

Item No. 609S

Native Grassland Seeding and Planting for Erosion Control

609S.1 Description

This item shall govern the preparation of a seeding and planting area to the lines and grades indicated on the Drawings. This may include seedbed preparation, sowing of seeds, planting of rooted plants, watering, hydromulch, compost and other management practices, as indicated in the Drawings or as directed by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, inch-pound units are given preference with SI units shown within parentheses.

609S.2 Submittals

The submittal requirements for this specification item shall include:

- A. Identification of the species, source, mixture and rate of application of the seeding.
- B. Type of mulch or compost.
- C. Watering frequency and amount.
- D. Type of management practices.

609S.3. Materials

- A. The seed furnished shall be of the previous season's crop and the date of analysis shown on each bag shall be within twelve months of the time of delivery to the project. Each variety of seed shall be furnished and delivered in separate bags or containers. A sample of each variety of seed shall be furnished for analysis and testing when directed by the Engineer or designated representative.

The amount of seed planted per 1000 square feet (93 square meters) shall be of the type specified in section 609S.5.

- B. Water shall be clean and free of industrial wastes and other substances harmful to the growth of grass in the area irrigated.
- C. Topsoil see Standard Specification Item No. 601S.3(A)
- D. A least toxic, integrated pest management (IPM) approach shall be used to control weeds. A written request for approval of weed control product(s) and/or materials shall be submitted to the City of Austin IPM program coordinator (499-2550) for approval.

- E. Rooted plants must be healthy and free of pests. The root system should be well established and in proportion to the top growth.

609S.4 Construction Methods

- A. General.

The Contractor shall limit preparation to areas that will be immediately seeded. All noxious weeds shall be eliminated by application of a herbicide and/or by physical removal (by the roots) prior to and/or during the seeding operation. The following list of plants are considered noxious weeds:

Table 1: Weed List

Weed Type	Botanical Name	Common Name
Herb	Ambrosia spp.	Ragweed
Grass	Bothriochloa ischaemum	K.R. Bluestem
Grass	Bromus unioloides	Rescue Grass
Herb	Cenchrus spp.	Sandbur
Herb	Cnidoscolus texanus	Bull Nettle
Herb	Convolvulus spp.	Bindweed
Grass	Cynodon dactylon	Bermudagrass*
Herb	Cyperus esculentus	Yellow Nutsedge (Nut-grass)
Herb	Cyperus rotundus	Purple Nutsedge (Nut-grass)
Grass	Digitaria spp.	Crab Grass
Herb	Medicago sp.	Bur-Clover
Grass	Paspalum dilatatum	Dallis Grass
Grass	Sorghum halapense	Johnson Grass
Herb	Torilis arvensis	Beggar's-tick
Vine	Toxicodendron radicans	Poison Ivy
Herb	Urtica spp.	Stinging Nettle

- B. Seed Bed Preparation.

After the designated areas have been rough graded, a suitable seedbed shall be prepared. In areas where cut or fill is required, a minimum of 6 inches (150 mm) of topsoil (see Section 609S.3.C) shall be placed or existing soil (that is not infested with weeds or weed rootstock) stockpiled over the entire planting area.

In areas with no soil disturbance, the weeds shall be eliminated and a minimum of 2 inches (50 mm) of topsoil, if none currently exists, shall be placed. An even seedbed shall be prepared with limited irregularities, lumps or soil clods and the surface shall be raked to facilitate seed to soil contact.

- C. Watering.

All watering shall comply with City of Austin Land Development Code requirements. Seeded areas shall immediately be watered with a minimum

of 5 gallons of water per square yard (22.5 liters of water per square meter) or as needed and in the manner and quantity as directed by the Engineer or designated representative.

Watering applications shall insure that the seedbed is maintained in a moist condition favorable for the growth of grass. Watering shall continue until minimum coverage is achieved and accepted by the Engineer or designated representative. Watering may be postponed immediately after a 1/2 inch (12.5 mm) or greater rainfall on the site but shall be resumed before the soil dries out.

Availability of water from the Austin Water Utility will be limited as stated under the Water Conservation Standard, City of Austin Land Development Code Chapter 6-2, Article II, "Water Use Management Plan Established".

The use of potable water will be restricted as stated in City of Austin Land Development Code Sections 6-4-73, 6-4-54, 6-4-63, 6-4-64, 6-4-65, 6-4-81, 6-4-92, 15-9-37(D) and 15-9-101(B).

609S.5 Native Grassland Seeding and Planting

All areas require both seed and rooted plants. Seeding and planting shall be performed in accordance with the requirements hereinafter described. The optimum depth for seeding shall be from 1/16 inch (1 1/2 millimeters) to 1/8 inch (3 millimeters). Seed shall be applied by a method that achieves consistent distribution and proper seed to soil contact (i.e. hand broadcasting, hydromulch, or drill method). Mulching is not required.

Species substitution, when necessary due to availability, shall be approved by the Engineer or designated representative. Only native species adapted for the designated environmental conditions shall be allowed as substitutes. Shorter growing natives such as Buffalograss should be sodded around manholes or other structures requiring higher visibility for access.

If the native grassland is being installed during the cool season (November 1 to February 15), the cool season cover crop species (as listed) shall be included in the mix.

The seed and rooted plant mixtures shall be applied in accordance with appropriate 'growing environments' (Upland Full Sun–Table 2, Upland Shade-Dappled-Table 3 and Facultative Moderate to High Moisture–Table 4).

Table 2. Upland Species, Full Sun Areas

Common Name	Comments	Botanical Name	Seed application rate lbs/1000 sq. ft. (kg/100 sq. m.)	Rooted Plants Size & Spacing
Buffalo Grass	grass	Buchloe dactyloides	0.3 (0.15)	1 - 16" x 24" piece of sod @ 10' (3m) ctrs.
Blue Grama	grass	Bouteloua gracilis	0.2 (0.1)	Not required
Green Srrangletop	grass	Leptochloa dubia	0.4 (0.2)	
Indian Grass	grass	Sorghastrum nutans	0.2 (0.1)	1 gal @ 10 ft.' (3m) ctrs.
Little Bluestem	grass	Schizachyrium scoparium	0.2 (0.1)	
Prairie Wild Rye	grass	Elymus canadensis	0.2 (0.1)	Not required
Purple Threeawn	grass	Aristida purpurea	0.2 (0.1)	
Sideoats Grama	grass	Bouteloua curtipendula	0.3 (0.15)	
Bluebonnet	wildflower	Lupinus texensis	0.4 (0.2)	Not required
Clover (Purple Prairie)	wildflower	Petalostemum purpurea	0.1 (0.05)	Not required
Coreopsis (Plains)	wildflower	Coreopsis tinctoria	0.05 (0.025)	Not required
Goldenrod	wildflower	Solidago altissima	0.02 (0.01)	Not required
Greenthread	wildflower	Thelesperma filifolium	0.075 (0.037)	Not required
Indian Blanket	wildflower	Gaillardia pulchella	0.15 (0.075)	Not required
Lemon Mint	wildflower	Monarda citriodora	0.06 (0.03)	Not required
Mexican Hat	wildflower	Ratibida columnaris	0.05 (0.025)	Not required
Pink Evening Primrose	wildflower	Oenothera speciosa	0.02 (0.01)	Not required
Sunflower (Common)	wildflower	Helianthus annus	0.075 (0.037)	Not required
Cereal rye grain*	cool season cover crop	Elymus	0.5 (0.25)	Not required
Oats*	cool season cover crop	Avena sativa	0.2 (0.10)	Not required
Wheat*	cool season cover crop	Triticum aestivum	0.3 (0.15)	Not required
TOTAL**			Winter: 4.0 (2.0) Summer 3.0 (1.5)	Rooted species mixed equally @ 10 ft. (3 m) ctrs.

* Plant only between Oct. 1 and Jan. 31. Non-persistent winter cover crop for erosion control.

** Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by the Engineer or designated representative.

Table 3. Upland Species, Shade-Dappled Light Areas

Common Name	Comments	Botanical Name	Seed Application Rate lbs/1000 sq. ft. (kg/100 sq. m.)	Rooted Plants Size & Spacing
Meadow Sedge*	sedge	Carex perdentata	No seed required	1 gal. @ 10' (3m) ctrs.
Inland Seaoats**	grass	Chasmanthium latifolium	0.5 (0.25)	
Prairie Wild Rye	grass	Elymus canadensis	0.75 (0.37)	Not required
Sideoats Grama	grass	Bouteloua curtipendula	0.75 (0.37)	1 gal. @ 10' (3m) ctrs.
Purple Coneflower	wildflower	Echinacea purpurea	0.1 (0.05)	Not required
Coreopsis (Lanceleaf)	wildflower	Coreopsis lanceolata	0.1 (0.05)	Not required
Sage (Scarlet)	wildflower	Salvia coccinea	0.1 (0.05)	Not required
Drummond Phlox	wildflower	Phlox Drummondii	0.1 (0.05)	Not required
Black-Eyed Susan	wildflower	Rudbeckia hirta	0.03 (0.015)	Not required
Cutleaf Daisy	wildflower	Engelmannia pinnatifida	0.2 (0.10)	Not required
Tall Aster	wildflower	Aster praealtus	0.02 (0.01)	Not required
Illinois bundleflower	wildflower	Desmanthus illinoensis	0.15 (0.075)	Not required
Standing cypress	wildflower	Ipomopsis rubra	0.1 (0.05)	Not required
Winecup	wildflower	Callirhoe involucrata	0.1 (0.05)	Not required
Cereal rye grain***	cool season cover crop	Secale cereale	0.5 (0.25)	Not required
Oats***	cool season cover crop	Avena sativa	0.2 (0.1)	Not required
Wheat***	cool season cover crop	Triticum aestivum	0.3 (0.15)	Not required
TOTAL****			Winter: 4.0 (2.0) Summer: 3.0 (1.5)	Rooted species mixed equally @ 10' (3m) ctrs.

* If unavailable replace with other shade and drought-tolerant sedge species.

** If unavailable replace with Prairie Wild Rye.

*** Plant only between Oct. 1 and Jan. 31. Non-persistent winter cover crop for erosion control.

**** Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by the Engineer or designated representative.

Table 4. Facultative Species, Moderate – High Moisture Areas

Common Name	Comments	Botanical Name	Seed application rate lbs/1000 sq. ft. (kg/100 sq. m.)	Rooted Plants Size & Spacing
Big Bluestem	grass	Andropogon gerardii	0.2 (0.1)	1 gal. @ 10' (3m) ctrs
Big Muhly (Lindhiemers)	grass	Muhlenbergia lindheimeri	0.2 (0.1)	
Bushy Bluestem	grass	Andropogon glomeratus	0.2 (0.1)	
Eastern Gama Grass	grass	Tripsacum dactyloides	0.3 (0.15)	
Indian Grass	grass	Sorghastrum nutans	0.2 (0.1)	
Inland Seaoats	grass	Chasmanthium latifolium	0.3 (0.15)	
Prairie Wild Rye	grass	Elymus canadensis	0.3 (0.15)	Not required
Sand Lovegrass	grass	Eragrostis trichodes	0.2 (0.1)	
Switchgrass	grass	Panicum virgatum	0.1 (0.05)	1 gal. @ 10' (3m) ctrs
Black-Eyed Susan	wildflower	Rudbeckia hirta	0.06 (0.03)	Not required
Bundleflower (Illinois)	wildflower	Desmanthus illinoensis	0.35 (0.17)	Not required
Clover (Purple Prairie)	wildflower	Petalostemum purpurea	0.1 (0.05)	Not required
Coneflower (Clasping)	wildflower	Rudbeckia amplexicaulis	0.06 (0.03)	Not required
Coreopsis (Plains)	wildflower	Coreopsis tinctoria	0.05 (0.025)	Not required
Goldenrod	wildflower	Solidago altissima	0.03 (0.015)	Not required
Lazy Daisy	wildflower	Aphanostephus sp.	0.03 (0.015)	Not required
Lemon Mint	wildflower	Monarda citriodora	0.07 (0.035)	Not required
Sunflower (Common)	wildflower	Helianthus annuus	0.15 (0.075)	Not required
Sunflower (Maximilian)	wildflower	Helianthus maximiliani	0.1 (0.05)	Not required
Cereal rye grain*	cool season cover crop	Secale cereale	0.5 (0.25)	Not required

Oats*	cool season cover crop	Avena sativa	0.2 (0.10)	Not required
Wheat*	cool season cover crop	Triticum aestivum	0.3 (0.15)	
TOTAL**			winter: 4.0 (2.0) summer: 3.0 (1.5)	Rooted species mixed equally @ 10' (3m) ctrs.

* Plant only between Oct. 1 and Jan. 31. Non-persistent winter cover crop for erosion control.

** Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by the Engineer or designated representative.

609S.6 Management Practices

Weeds, as defined in the Weed List (Table 1), shall be controlled in the most efficient manner possible. The timing of weed control may occur prior to soil disturbance, just before the installation of seed, and/or during the period of grassland establishment. Weed control shall be introduced at one or all of these times, so that the greatest control is achieved. The preferred method of control is to remove weeds, either by physical or mechanical means, when the site is conducive (e.g. when the ground is moist) to this approach.

The entire root system of perennial weeds shall be removed to prevent re-sprouting. Weeds may be controlled with an approved contact, systemic herbicide, provided the product is used with appropriate care and is applied in accordance with label instructions and the following guidelines:

1. Herbicide shall not be applied when the wind is greater than 8 mph (12.9 kph),
2. Herbicide shall not be applied when rainfall is expected within 24 hours,
3. Herbicide shall not contact surface water, i.e. creeks, rivers, and lakes,
4. Herbicide shall not contact desirable vegetation (a wicking method shall be used, if necessary, to accurately contact target weed only during application).

The Engineer or designated representative shall be consulted to determine appropriate weed control management when weeds are located in an environmentally sensitive location (e.g. near water or adjacent to a critical environmental feature).

609S.7 Measurement

Work and acceptable material for "Native Grasslands for Erosion Control" will be measured by the square yard (square meter: 1 square meter equals 1.196 square yards) or by the acre (hectare: 1 hectare equals 2.471 acres), complete in place, with a minimum of 95 percent coverage with no bare areas exceeding 16 square feet (1.5

square meters) and a 1 1/2 inch (40 millimeters) stand of grass. Bare areas shall be reprepared and reseeded as required by the Engineer or designated representative in order to develop an acceptable stand of grass.

609S.8 Payment

The work performed and materials furnished and measured will be paid for at the unit bid price for "Native Grasslands For Erosion Control" of the method specified on the Drawings.

The unit bid price shall include full compensation for furnishing all materials, including all topsoil, water, seed, or fertilizer or mulch and for performing all operations necessary to complete the work.

Payment will be made under one or more of the following pay items:

Pay Item No. 609S-A:	Topsoil and Seedbed Preparation	Per Square Yard.
Pay Item No. 609S-B:	Topsoil and Seedbed Preparation	Per Acre.
Pay Item No. 609S-C:	Native Grassland Seeding and Planting	Per Square Yard.
Pay Item No. 609S-D:	Native Grassland Seeding and Planting	Per Acre.
Pay Item No. 609S-E:	Watering	Per Square Yard
Pay Item No. 609S-F:	Watering	Per Acre
Pay Item No. 609S-G:	Management Practices	Per Square Yard
Pay Item No. 609S-H:	Management Practices	Per Acre

End

SPECIFIC CROSS REFERENCE MATERIALS

Specification Item 609S "Native Grassland Seeding and Planting for Erosion Control"

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 130S	Borrow
Item No. 606S	Fertilizer

City of Austin Land Development Code

<u>Designation</u>	<u>Description</u>
Section 6-4-52	Water Use Management Plan Established
Section 6-4-53	Applicability
Section 6-4-54	Compliance Required
Section 6-4-63	Permanent Water Use Restrictions
Section 6-4-64	Water Conservation Stage One Regulations
Section 6-4-65	Water Conservation Stage Two Regulations
Section 6-4-81	Variance
Section 6-4-92	Penalty
Section 15-9-37(D)	Customer's Responsibilities
Section 15-9-101(B)	Basis for Termination of Service

RELATED CROSS REFERENCE MATERIALS

Specification Item 609S "Native Grassland Seeding and Planting for Erosion Control"

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 601S	Salvaging and Placing Topsoil
Item No. 602S	Sodding for Erosion Control
Item No. 604S	Seeding (Non-Native) for Erosion Control
Item No. 605S	Soil Retention Blanket
Item No. 607S	Slope Stabilization
Item No. 608S	Planting

City of Austin Standards (Details)

<u>Standard No.</u>	<u>Description</u>
627S-1	Grass Lined Swale
62S7-2	Grass Lined Swale W/ Stone Center
633S-1	Landgrading

Texas Department of Transportation: Standard Specifications for
Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 160	Furnishing and Placing Topsoil
Item No. 162	Sodding for Erosion Control
Item No. 164	Seeding for Erosion Control
Item No. 166	Fertilizer
Item No. 168	Vegetative Watering
Item No. 169	Soil Retention Blanket
Item No. 180	Wildflower Seeding
Item No. 192	Roadside Planting and Establishment