

Section 630 Seeding

630.1 Description

- (1) This section describes preparing seed beds and furnishing and sowing the required seed on slopes, appurtenances, and other areas, and on borrow pits and material disposal sites.
- (2) This section also describes furnishing and sowing temporary seed mixture on the slopes and appurtenances of temporary embankments and roadways.

630.2 Materials

630.2.1 Seed

630.2.1.1 General

- (1) Use seed within one year of the test date appearing on the label.
- (2) Seed mixtures 70, 70A, 75, and 80 contain wild type forbs and grasses. Wild type is defined as seed that is derived directly from native, wild stock, including seed that was wild collected and placed into production or has been harvested directly from native stands.

630.2.1.2 Purity and Germination

- (1) Test seed for purity, germination, and noxious weed seed content according to the Rules for Testing Seed, published by the Association of Official Seed Analysts.

Add 630.2.1.2(2) to define PLS and reference the CMM for sowing rate and measurement calculations.

- (2) Percent live seed (PLS) is determined by multiplying the percent purity times the percent germination. Determine sowing rate and measure mixtures containing PLS as described in [CMM 6-40.3.4](#) to ensure the correct quantity of viable seed of each species is applied.

630.2.1.3 Inoculation

- (1) Inoculate legume seed (white clover, red clover, alsike clover, partridge pea, purple prairie clover, Canada tick-trefoil, and lupine) unless pre-inoculated by the vendor. Follow the inoculation instructions that come with the culture purchases. If applying the seed according to method B, [630.3.3.3](#), treat seeds requiring inoculation with 5 times the quantity of inoculant recommended in the instructions.
- (2) Avoid exposure of the culture or inoculated seed to the sunlight; do not exceed 1/2 hour exposure.

630.2.1.4 Storing Seed

- (1) Store seed delivered before use in a way that protects it from damage by heat, moisture, rodents, or other causes. Discard and replace any previously tested and accepted seed that becomes damaged.

630.2.1.5 Seed Mixtures

630.2.1.5.1 Permanent

630.2.1.5.1.1 Composition

- (1) Seed mixtures for the right-of-way and easements shall, unless specified otherwise, be composed of seeds of the purity, germination, and proportions, by weight, as given in [table 630-1](#) and [table 630-2](#).
- (2) Use seed of the species and varieties listed below. If no variety is listed, there will be no restriction on the variety furnished, except as follows:

1. Pure live seed (PLS) species shall contain no named or improved varieties and be grown in Wisconsin, northern Illinois, northeastern Iowa, or eastern Minnesota. Use out-of-state seed grown in one of the following counties:

1.1 From northern Illinois:

Boone	Bureau	Carroll	Cook	De Kalb	Du Page	Grundy	Henry
Jo Daviess	Kane	Kendall	Lake	La Salle	Lee	McHenry	Ogle
Putnam	Rock Island	Stevenson	Whiteside	Will	Winnebago		

1.2 From northeastern Iowa:

Allamakee	Benton	Black Hawk	Bremer	Buchanan	Cedar	Chickasaw	Clayton
Clinton	Delaware	Dubuque	Fayette	Floyd	Howard	Jackson	Johnson
Jones	Linn	Mitchell	Muscatine	Scott	Winneshiek		

1.3 From eastern Minnesota:

Aitkin	Anoka	Carlton	Carver	Chisago	Dakota	Dodge	Fillmore
Goodhue	Hennepin	Houston	Isanti	Kanabec	La Sueur	Mille Lacs	Mower
Olmsted	Pine	Ramsey	Rice	Scott	Sherburne	Steele	Wabasha
Washington	Winona	Wright					

2. PLS for seed mixtures 70, 70A, 75, and 80 shall be packaged separately by species and clearly labeled with the vendor's name, species common and botanical names, gross weight, percent PLS, year of harvest and any specialized treatments that have been applied to ensure or enhance germination.
3. Minimum percent purity for native for species is 90 percent. If a listed species is not available, substitutions may be made with engineer's approval and must be documented.

(3) Mix native species on the project; clean and debarbed seed with awns or excessive hairs before mixing.

SPECIES COMMON NAME	SPECIES BOTANICAL NAME	ACCEPTABLE VARIETIES
Kentucky Bluegrass	Poa pratensis	Low Maintenance
Red Fescue	Festuca rubra	Creeping
Hard Fescue	Festuca ovina var. duriuscula	Improved
Tall Fescue	Festuca arundinacea	Improved turf type
Salt Grass	Puccinella distans	Fult's
	Puccinella distans	Salty
Redtop	Agrostis alba	
Timothy	Phleum pratense	
Canada Wild Rye	Elymus canadensis	
Perennial Ryegrass	Lolium perenne	
Perennial Ryegrass	Lolium perenne	Improved Fine
Annual Ryegrass	Lolium multiflorum	
Alsike Clover	Trifolium hybridum	
Red Clover	Trifolium pratense	
White Clover	Trifolium repens	
Japanese Millet	Echinochola crusgalli var. frumentacea	
Annual Oats	Avena sativa	
Agricultural Rye	Secale cereale	
Winter Wheat	Triticum aestivum	

Revise table 630-1 to require more red fescue and less perennial ryegrass to promote germination.

TABLE 630-1 HIGHWAY SEED MIXTURES

SPECIES	PURITY minimum %	GERMINATION minimum %	MIXTURE PROPORTIONS (in percent)				
			NO.10	NO.20	NO.30	NO.40	NO.60
Kentucky Bluegrass	98	85	40	6	10	35	
Red Fescue	97	85	25	15	30	30	
Hard Fescue	97	85		24	25	20	
Tall Fescue	98	85		40			
Salt Grass	98	85			15		
Redtop	92	85	5				
Timothy	98	90					12
Canada Wild Rye		PLS					10
Perennial Ryegrass	97	90	20	15			
Improved Fine Perennial Ryegrass	96	85			20	15	
Annual Ryegrass	97	90					30
Alsike Clover	97	90					4
Red Clover	98	90					4
White Clover	95	90	10				
Japanese Millet	97	85					20
Annual Oats ^[1]	98	90					20

^[1] Substitute winter wheat for annual oats in fall plantings started after September 1.

TABLE 630-2 NATIVE SEED MIXTURES

	SPECIES	SPECIES BOTANICAL NAME	PURITY & GERMINATION minimum %	MIXTURE PROPORTIONS in percent			
				NO. 70	NO. 70A	NO. 75	NO. 80
FORBES	Canada Anemone	<i>Anemone canadensis</i>	PLS	2			
	Butterflyweed	<i>Asclepias tuberosa</i>	PLS		2		
	New England Aster	<i>Aster novae-angliae</i>	PLS	2	2		
	Partridge-pea	<i>Chamaecrista (Cassia) fasciculata</i>	PLS		2		
	Purple Prairie Clover	<i>Dalea (Petalostemum) purpurea</i>	PLS	2	2	4	
	Canada Tick-trefoil	<i>Desmodium canadense</i>	PLS	2			
	Flowering Spurge	<i>Euphorbia corollata</i>	PLS		2		
	Wild Geranium	<i>Geranium maculatum</i>	PLS	2			
	Western Sunflower	<i>Helianthus occidentalis</i>	PLS	3	2		
	Rough Blazingstar	<i>Liatris aspera</i>	PLS		2		
	Prairie Blazingstar	<i>Liatris pycnostachya</i>	PLS	2			
	Lupine	<i>Lupinus perennis</i>	PLS		3		
	Wild Bergamot	<i>Monarda fistulosa</i>	PLS	2			
	Horse Mint	<i>Monarda punctata</i>	PLS		2		
	Yellow Coneflower	<i>Ratibida pinnata</i>	PLS	2	2		
	Blackeyed Susan	<i>Rudbeckia hirta</i>	PLS			1	
	Showy Goldenrod	<i>Solidago speciosa</i>	PLS	2	2		
	Spiderwort	<i>Tradescantia ohiensis</i>	PLS	2	2		
Golden Alexanders	<i>Zizia aurea</i>	PLS	2				
GRASSES	Big Bluestem	<i>Andropogon gerardi</i>	PLS	15	15	10	
	Sideoats Grama	<i>Bouteloua curtipendula</i>	PLS	15	20	20	25
	Canada Wildrye	<i>Elymus Canadensis</i>	PLS	15	15	35	23
	Slender Wheatgrass	<i>Elymus trachycaulus</i>	PLS				20
	Junegrass	<i>Koeleria macrantha</i>	PLS		5		
	Annual Ryegrass	<i>Lolium multiflorum</i>	[1]			10	10
	Switchgrass	<i>Panicum virgatum</i>	PLS				10
	Salt Grass	<i>Puccinella distans</i>	[1]				2
	Little Bluestem	<i>Schizachyrium (Andropogon) scoparium</i>	PLS	15	20	10	10
	Indiangrass	<i>Sorghastrum nutans</i>	PLS	15		10	
ALTERNATE FORBES	Sky Blue Aster	<i>Aster azureus</i>	PLS	[2]	[2]		
	White Wild Indigo	<i>Baptisia leucantha</i>	PLS	[2]	[2]		
	Pale Purple Coneflower	<i>Echinacea pallida</i>	PLS	[2]	[2]		
	White Prairie Clover	<i>Petalostemum candidum</i>	PLS	[2]	[2]		
	Stiff Goldenrod	<i>Solidago rigida</i>	PLS	[2]	[2]		
	Hoary Vervain	<i>Verbena stricta</i>	PLS	[2]	[2]		

[1] Provide the minimum purity and germination specified in [table 630-1](#).

[2] The contractor may, if the engineer approves, substitute an alternate forb for a required forb that is not available using the same percentage as specified for the required forb. Use a different alternate forb for each unavailable required forb. Provide documentation showing that a required forb is not available before using an alternate.

630.2.1.5.1.2 Mixture

- (1) Use seed mixtures that meet with the engineer's approval and conform to the following:
 - No. 10 where average loam, heavy clay, or moist soils predominate.
 - No. 20 where light, dry, well-drained, sandy, or gravelly soils predominate and for all high cut and fill slopes generally exceeding 6 to 8 feet, except where using No. 70.
 - No. 10 or 20 on all ditches, inslopes, median areas, and low fills, except where using No. 30 or 70.
 - No. 30 for medians and on slopes or ditches generally within 15 feet of the shoulder where a salt-tolerant turf is preferred.
 - No. 40 in urban or other areas where a lawn type turf is preferred.
 - No. 60 only on areas, the contract designates or the engineer specifies. Use it as a cover seeding for newly graded wet areas or as a nurse crop for specified wetland seed mixtures. The contractor shall not apply it to flooded areas.
 - Nos. 70 and 70A on slopes and upland areas the contract designates or the engineer specifies. Use seed mixture No. 70 on loamy soils and seed mixture No. 70A on sandy soils.
 - No. 75 where native grasses are desired for erosion control.
 - No. 80 on inslopes where a salt tolerant seed mix containing native grasses is desired.

630.2.1.5.2 Temporary

- (1) Under the Seeding Temporary bid item, use a temporary seed as follows:

SPECIES	% MINIMUM PURITY	% MINIMUM GERMINATION
Annual Oats	98	90
Agricultural Rye	97	85
Winter Wheat	95	90

- (2) Use oats in spring and summer plantings. Use winter wheat or rye for fall plantings started after September 1.

630.2.1.5.3 Nurse Crop

- (1) If seeding bare soil with either mixture 70, 70A, 75, or 80, include the Seeding Nurse Crop as follows:

SPECIES	% MINIMUM PURITY	% MINIMUM GERMINATION
Annual Oats	98	90
Annual Ryegrass	97	90
Winter Wheat	95	90

- (2) When a nurse crop is required for spring seeding before June 15, or if the engineer allows seeding between June 15 and October 15, use annual oats. For fall seeding after October 15, use winter wheat, or annual ryegrass.

Delete 630.2.1.5.1.4 because all disturbed areas now use the same seed. Add 630.2.2 to specify water for seeding.

630.2.2 Water

- (1) Furnish clean water, free of impurities or substances that might injure the seed.

630.3 Construction

630.3.1 General

- (1) Perform seeding when and as the engineer directs or allows. Provide protective cover within 24 hours after sowing. The engineer may direct or allow covering with mulch as specified in [627](#), erosion mat as specified in [628](#), or using other contract bid items.
- (2) If using Nos. 60, 70 and 70A mixtures, do not seed between June 15 and October 15 unless the engineer allows.

630.3.2 Seed Bed Preparation

- (1) Complete grading, shouldering, topsoiling, and fertilizing, if part of the work under contract, before permanent seeding, except the contractor may place the fertilizer and seed mixture in one operation if using equipment designed for the purpose.
- (2) Just before seeding, work the area being seeded with discs, harrows, or other appropriate equipment to obtain a reasonably even and loose seedbed. Place topsoil as specified in [625.3.3](#).

630.3.3 Sowing Methods

630.3.3.1 General

- (1) Select the method of sowing from either method A, method B, method C, or an appropriate combination of methods A, B, and C. Obtain the engineer's approval for the sowing method and specific procedures used for each seed mixture used before sowing that mixture.

630.3.3.2 Method A

- (1) Sow the selected seed mixture using equipment adapted to the purpose, or by scattering it uniformly over the areas to be seeded. Lightly rake or drag to cover the seed with approximately 1/4 inch of soil. After seeding, lightly roll or compact the areas using suitable equipment, preferably the cultipacker type, when the engineer judges the seedbed too loose, or if the seedbed contains clods that might reduce seed germination. The contractor shall not roll slopes steeper than 1:3.
- (2) If scattering seed by hand, perform this work with satisfactory hand seeders and only when the air is calm enough to prevent seeds from blowing away.

630.3.3.3 Method B

- (1) Sow or spread the seed upon the prepared bed using a stream or spray of water under pressure and operated from an engineer-approved machine designed for that purpose. Place the selected seed mixture and water into a tank, provided within the machine, in sufficient quantities that when spraying the seed on a given area it is uniformly spread at the required application rate. During this process, keep the tank contents stirred or agitated to provide uniform distribution. Spread the tank contents within one hour after adding the seed to the tank. The engineer will reject seed that remains mixed with the water for longer than one hour. The engineer will not require dragging or rolling.

630.3.3.4 Method C

- (1) For spring seeding of seed mixtures 70 and 70A into existing ground cover, mow existing vegetation to 4 inches or less in height 2 to 4 weeks before seeding. Ten to 14 days after mowing, spray with vegetation control herbicide conforming to [632.2.12](#).
- (2) For fall seeding of seed mixtures 70 and 70A into existing ground cover, mow existing vegetation to 4 inches or less in height 4 to 6 weeks before seeding. Ten to 14 days after mowing, spray with vegetation control herbicide conforming to [632.2.12](#). Retreat with vegetation control herbicide 10 to 14 days after initial application if live vegetation persists.
- (3) Seed with a rangeland type drill with one or more seed boxes that can be calibrated independently to deliver different sized seeds uniformly at the required rate and equipped with a rear-mounted press wheel for each seed drop tube. If seeding into existing vegetation or thatch, use a rangeland type drill equipped with a no-till attachment that can cut through the vegetation or thatch in front of the V disc and seed drop tube. If the configuration of the area to be seeded allows, apply seed at 1/2 the specified seed rate and apply the second 1/2 in a perpendicular direction.

630.3.4 Borrow Pits and Material Disposal Sites

- (1) Seed borrow pits and material disposal sites off the right-of-way. Consult with the landowner or the landowner's agent when selecting the seed mixture.

630.3.5 Seeding Rates

- (1) Use the following sowing rate for seeds in pounds per 1000 square feet:
 - No. 10 at 1.5 pounds
 - No. 20 at 3 pounds
 - No. 30 at 2 pounds
 - No. 40 at 2 pounds
 - No. 60 at an equivalent seeding rate of 1.5 pounds^[1]
 - No. 70 or 70A at 0.4 pounds
 - No. 75 at an equivalent seeding rate of 0.7 pounds^[1]
 - No. 80 at an equivalent seeding rate of 0.8 pounds^[1]
 - Temporary seeding at 3 pounds
 - Nurse crop seeding at 0.8 pounds

^[1] Determine the actual seeding rate by multiplying the equivalent seeding rate by the sum of the unadjusted and adjusted percentages of the various species in the seed mixtures as sown.

- (2) The unadjusted percentage equals the minimum percent of purity and germination specified in the [table 630-1](#) and [table 630-2](#).

- (3) Obtain the adjusted percentage for each of the PLS species by dividing the specified percentage of the species by the product of the percent of purity and the percent of germination for each of the PLS species as delivered.

Add 630.3.6 to specify water for seeding.

630.3.6 Watering

- (1) If rainfall is not sufficient, keep seeded areas thoroughly moist. Once the seed has germinated, do not let the top inch of soil dry out until the grass is well established. Maintain soil moisture for 30 days unless the engineer directs or allows otherwise. Apply water in a manner that precludes washing or erosion.

630.3.7 Establishment Period for Native Seeding

- (1) During the growing season after planting seed mixture 70 or 70A, mow all seeded areas twice as the engineer directs. Mow vegetation back to 6 inches when it has reached a height of at least 12 inches.

Revise 630.3.7 to add teasel and phragmites to the list of species requiring eradication.

- (2) During the growing season after planting seed mixture 70 or 70A, eradicate the following species from the seeded areas as soon as they become evident:

SPECIES COMMON NAME	SPECIES BOTANICAL NAME
Musk thistle	Carduus nutans
Spotted knapweed	Centaurea maculosa
Canada thistle	Cirsium arvense
Bull thistle	Cirsium vulgare
Field bindweed	Convolvulus arvensis
Leafy spurge	Euphorbia esula
Sweetclover	Melilotus species
Wild parsnip	Pastinaca sativa
Teasel	Dipsacus species
Phragmites	Phragmites australis

- (3) Eradicate by hand pulling or by applying a vegetation control herbicide conforming to [632.2.12](#) to individual plants.

630.4 Measurement

630.4.1 Seeding

- (1) The department will measure the Seeding bid items by the equivalent pound acceptably completed, measured based on net weights of seed shipments or weighed on department-approved scales the contractor furnishes. The department will deduct quantities wasted or not actually incorporated in the work according to the contract. The department will determine the equivalent pounds of seed furnished and applied by dividing the actual pounds of seed applied by the sum of the unadjusted and adjusted percentages, determined as specified in [630.3.5](#), of the various species in the seed mixture sown.

630.4.2 Watering

- (1) The department will measure Seed Water by the 1000 gallons acceptably completed, measured as the volume indicated by engineer-approved meters or by the volume of tanks of known capacity.

630.5 Payment

Revise 630.5 to add the Seed Water bid item and specify separate payment for seed covering.

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
630.0100 - 0199	Seeding (mixture)	LB
630.0200	Seeding Temporary	LB
630.0300	Seeding Borrow Pit	LB
630.0400	Seeding Nurse Crop	LB
630.0500	Seed Water	MGAL

- (2) Payment for the Seeding bid items is full compensation for providing, handling, and storing all seed; for providing the required culture and inoculating seed as specified; and for preparing the seed bed, sowing, covering, and firming the seed. If the landowner does not want the pit or material disposal site

seeded, or seeded with any of the mixtures allowed, the department will not pay for fertilization or seeding of those areas.

- (3) Payment for Seed Water is full compensation for watering seed.
- (4) The department will pay separately for seed covering required under [630.3.1](#) as follows:
 - Under the Mulching bid items as specified in [627.5](#).
 - Under the Erosion Mat and Soil Stabilizer Type A bid items as specified in [628.5](#).
- Absent the appropriate bid items, as extra work.