SECTION 3: SURFACE STABILIZATION - EROSION CONTROLS

Temporary Seeding



Practice Description

Temporary seeding is the establishment of fast-growing annual vegetation to provide economical erosion control for up to 6 months and reduce the amount of sediment moving off the site. Annual plants that germinate rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover.

This practice applies where short-lived vegetation needs to be established before final grading or in a season not suitable for permanent seeding.

Recommended Minimum Requirements

A qualified professional should specify plant materials, seeding rates and times of planting. The site superintendant and field personnel should refer to plans and specifications throughout the construction process. To ensure emergence, vigorous growth of seedlings and continued plant growth, prepare the seedbed and add soil amendments according to soil tests. Protect the soil and seed with mulch or other erosion control until the vegetation is fully established to a density of 70 percent over the entire vegetated area.

Make sure there is a minimum of three inches of topsoil with a sufficient percentage of organic material to sustain vegetative growth.

Loosen soil to depth of 3-inches for broadcast seeding or drilling. If compacted, loosen soils for

no till drilling. Avoid excessively wet conditions. Incorporate fertilizer and lime (if soil pH is less than 5.3) incorporated 3- to 6-inches into the soil. See Table 6.2.

Seed Quality Use certified seed, tested within the past nine months.

Select recommended temporary erosion control plant species. Rate of application and seeding dates are listed in Tables 6.3 and 6.4.

Erosion Control Cover the seeded area with approved mulching materials or other erosion control devices to protect the soil and seed until vegetation is fully established.

Inspect seeded areas 2 to 4 weeks after seeding for seed germination, vegetation establishment, erosion control and weed control. Repair and reseed as necessary.

After six months if the site is not in permanent vegetation over the entire disturbed area to a density that impedes erosion.

Successful vegetative establishment is directly dependent on the nutrients in the soil. For

Use certified seed, tested within the past 9 months.

Planting Dates

surface compaction.

tillage equipment.

than bagged fertilizer.

potassium within the bag.

(See Table 6.5).

optimum results, take soil samples from the top 6-inches in each area to be seeded. Submit samples to a soil testing laboratory for liming and fertilizer amendment recommendations.

Seedbed preparation is essential for the seed to germinate and grow.

- · For broadcast seeding and drilling, loosen the soil to a depth of approximately 3-inches. · For no-till drilling, the soil surface does not need to be loosened unless the site has surface
- Use a disk, ripper, chisel, harrow or other acceptable tillage equipment to loosen compacted, hard or crusted soil surfaces. Avoid preparing the seedbed under excessively wet conditions.
- · Acid soils with an extremely low pH can prevent seeding success. However, most of the recommended temporary vegetation is tolerant of low pH soils and will establish on all but the
- · If soil pH in the region is known to be extremely low, conduct a soil pH test to determine if limestone is necessary for temporary seeding. Amend soils with lime according to information in Table 6.2. Soils with a pH above 7.0 should not be limed.

Coordinate the construction schedule with planting dates appropriate for region and species

Select from recommended erosion control plants (grass or grass/legume mixtures) as shown in

Cover a minimum of 75 percent of the ground surface with approved material (See Mulching).

Inspect seeded areas during each weekly inspection. Repair and reseed as necessary.

sample to a soil testing laboratory for liming and fertilizer recommendations

Seedbed preparation is essential for the seed to germinate and grow.

Avoid preparing the seedbed under excessively wet conditions.

unless a soil test shows a pH of 6.5 or greater.

Incorporate lime into the top 3- to 6-inches of soil.

It may wash down stream if applied heavily during seeding.

Do not add lime if the pH is 7.0 or greater.

Tables 6.5 and 6.6. Rate of application and seeding dates are shown in Tables 6.4, 6.7 and 6.8.

During final grading, take soil samples from the top 6-inches in each area to be seeded. Submit

For broadcast seeding and drilling, loosen the soil to a depth of approximately 3-inches.

· Loosen compacted, hard or crusted soil surfaces with a disk, ripper, chisel, harrow or other

Follow the recommendations resulting from the soil test. Apply ground agricultural limestone

Remember: Phosphorus helps roots grow and develop to get the grass plants established.

Nitrogen will only be taken up after the seed has germinated and the vegetation is growing.

recommendations to local fertilizer dealer for bulk fertilizer blends. This may be more economical

For establishment and long-term growth, apply a complete fertilizer at rates recommended by soil

tests or as specified in the design plan. In the absence of soil tests, use the following as a guide:

· A typical fertilizer blend for lawn grass mixes: Apply 10-24-18 which represents 10 percent of

the fertilizer compound. If you had 100 pounds of a 10-24-18 blend you would have

10 pounds of actual nitrogen, 24 pounds of actual phosphorus and 18 pounds of actual

actual nitrogen - 24 percent of actual phosphorus and 18 percent of actual potassium within

Note: Fertilizer can be blended to meet exact fertilizer recommendations. Take soil test

· For no-till drilling, the soil surface does not need to be loosened unless the site has

Table 6.2 Liming Requirements for Temporary Site

H Test	Plant Response	Recommended Application of Agricultural Limestone
elow 6.0	Poor growth	Lime according to soil test
0 - 6.5	Adequate growth	No lime recommended
reater than 6.5	Optimum	No lime recommended

. The soil will most likely be deficient in nutrients required for growth. A soil test will provide the best guide for the amount and types of fertilizer to apply for optimum plant growth.

 A general recommendation is to broadcast Ntirogen, Phosphorus and Potassium at 90 lbs./acre for areas receiving more than 30 inches of precipitation and 50 lbs./acre in areas receiving less than 30 inches of precipitation.

For example, to compute the bulk pounds of product to use - For 100 pounds of a 10-10-10 fertilizer mix you have 10 percent or 10 pounds of actual Nitrogen, Phosphorus and Potassium. The remaining 70 percent or 70 pounds of product in the bag is inert material that improves application consistency. You would need to apply 900 pounds of product per acre to provide 90 pounds of actual Nitrogen per acre.

· For best results incorporate the fertilizer into the top 3- to 6-inches before seeding.

· Apply seed evenly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. Plant small grains no more than 11/2 inches deep. Plant grasses and legumes no more than

· Prior to mulching, harrow, rake or drag a chain to lightly incorporate broadcast seed into the soil to enhance germination. Cover applied seed with mulch (See Mulching).

Table 6.3 Temporary Seeding Plant Materials and Minimum Seeding Rate *

Casalas	Seedin	ng Rate	Plant Characteristics		
Species	lbs. per Acre lbs. per 1,000 ft.2		Plant Characteristics		
Oats	80 lbs.	2 lbs	Not cold tolerant, height up to 2 feet		
Cereals: Rye/Wheat	90 / 120	2 / 2.5	Cold tolerant, height up to 3 feet, low pH tolerant		
Millets, Sudangrass	45 / 60	1 / 1.25	Warm season annual, aggressive growth, height up to 5 feet		
Annual Ryegrass	75	2	May be added to mix, not heat tolerant, height up to 16 inches		
Annual Lespedeza** plus Tall Fescue	15 plus 45	0.5 plus 1	Warm season annual legume, makes own nitrogen, tolerated low pH		

* In areas receiving less than 30 inches of precipitation, use 75 percent of these rates. ** If there is any possibility the seeding will be required to control erosion for more than one year, then consider the addition of fescue or another permanent species as part of a mixture when seeding.

· A typical application rate of fertilizer for initial establishment of vegetation after seeding is approximately 1 pound of actual nitrogen per 1,000 square feet. With the 10-24-18

more than 2 pounds of phosphorus per acre.

at 435 pounds of fertilizer per acre.

Resources Conservation Service or Extension office.

Nurse Crops (Temporary or Annual Species)

of up to 3:1.

Developing a Mixture

Planting Dates

fertilizer this would require the application of approximately 435 pounds of this fertilizer mix

per acre since there are 43,500 square feet in an acre. This fertilizer would also provide

Incorporate lime and fertilizer to a depth of 3- to 6-inches by disking or chiseling on slopes

Grade soil to a smooth firm surface to enhance rooting of seedlings and reduce rill erosion.

germination to achieve the density of vegetation to prevent or minimize erosion. A typical

fertilizer for a second application once vegetation is established would be a 20-10-5 mix

mixture from Tables 6.5 and 6.6 appropriate for the season. Consider site conditions including

soils, plant characteristics, region of the state and desired level of maintenance. The species

shown are adapted for lawns and erosion control. If there are questions on species selection and how they may be adapted in wildlife habitat or wetland applications, contact your local Natural

A pure stand of grass provides the best erosion control. The advantage of a grass/legume mix is

the legume provides nitrogen to the grass and often grows during hotter and drier months when

the grass is dormant. Usually one grass and one or two legumes is sufficient in a mixture.

information about each grass and legume to determine the correct species for your site.

More grasses can be mixed together, but may be of little use. Refer to Tables 6.5 and 6.6 for

Nurse crops are temporary grains that have one growing season such as wheat, rye and oats

and are sometimes used in a seeding mixture. These annuals can reduce weeds, control

erosion and provide protection to young seedlings until the perennial species become

1/4 inch deep. Permanent seedings should not be planted deeper than 1/4 inch.

Conservation Service office for species selection and seeding rates.

to schedule, use the seeding calendar shown in Table 6.5.

Plant nurse crops about 1-inch deep. Most permanent grasses and legumes are sown

A wide variety of native forbs and grasses are available that add diversity and beauty to

permanent plantings (e.g., switchgrass as an accent). Contact your local Natural Resources

If seeding dates are not specified in the design plan or construction has not proceeded according

Plant during optimum seeding dates if at all possible. Always use mulch or other erosion control

measures to protect the seed and reduce erosion until the vegetation is established. For dormant

seeding dates, broadcast seed and immediately roll and cultipack for good soil-to-seed contact.

If unable to seed according to schedule, use temporary seeding until the preferred date for

 Subsequent fertilization with an additional 2 pounds per 1,000 square feet of actual Nitrogen approximately one month after initial seeding will help grass growth after

If not specified in the design plan, choose a suitable species of grass or a grass/legume

 Plant according to the design plan. In absence of a plan, choose a recommended temporary species or mixture appropriate for the season from Tables 6.3 and 6.4.

- · Plant during optimum seeding dates if at all possible. Always use mulch or other erosion control practices to cover and protect seed and soil during vegetation establishment.
- Roll and cultipack broadcast seed for good soil-to-seed contact. · Use high quality seed and for best results, use certified seed. When using uncertified seed,

use the highest recommended seeding rate. Table 6.4 Seeding Dates for Temporary Seeding

Species	Seeding Dates Optimum and Acceptable												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	S	ер	Oct	Nov	Dec
Oats													
Cereals: Rye/Wheat													
Millets, Sudangrass													
Annual Ryegrass													
Annual Lespedeza plus Tall Fescue ¹													
¹ If site may not be develope in Table 6.5.	d within o	ne year,	consider	perman	ent speci	ies listed] 0		ible Key um See	•	nes

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· Mulching conserves moisture and reduces erosion during seed germination and

 Evenly cover a minimum of 75 percent of the ground surface with mulch material specified in the design plan. Tack or tie down the mulch according to plan (See Mulching).

Acceptable Seeding Times

Optimum Seeding Tim

* With Mulch Cover

onstruction Verification Check materials and installation for compliance with specifications.

Maintenance and Inspection Check temporary seeding during each weekly inspection to monitor germination, growth and to see if stands are of adequate thickness (more than 70 percent density of the ground surface vegetation over the entire area to be stabilized). Stands should be uniform and dense for best results. Fertilize, reseed and mulch bare and sparse areas immediately to prevent

- · Mowing is not recommended for cereals seeded alone. Cereals seeded with a grass can be mowed when height is greater than 12-inches. However, to prevent damage to grasses, do not mow shorter than 4-inches.
- · Mow millets and sudangrass before height is greater than 6-inches to allow regrowth and continued erosion protection
- Annual lespedeza and tall fescue may be mowed after height exceeds 8-inches.
- Do not mow shorter than 4-inches. Replant temporary or permanent vegetation within 12 months as annual plants die off
- and no longer provide erosion control (see Permanent Seeding). Consider no-till planting

If seeding rates are not specified in the design plan, use rates in Table 6.8 for grasses alone.

conditions that typically exist on a development site, a need for dense growth and high

seeding rate. Higher seeding rates will not substitute for good

legumes no more than 1/2 inch. Calibrate equipment in the field.

inoculum from seed dealer and mix with seed prior to planting.

Table 6.5 Planting Dates Optimum and Acceptable* Planting Dates

² Usually sprigged. Space plugs every 6-, 8- or 12-inches; with 4,000, 2,250 or 1,000 sprigs/1000 ft² respectively.

³ Check with your local Noxious Weed Department before planting.

⁶ Provides a quick temporary cover or nurse crop even if planted in the fall.

Kentucky Bluegrass

Bermuda - Common

Bermuda- Hybrid

Reed Canary

White Clover

Wheat/Rye3

¹Can also be sprigged.

4 Nurse crop only.

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Use rates in Table 6.9 for a grass or legume mixture. These rates are based on the poor growing

For best results use certified seed. When using uncertified seed, use the highest recommended

seedbed preparation.

• Apply seed uniformly using a cyclone seeder, drop-type spreader, drill, cultipacker seeder

· When using a drill seeder, plant rye or other grains about 1-inch deep; plant grasses and

· Cover seed by raking, or dragging a chain, brush or mat. Then firm the soil lightly with a roller. Seed can also be covered with hydro-mulched wood fiber and tackifier or a rolled

Legumes require inoculation with nitrogen-fixing bacteria to ensure good growth. Purchase

where possible.

holding capacity.

seedbed preparation.

dates or mulching cannot be met.

Vegetation is not sustainable as a permanent

Poor seedling emergence and growth with

erosion of the soil caused by inadequate

resulting in poor germination or inadequate

stand (less than 70 percent of the ground

Poor or spotty stands of vegetative cover

away of the seed and erosion of the soil

caused by a lack of nitrogen.

availability to plants.

caused by inadequate mulching, washing

Poor plant vigor, yellow color and short height

Unsuitable choice of plant materials:

a lack of organic material, nutrients and water organic material.

subirrigation or overland flow. ¹ Will be high maintenance in lawn – type or low rainfall (<30") settings. ² Adapted to shorelines, wet or frequently flooded areas.

3 Responds well to fertilizer, but doesn't necessarily require it. 4 Usually seeded, by can be sprigged. Usually sprigged, plugged or sodded. 6 Legumes alone will not provide adequate erosion protection: use with a grass in a mixture 7 Will reseed each year if not mowed until after seed shatter in September.

Table Key H = high. G = good.

Design specifications for seed variety, seeding | Substitutions may be required. Unapproved

cover caused by a lack of topsoil resulting in Add topsoil with a minimum of three percent

Dying plants caused by a lack of topsoil or soil Add organic material and loosen soil if

compaction that limits root growth and water reseeding is necessary or before seeding

Repair gullies, prepare seedbed, fertilize,

Choose plant materials appropriate for

Poor plant vigor, yellow color and short height

caused by a lack of nitrogen - add 50 lbs. of

ver the top of existing plants from June 1

Add 50 lbs. of nitrogen fertilizer per acre.

Do not apply over the top of existing plants

from June 1 to Aug. 15 or on frozen ground.

to Aug. 15 or on frozen ground.

permanent vegetation.

ogen fertilizer per acre. Do not apply

season, prepare seedbed and replant.

lime (if necessary), mulch and reseed.

Adaptation limited to areas that receive additional moisture enhancement by irrigation,

Permanent Seeding



Practice Description

longer than 12 months. Permanent vegetation provides economical long-term erosion control and helps prevent sediment from leaving the site. This practice is used when vegetation is desired to permanently stabilize the soil or if future phases of a construction site will remain dormant for a significant period of time after grading. It is necessary to protect earthen structures such as dikes, channels and embankments. Particular care is required to establish a good, thick cover of

Recommended Minimum Requirements A qualified professional should specify plant materials, seeding rates and times prior to start of

throughout the construction process. To ensure germination and growth, prepare seedbed, add soil amendments according to soil tests, mulch all seeded areas and follow the seeding dates. For broadcast seeding or drilling, loosen soil to depth of 3-inches. For no till drilling, loosen the

construction. The site superintendant and field personnel should refer to plans and specifications

soil if it's compacted. Avoid excessively wet conditions.

Incorporate fertilizer and lime (if soil pH is less than 6.0) incorporated 3- to 6-inches into the soil.

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		Tolerance							
Species		Shade	Drought	Flooding	Traffic	Soil Wetness			
	Perennial ryegrass	L	L	М	М	М			
ses	Canada wildrye	М	M	L	М	Р			
iras	Tall fescue	M	M	М	М	Р			
9	Crested wheatgrass	L	Н	М	М	G			
asc	Kentucky bluegrass	L	L	M	Н	G			
Cool Season Grasses	Bromegrass	L	М	L	Н	M			
8	Redtop	L	L	М	Н	G			
0	Reed canary	L	М	Н	Н	G			
70	Common Bermuda	L	Н	Н	Н	M			
	Hybrid Bermuda	L	Н	Н	Н	M			
sse	Buffalograss	L	Н	Н	Н	G			
gra	Blue grama	L	Н	L	М	Р			
Warm Season Grasses	Zoysia	L	Н	M	Н	Р			
sas	Sideoats grama	L	Н	М	Н	М			
Š	Little bluestem	L	Н	L	L	Р			
/aru	Big bluestem	L	Н	М	L	М			
>	Indiangrass	L	М	L	М	Р			
	Switchgrass	L	М	М	М	G			
Legumes	Birdsfoot trefoil	L	Н	L	М	G			
	Annual lespedeza	L	L	M	L	М			
	Red clover	L	L	L	М	P			
	White clover	L	L	L	Н	М			
	Alfalfa	L	L	L	L	Р			

Table Key M = Moderate H = High P = Poor G = Good

Table 6.8 Seeding Rates Kansas: Full Seeding Rate¹ Missouri: Full Seeding Rate¹ Perennial ryegrass Canada wildrye Tall fescue Crested wheatgrass Kentucky bluegrass Bromegrass Reed canary¹ 20 bu./acre Buffalograss³ Blue grama Sideoats grama Little bluestem Big bluestem Red clover White clover 1 bu./acre 1 bu./acre 1 bu./acre 1 bu./acre 1.5 bu./acre 1.5 bu./acre

Note: Rates based on typical construction site conditions where seedbed is normally less than ideal. Planned future use or specific site conditions may dictate an increase or a decrease in rates. Contact your local Natural Resources Conservation Service office or consulting agronomist for specific seeding rates within your county. PLS or Pure Live Seed = the amount of seed guaranteed to grow.

Legumes alone will not provide adequate erosion protection: use with a grass in a mixture.

	Seeding Rate (PLS) *					
Grass - Legume Mixture	lbs./1000 ft.2***	lbs./acre				
Reed canarygrass / White clover	5 + 0.1	40 + 1				
Reed canarygrass / Red clover	5 + 0.25	40 + 2				
Tall fescue** / Birdsfoot trefoil	10 + 0.25	80 + 2				
Tall fescue** / White clover	10 + 0.1	80 + 1				
Tall fescue** / Lespedeza	10 + 0.5	80 + 4				
Tall fescue** / Lespedeza / White clover	10 + 0.25 + 0.1	80 + 4 + 1				
Tall fescue** / Red clover	10 + 0.25	80 + 2				
Tall fescue** / Red clover / White clover	10 + 0.25 + 0.1	80 + 2 + 1				
Kentucky bluegrass / White clover	3 + 0.1	25 + 1				
Kentucky bluegrass / Red clover	3 + 0.25	25 + 2				
Kentucky bluegrass / Birdsfoot trefoil	3 + 0.25	25 + 2				
Kentucky bluegrass / Lespedeza	3 + 0.5	25 + 4				
Perennial ryegrass / Red Clover	8 + 1	70 + 10				
Perennial ryegrass / Birdsfoot trefoil	8 + 0.5	70 + 5				
Perennial ryegrass / Lespedeza	8 + 3	70 + 25				
Big bluestem / Indiangrass / Switchgrass / Sideoats grama / Western Wheatgrass	-	3.4 + 2.5 + 2 + 3 + 4				
Wheat / Rye (as nursery crop)	1.5	60				
Oats (as nursery crop)	0.75	30				
PLS or Pure Live Seed = the amount of seed guaranteed to	grow. To calculate amount of bulk s	eed needed: Read seed tan				

***Note: Use lbs. / 1,000 ft.2 rate to establish dense vegetation for lawns.

Mulching or a rolled erosion control product is recommended to conserve moisture, reduce

· Cover at least 75 percent of the area with approved mulch materials. Crimp, tack or tie down mulch with netting. Mulching is extremely important for successful seeding (See Mulching).

Check materials and installation for compliance with specifications.

Inspect seeded areas weekly and after rain events. Check for erosion and seed wash out.

following grasses.

 Vigorous seedlings. Uniform density with at least 70 percent of the ground surface covered.

Uniformity with nurse plants, legumes and grasses well intermixed.

at least at the plant bases.

and multiply % purity X % germination = % PLS; then divide lbs of PLS recommended by % PLS. Example: 30 lbs of Reed canary is needed to seed a 1 acre waterway; 90% pure X 90% germination = 81% PLS; 30 lbs PLS / .81 = 37 lbs. bulk seed needed. ** Turf fescue may be substituted for fescue at the same rates

Erosion Control

erosion and protect the seed.

Construction Verification

laintenance and Inspection

Expect emergence of grasses and legumes within 28 days after seeding, with legumes

 Check permanent seeding at each regular weekly inspection. Look for: Germination.

· Green, not yellow, leaves. Perennials should remain green throughout the summer,

**	Perennial ryegrass	E, C, W*	N, S	L	М	М
ses	Canada wildrye	E, C, W	N, S	M	L	G
Cool Season Grasses	Tall fescue	E, C, W*	N, S	M	L-H	G
	Crested wheatgrass	E, C, W	N	M	L	M-G
	Kentucky bluegrass	E, C, W*	N, S	Н	M - H1	M - G
	Bromegrass	E, C, W*	N, S	M	M - H1	M-G
	Redtop	S1/₂ E	N, S	L	L	М
0	Reed canary ¹	E, C, W*	N, S	Н	L = M ³	Р
10	Common Bermuda	E, C, W*	S	L	L-M	М
	Hybrid Bermuda	E, C, W*	-	L	L-M	М
SSE	Buffalograss ³	E, C, W*	N, S	L	L	М
ia:	Blue grama	E, C, W*	N, S	L	L	М
9	Zoysia ⁴	E, C, W*	-	M	M - H	М
sas	Sideoats grama	E, C, W*	N, S	M	L	G
Š	Little bluestem	E, C, W*	N, S	M	L	М
Warm Season Grasses	Big bluestem	E, C, W*	N, S	M	L	М
>	Indiangrass	E, C, W*	N, S	M	L	М
	Switchgrass	E, C, W*	N, S	M	L	М
Legumes ⁵	Birdsfoot trefoil	E, C, W*	N, S	L	М	P-M
	Crownvetch	E, C, W*	N, S	M	М	P-M
	Annual lespedeza ⁶	E, C, W*	N, S	M	М	P-M
	Red clover	E, C, W*	N, S	M	М	G
ت	White clover	E, C, W*	N, S	L	M	M-G
	Alfalfa	E, C, W*	N, S	M	L	Р
=	Wheat	E, C, W*			М	М
ion	Rye (cereal)	E, C, W*			М	М
s/C	Oats	E, C, W*			М	М
Companion Crops/Cereal Grains						

ISSUE DATE / REMARKS

l-19-2024 Initial Submittal 5-01-2024 City Comment Revisions 6-21-2024 City Comment Revisions

7-30-2024 City Comment Revisions

8-30-2024 City Comment Revisions

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1 Legumes alone will not provide adequate erosion protection: use with a grass in a mixture.

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