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SECTION 900 SEEDING, FERTILIZER, MULCHING AND SODDING

900.01 Description

This work shall consist of furnishing and spreading fertilizers; soil preparation; furnishing and drilling or sowing seed; mulching the seeded areas; and placing blue grass sod in accordance with these specifications, accepted horticultural practice, and in reasonably close conformity with the locations and details shown on the plans or as designated.

For seeding in unirrigated or sprinkled areas, spring seeding is allowed from the spring thaw to June 15th and fall seeding is allowed from September 1st until consistent ground freeze. Seeding will be allowed between June 15th and September 1st only with irrigation or sprinkler systems being utilized.

Seeding accomplished outside the time periods listed above will be allowed only when ordered by the Engineer or when the Contractor's request is approved in writing. When requested by the Contractor, the Contractor must agree to perform the following work at no cost to the City: (1) apply the specified seed and mulch at a rate of not less than 25 percent greater per unit area than the rates specified for use within the time periods listed above, (2) reseed, remulch, and repair areas which fail to produce vegetation.

When seeding is ordered by the Engineer outside the time periods listed above, the cost of additional material will be paid for by the City. The Contractor will not be responsible for failure of the seeded area to produce vegetation due to reasons beyond the control of the Contractor.

Sod shall be placed between September 15 to October 15 and March 1 to April 15 of the calendar year or as otherwise approved by the Engineer.

Mulching may be accomplished by the crimping method using straw or hay, by the hydraulic method using wood cellulose fiber mulch or by other acceptable mulching methods approved by the Engineer.

900.02 Materials - Seed, Fertilizer, Mulch and Sod

A. Seed. All seed shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin, the percent of weed seed content, the guaranteed percentage of purity and germination, pounds of pure live seed (PLS) of each seed species and the total pounds of pure live seed in the container. All brands furnished shall be free from such noxious seeds as Russian or Canadian Thistle, European Bindweed, Johnson Grass and Leafy Spurge. The Contractor shall furnish to the Engineer a signed statement certifying that the seed furnished is from a lot that has been tested by a recognized laboratory for seed testing within six months prior to the date of delivery. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.

The mixture shall consist of the following species and rates. Planting rates are expressed in terms of pure live seed (PLS).

SPECIES	VARIETY	LBS. PLS PER ACRE DRILLED	LBS. PLS PER ACRE BROADCAST
Blue grama (B. gracillis)	Lovington	.4	.8
Little bluestem (S. scoparius)	Pastura	1.2	2.4
Sideoats grama (B. curtipendula)	Butte or Vaughn		
Prairie sandreed (C. longifolia)	Goshen	1.1	2.2
Sand dropseed (S. cryptandrus)		.1	.1
Green needlegrass (S. viridula)		1.7	3.4
Steambank wheatgrass	Sodar	2.0	4.0
		8.1# PLS	16.1#PLS

Seed and seed labels shall conform to all current State and Federal regulations and will be subject to the testing provisions of the Association of Official Seed Analysis. Computations for quantity of seed required are based on the percentage of purity and percent of germination.

If seed available on the market does not meet the minimum purity and germination percentages specified, the Contractor must compensate for a lesser percentage of purity of germination by furnishing sufficient additional seed to equal the specified product. Product comparison shall be made on the basis of pure live seed in pounds based on the information received from each seed bag. The formula used for determining the quantity of pure live seed (PLS) shall be: Pounds of Seed x (Purity x Germination) = Pounds of Pure Live Seed (PLS).

Areas that are non-irrigated or not provided with sprinkling or watering systems shall be seeded prior to May 15th in the Spring or following September 30th in the Fall.

Seeding shall follow closely behind the tilling of the fertilizer or as directed by the Engineer, to make special seed bed preparation unnecessary. The Engineer may establish test sections for adjusting the seeding equipment to assure the specified rate. The Engineer may order equipment re-adjustment at any time.

All slopes 2:1 and flatter shall be seeded by mechanical power drawn drills followed by packer wheels or drag chains. Mechanical power drawn drills shall have depth bands set to maintain a planting depth of at least one-quarter inch and shall be set to space the rows not more than seven inches (7") apart. Seed that is extremely small shall be sown from a separate hopper adjusted to the proper rate of application.

Seed shall not be drilled or sown during windy weather or when the ground is frozen or otherwise untillable.

If inspections indicate that strips wider than the specified space between the rows planted have been left or other areas skipped, the Engineer may require immediate resowing of seed in such areas at the Contractor's expense.

Unless otherwise noted on the plans, the Contractor shall be responsible for maintaining and watering areas seeded for a period of seven weeks after the time of seeding.

Areas in which there is not a satisfactory stand (no bare areas larger than six (6) square inches) at the expiration of this seven week period shall be reseeded. Sprinkling of the seeded areas shall be carefully done in such manner to avoid standing water, surface wash, or scour. Areas seeded and so maintained shall be protected against damage by vehicle and pedestrian traffic by the use of barriers and appropriate warning signs.

- B. Fertilizers. Fertilizers for seeded areas shall be commercial type of uniform composition, free-flowing and conforming to the applicable State and Federal laws. Submit manufacturer's guaranteed analysis. Guaranteed analysis shall be designed to conform with the following percentages by weight for all seeded areas:

Nitrogen	20%
Phosphorous	20%
Potassium	10%

Other forms of commercial fertilizers may be used only upon written request by the Contractor and approval by the Engineer.

Commercial fertilizer shall conform to the applicable State Fertilizer laws. It shall be uniform in composition, dry and free flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

- C. Mulch. Hay mulch shall consist of clean field hay and shall not contain seeds of noxious weeds. Hay in such an advanced state of decomposition as to smother or retard the growth of grass will not be accepted. Hay which breaks in the crimping process rather than bending will not be accepted. The hay mulch shall have a minimum of 60% of the hay stubble 10" or longer upon completion of the crimping operation.

After seeding has been completed, hay shall be uniformly applied at the rate of two tons per acre or as directed. It shall then be crimped in with a crimper or other approved equipment. After application 60% of the crimped hay shall be 10" or longer. The Engineer may order the employment of hand-crimping operations on such areas where excessive ground slopes or confined areas would cause unsatisfactory crimping to result by mechanical methods. Crimping shall be performed on the contour. Crimping against the contour shall not be accepted.

The seeded area shall be mulched and crimped within 24 hours after seeding. Areas not mulched and crimped within 24 hours after seeding must be reseeded with the specified seed mix at the Contractor's expense.

Wood Cellulose Fiber for hydraulic mulching shall not contain any substance or factor which might inhibit germination or growth of grass seed. It shall be dyed an appropriate color to allow visual metering of its application. The wood cellulose fibers shall have the property of becoming evenly dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fiber shall form a blotter-like ground cover which readily absorbs water, and allows infiltration to the underlying soil. Weight specifications from suppliers, and for all applications, shall refer only to air dry weight of the fiber, a standard equivalent to 10 percent moisture. The mulch material shall be supplied in packages having a gross weight not in excess of 100 pounds, and shall be marked by the manufacturer to show the air dry weight content. Suppliers shall certify that laboratory and field testing of their product has been accomplished, and that it meets all of the foregoing requirements pertaining to wood cellulose fiber mulch.

Cellulose wood fiber mulch shall be added after the proportionate quantities of water and other approved materials have been placed in the slurry tank. All ingredients shall be mixed to form a homogeneous slurry. Using the color of the mulch as a metering agent, the operator shall spray apply the slurry mixture uniformly over the designated seeded areas. Areas not properly mulched or areas damaged due to the Contractor's negligence, shall be repaired and remulched in an acceptable manner at the Contractor's expense.

Mulch removed by circumstances beyond the Contractor's control shall be repaired and remulched as ordered. Payment for this corrective work, when ordered, shall be at the contract prices.

- D. Sod. Bluegrass sod shall be a blend of not less than three improved Kentucky Bluegrass varieties with 15% Perennial Rye grass. Sod shall be weed and pest free, containing no more than one percent other grasses, none of which shall be coarse textured grass. Sod shall be a minimum of 3/4" thick, harvested in rolls, fertilized two to three weeks before cutting and shall be cut not more than 24 hours prior to planting. Sod shall be one year old, minimum, grown under intensive care and cultivation to produce a thick, even stand of grass. Sod may be inspected by Engineer before cutting. Sod shall be of sufficient quantity to cover all new sodded areas. Time delivery so that sod will be placed within 24 hours after stripping. Protect sod against drying and breaking of rolled strips.

Preparatory to sodding, the top four inches of the surface shall be tilled and brought to the desired line and grade.

The application of fertilizer shall be incorporated into the soil prior to sodding and shall consist of a commercial fertilizer having an available nutrient analysis as in Item B., Fertilizer, unless otherwise shown on plans. Spread the fertilizer over the entire area to be sodded and incorporate into the top four (4) inches of soil by dicing or rotating until a uniform mixture is obtained with no pockets of soil or amendments remaining.

1. Lay sod smoothly, edge to edge, and with staggered joints. Butt edges tightly. Lay within eight hours after delivery.
2. Water sod lightly as laying progresses to prevent drying of sod.
3. Roll sod with a light roller diagonally, leveling irregularities and sealing joints.
4. Keep the soil bed moist during laying of sod.
5. Top of sod should be slightly below gravel, asphalt and concrete walks on the downhill side and flush on the uphill side.
6. Water sod thoroughly with a fine spray immediately after planting.

Provide necessary grass care including fertilizing, erosion repair, watering, to permit establishment of the sod. Provide maintenance of protection fences, barriers or warning signs needed to protect sodded area from encroachment by vehicular or pedestrian traffic where necessary or where required by the Engineer.

Minor damage or vandalism to the sodded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Engineer.

Major damage caused by flood, hail storm, or large rain storm, unusual for that time of season or vandalism and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Engineer who will be the sole judge as to the extent of such damage.

Major damage shall be repaired by the Contractor and paid for by the Owner under the provisions of "changed conditions", as stated in the General Provisions if such work is authorized by the Engineer.

Upon completion of all sodding operations, the Contractor shall request an inspection by the Engineer. If all work is acceptable, the Contractor shall maintain all sodded areas for a period of one (1) year from the contract "Date of Completion". At the end of this period, the sodded areas shall be given "Final Acceptance" if the sod is adequately established as determined by the Engineer.

900.03 Erosion Matting

The erosion matting shall be installed as shown on the drawings and as directed by the Engineer. An additional row of blanket (approximately four feet wide) may also be required in areas of steep slopes, drainage paths or south exposures. The area to be covered shall be properly prepared, fertilized, and seeded before the blanket is applied.

The product data for the erosion matting must be submitted to and approved by the Engineer prior to installation.

When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. In ditches, the blankets shall be applied in the direction of the flow of the water, butted snugly at ends and side and stapled. On slopes, the blankets shall be applied either horizontally or vertically to the slope. Ends and sides shall be butted snugly and stapled.

When two or more lengths of fabric area required to be installed side-by-side or end-to-end to cover an area, a common row of staples will be used on adjoining blankets.

Minimum Blanket Dimensions:

Width	4 feet minimum
Length	180 feet minimum
Roll Sizes	80 square yards
Approximate Weight	78 pounds per roll
Staples	11 gauge wire, "U" shaped with 2-inch crown and legs 8-inches in length, minimum

The erosion matting will be applied uniformly and completely over the designated area. Use four staples across at the start of each roll. When blankets are placed along side of each other, outer staples shall be placed so as to catch the edge of each roll. Staple in row, in two-foot intervals along the entire length of the roll, and place two staples centered on the blanket, halfway between each row.

As a waterway liner, staple at two-foot intervals throughout the length of the roll. When using two or more blankets side-by-side in a water course, do not put the seam (edges of adjoining blanket) at the center of the water flow. Offset approximately six (6) inches to one (1) foot.

The Contractor shall also be responsible for maintaining and caring for the blankets for a seven-week period. All blankets that are disturbed during this period will be replaced and/or restapled by the Contractor.

900.04 Method of Measurement

The quantities of native seeding will not be measured but shall be the quantities shown on the plans, completed and accepted; except that measurements will be made for revisions requested by the Engineer, or for discrepancies of plus or minus five percent of the total quantity shown on the plans.

The quantity of native seeding shall include fertilizer and matting (if applicable), mulch and seed, completed and accepted. The quantity of sod to be measured will be the actual number of square feet including sod preparation, fertilizer and sod, completed and accepted.

Measurement for acres will be by slope distances.

900.05 Basis of Payment

The accepted quantities of native seeding and sod will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Seeding (Native)	Acre
Sod	Square Foot

Soil preparation, seed, fertilizer, mulching and erosion matting will not be paid for separately but shall be included in the work.

Cost for adjusting or re-adjusting the seeding or fertilizing equipment will not be paid for separately but shall be included in the work.

Costs for adjusting or re-adjusting the mulching equipment will not be paid for separately but shall be included in the work.

Water for seeding, mulching, hydraulic mulching, and sodding will not be paid for separately but shall be included in the work.