

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils with a well-established vegetative cover. This is one of the most effective methods of reducing erosion.

Conditions of Use

- Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.
- The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.
- Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.
- Between October 1 and March 30 seeding requires a cover of mulch with straw or an erosion control blanket until 75 percent grass cover is established.
- Where the term “fully established” is used to describe vegetative cover or plantings, it shall be understood to mean that healthy vegetation covers 90 percent of exposed soil.
- Inspect all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.
- Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.
- Seed and mulch all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) that will prevent erosion.

Design and Installation Specifications

- Seed retention/detention ponds as required.
- Install channels intended for vegetation before starting major earthwork and hydroseeded with a Bonded Fiber Matrix (BFM). For vegetated channels that will have high flows, install erosion control blankets over hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow,

install sod in the channel bottom – over hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- The seedbed should be firm and rough. All soil should be roughened no matter what the slope. If compaction is required for engineering purposes, slopes must be track walked before seeding. Backblading or smoothing of slopes greater than 4:1 is not allowed if they are to be seeded.
- New and more effective restoration-based landscape practices rely on deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical the subgrade should be initially ripped to improve long-term permeability, infiltration, and water inflow qualities. At a minimum, permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches the rototilling process should be done in multiple lifts, or the prepared soil system shall be prepared properly and then placed to achieve the specified depth.
- Organic matter is the most appropriate form of “fertilizer” because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form. A natural system typically releases 2 to 10 percent of its nutrients annually. Chemical fertilizers have since been formulated to simulate what organic matter does naturally.
- In general, 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer can be used at a rate of 90 pounds per acre. Slow-release fertilizers should always be used because they are more efficient and have fewer environmental impacts. It is recommended that areas being seeded for final landscaping conduct soil tests to determine the exact type and quantity of fertilizer needed. This will prevent the over-application of fertilizer. Fertilizer should not be added to the hydromulch machine and agitated more than 20 minutes before it is to be used. If agitated too much, the slow-release coating is destroyed.
- There are numerous products available on the market that takes the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal is a good source of long-term, slow-release, available nitrogen.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- On steep slopes, BFM or Mechanically Bonded Fiber Matrix (MBFM) products should be used. BFM/MBFM products are applied at a minimum rate

of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Application is made so that a minimum of 95 percent soil coverage is achieved. Numerous products are available commercially and should be installed per manufacturer's instructions. Most products require 24 to 36 hours to cure before a rainfall and cannot be installed on wet or saturated soils. Generally, these products come in 40 to 50 pound bags and include all necessary ingredients except for seed and fertilizer.

- BFM and MBFM have some advantages over blankets:
 - No surface preparation required
 - Can be installed via helicopter in remote areas
 - On slopes steeper than 2.5:1, blanket installers may need to be roped and harnessed for safety
 - They are at least \$1,000 per acre cheaper installed.
- In most cases, the shear strength of blankets is not a factor when used on slopes, only when used in channels. BFM and MBFM are good alternatives to blankets in most situations where vegetation establishment is the goal.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application. See also soil preservation and amendment in Volume III, Section 3.1.
- When installing seed via hydroseeding operations, only about one-third of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:
 1. Phase 1 – Install all seed and fertilizer with 25 to 30 percent mulch and tackifier onto soil in the first lift.
 2. Phase 2 – Install the rest of the mulch and tackifier over the first lift.Or, enhance vegetation by:
 1. Installing the mulch, seed, fertilizer, and tackifier in one lift.
 2. Spread or blow straw over the top of the hydromulch at a rate of 800 to 1,000 pounds per acre.
 3. Hold straw in place with a standard tackifier.

Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:

- Irrigation
- Reapplication of mulch
- Repair of failed slope surfaces.

This technique works with standard hydromulch (1,500 pounds per acre minimum) and BFM or Mechanically Bonded Fiber Matrix (MBFM) (3,000 pounds per acre minimum).

- Seed may be installed by hand if:
 - Temporary and covered by straw, mulch, or topsoil
 - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
- The seed mixes listed in the tables below include recommended mixes for both temporary and permanent seeding.
- Apply these mixes, with the exception of the wetland mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used.
- Consult the local suppliers or the local conservation district for their recommendations because the appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the county may be used.
- Other mixes may be appropriate, depending on the soil type and hydrology of the area.
- Table 3.2 represents the standard mix for areas requiring a temporary vegetative cover.

Table 3.2. Temporary Erosion Control Seed Mix.

	% Weight	% Purity	% Germination
Chewings or annual blue grass (<i>Festuca rubra var. commutata</i> or <i>Poa anna</i>)	40	98	90
Perennial rye (<i>Lolium perenne</i>)	50	98	90
Redtop or colonial bentgrass (<i>Agrostis alba</i> or <i>Agrostis tenuis</i>)	5	92	85
White dutch clover (<i>Trifolium repens</i>)	5	98	90

- Table 3.3 lists a recommended mix for landscaping seed.

Table 3.3. Landscaping Seed Mix.

	% Weight	% Purity	% Germination
Perennial rye blend (<i>Lolium perenne</i>)	70	98	90
Chewings and red fescue blend (<i>Festuca rubra</i> var. <i>commutata</i> or <i>Festuca rubra</i>)	30	98	90

- Table 3.4 lists a turf seed mix in dry situations where there is no need for watering. This mix requires very little maintenance.

Table 3.4. Low-Growing Turf Seed Mix.

	% Weight	% Purity	% Germination
Dwarf tall fescue (several varieties) (<i>Festuca arundinacea</i> var.)	45	98	90
Dwarf perennial rye (Barclay) (<i>Lolium perenne</i> var. <i>Barclay</i>)	30	98	90
Red fescue (<i>Festuca rubra</i>)	20	98	90
Colonial bentgrass (<i>Agrostis tenuis</i>)	5	98	90

- Table 3.5 lists a mix for bioswales and other intermittently wet areas.

Table 3.5. Bioswale Seed Mix.^a

	% Weight	% Purity	% Germination
Tall or meadow fescue (<i>Festuca arundinacea</i> or <i>Festuca elatior</i>)	75 to 80	98	90
Seaside/Creeping bentgrass (<i>Agrostis palustris</i>)	10 to 15	92	85
Redtop bentgrass (<i>Agrostis alba</i> or <i>Agrostis gigantea</i>)	5 to 10	90	80

^a Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix

- Table 3.6 lists a low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Apply this mixture at a rate of 60 pounds per acre. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.

Table 3.6. Wet Area Seed Mix.^a

	% Weight	% Purity	% Germination
Tall or meadow fescue (<i>Festuca arundinacea</i> or <i>Festuca elatior</i>)	60 to 70	98	90
Seaside/Creeping bentgrass (<i>Agrostis palustris</i>)	10 to 15	98	85
Meadow foxtail (<i>Alepocurus pratensis</i>)	10 to 15	90	80
Alsike clover (<i>Trifolium hybridum</i>)	1 to 6	98	90
Redtop bentgrass (<i>Agrostis alba</i>)	1 to 6	92	85

^a Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix

- Table 3.7 lists a recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.

Table 3.7. Meadow Seed Mix.

	% Weight	% Purity	% Germination
Redtop or Oregon bentgrass (<i>Agrostis alba</i> or <i>Agrostis oregonensis</i>)	20	92	85
Red fescue (<i>Festuca rubra</i>)	70	98	90
White dutch clover (<i>Trifolium repens</i>)	10	98	90

Maintenance Standards

- Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, an alternate method, such as sodding, mulching, or nets/blankets, shall be used. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the county when sensitive areas would otherwise be protected.
- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Approved as Equivalent

Ecology has approved specific products as able to meet the requirements of BMP C120. The products did not pass through the Technology Assessment Protocol – Ecology

(TAPE) process. The county has reviewed these products for application in Pierce County, and has developed a county-specific list of the approved and prohibited products. This county-specific list can be obtained from Pierce County Planning and Land Services' (PALS) web site: <piercecountywa.org/PALS>. The county web site is updated routinely, but the latest list from Ecology is available on Ecology's web site at <www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html>. Contact the county if a new Ecology approved product is not listed on the county web site.