GROVE COMPOST FILTER SOCKS & BERMS SPECIFICATIONS

TABLE 1. Compost Filter Sock and Berm Spacing, and Berm Size

Slope	Maximum Spacing	Berm Size (height x base)
0%-2%	250 ft.	1 ft. x 2 ft.
2%-10%	125 ft.	1 ft. x 2 ft.
10%-20%	100 ft.	1 ft. x 2 ft.
20%-33%	75 ft.	1 ft. x 2 ft.
33%-50%	50 ft.	1.5 ft. x 3 ft.

TABLE 2. Compost Particle Size for Filter Socks & Berms

WSDOT "Coarse"		WSDOT "Medium"	
Sieve Size	Percent Passing	Sieve Size	Percent Passing
2"	100%	2"	100%
1"	90-100%	1"	100%
3/4"	70-100%	3/4"	
5/8"		5/8"	85-100%
1/4"	40-60%	1/4"	70-85%

CEDAR GROVE SOLUTIONS

LANDSCAPE & CONSTRUCTION SERVICES

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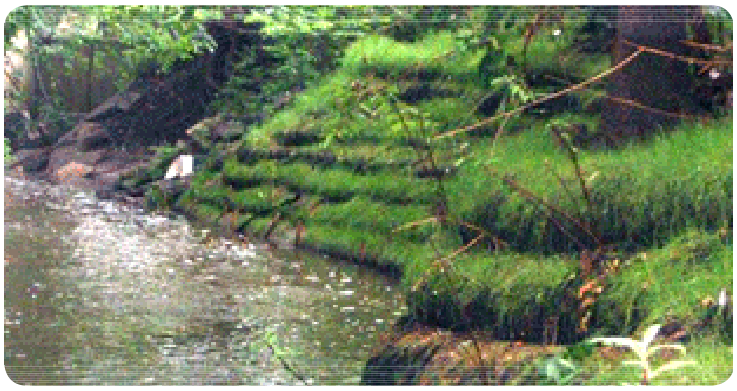
LIVING WALLS

Living walls are retaining structures built with compost-filled mesh tubes. Living walls are typically seeded or planted to enhance appearance and stability. The tubes can be tied together with geotextile fabric when added strength is needed.

Living walls provide a natural, vegetation-covered alternative to low to moderate height retaining walls made of blocks, boulders, gabions or riprap. They are also used to prevent erosion and create low terraces on slopes. Common Living Wall applications include:

- **Structural armoring to stabilize banks & slopes.**
- **Create planting terraces & raised beds.**
- **Provide stable soil to vegetate eroded / rocky slopes.**



Cedar Grove works with designers and contractors to install Living Walls by providing these products and services:

- **Blowing services**
- **Mesh tubes**
- **Pre-seeded compost planting media**
- **Live stakes for restoration plantings.**

Living Walls are laid and staked to banks, or stacked and backfilled with soil.

Plants are integral to Living Walls structural capabilities. Seeded grasses help provide initial stability until larger plants become established.

LEED Credits from Living Walls:
SS 6.2 – Stormwater Quality
MR 4 – Recycled Materials
MR 5 – Regional Materials
MR 6 – Rapidly Renewable Building Materials

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CEDAR GROVE LIVING WALL SPECIFICATIONS

LIVING WALL MATERIALS

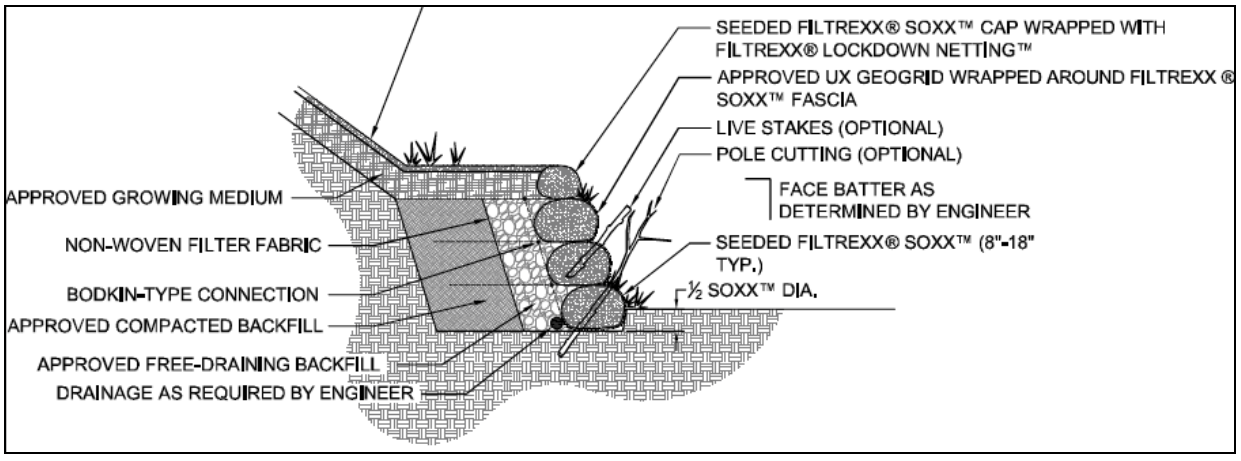
1. Living walls shall be constructed of mesh tubes, filled with compost using a pneumatic blower hose or equivalent. Filled tubes shall be firmly packed yet flexible.
2. Compost shall be the result of the biological degradation of recycled plant materials, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220.
3. Compost shall be certified in compliance with U.S. Composting Council STA program. Feedstocks shall originate from local recycling collection programs, and contain a minimum or 10% post consumer waste as defined in WAC 173-350. **Approved products include Cedar Grove Coarse Compost**.
4. Compost shall meet the following particle size gradation.

Sieve Size	Percent Passing
1”	90-100
3/4”	70-100
1/4”	40-60

5. Mesh tubes shall be an approved 5-mil thick, continuous, tubular, knitted, 3/8” mesh HDPE netting material.

LIVING WALL CONSTRUCTION

1. Living Wall shall be constructed at locations indicated on plans, as directed by the Project Engineer.
2. Living Wall should be installed to ensure a continuous tube. When completing filling of one tube section, the next section shall be ‘sleeved’ over it to overlap by a minimum of one-foot. A stake shall be placed in this overlap section, securing the two sections together.
3. Larger diameter, heavier mesh tubes shall be placed at the base of Living Walls, with sequentially smaller tubes placed on top.
4. Living Wall applications must be seeded during time of installation for anchoring to the soil. Grass seed should be used as a nurse crop to other vegetation planned to naturalize the site.
5. During installation, each layer shall be staked to underlying soil.



OUR LOCATIONS

1. 3260 36th Pl NE
   Everett, WA 98201

2. 18720 SR 203
   Monroe, WA 98272

3. 6100 238th St. SE
   Woodinville, WA 98072

4. 969 118th Ave SE
   Bellevue, WA 98005

5. 7343 E Marginal Way S.
   Seattle, WA 98108

6. 17825 Cedar Grove Rd. SE
   Maple Valley, WA 98038