

SECTION 1200

MISCELLANEOUS CONSTRUCTION

SECTION 1201 – TOPSOIL

1201-1 DESCRIPTION

This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans as directed by the ENGINEER.

1201-2 MATERIALS

1201-2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), clay lumps, or similar objects. Brush and other vegetation which will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3 percent nor more than 20 percent as determined by the wet-combustion method (Chromic acid reduction). There shall be not less than 20 percent nor more than 80 percent of the material passing the 200 mesh sieve as determined by the wash test in accordance with ASTM D1140.

Natural topsoil may be amended by the CONTRACTOR with approved materials and methods to meet the above specifications.

1201-2.2 INSPECTION AND TESTS. Within ten (10) days following acceptance of the bid, the ENGINEER shall be notified of the source of topsoil to be furnished by the CONTRACTOR. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the CONTRACTOR may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in 1201-2.1.

1201-3 CONSTRUCTION REQUIREMENTS

1201-3.1 GENERAL. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the ENGINEER before the various operations are started.

1201-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by disks or spike-tooth harrows, or by other means approved by the ENGINEER, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches in any diameter, and all litter or other material which may be detrimental to proper bonding, the rise of areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and properly compacted condition to prevent, insofar as practical, the formation of low places or where water will stand.

1201-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish, or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the ENGINEER. Heavy sod or other cover, which cannot be incorporated into the topsoil by disking or other means, shall be removed.

When suitable topsoil is available on the site, the CONTRACTOR shall remove this material from the designated areas and to the depth as directed by the ENGINEER. The topsoil shall be spread on areas already tilled and smooth graded, or stockpiled in areas approved by the ENGINEER. Any topsoil stockpiled by the CONTRACTOR shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others and is required for topsoiling purposes, shall be removed and placed by the CONTRACTOR. The sites of all stockpiles and areas adjacent thereto, which have been disturbed by the CONTRACTOR, shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the project site, the CONTRACTOR shall locate and obtain the supply, subject to the approval of the ENGINEER. The CONTRACTOR shall notify the ENGINEER sufficiently in advance of operations in order that necessary measurements and tests can be made. The CONTRACTOR shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the

site of the work and placed for spreading or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

1201-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 4 inches after compaction unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turving operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the CONTRACTOR. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the ENGINEER. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

1201-4 MEASUREMENT AND PAYMENT

1201-4.1 TOPSOILING. Topsoiling shall be measured by the cubic yard (CY) and paid for at the unit price bid for "Topsoiling" complete in place and accepted by the ENGINEER. When topsoil is weighed for final quantity, it shall be converted to cubic yards at the rate of 1.3 tons per cubic yard or at a rate approved by the ENGINEER.

SECTION 1202 – SEEDING

1202-1 DESCRIPTION

This item shall consist of seeding the areas shown on the plans or as directed by the ENGINEER in accordance with these specifications.

1202-2.1 SEED. All seed shall be of certified class quantity and shall be certified by the state in which the seed variety was grown. All seed containers must be sealed and labeled to comply with existing North Dakota Seed Laws and Regulations or in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act, if shipped in Interstate Commerce. Seed shall be furnished separately or in mixtures in standard containers with the seed name including variety and species, lot numbers net weight, percentages of maximum weed seed content clearly marked for each kind of seed. The CONTRACTOR shall furnish the ENGINEER duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within nine (9) months of date of delivery. Seed not planted within the nine-month period shall be retested for dormant seed, hard seed, and germination, and a new certified test report furnished. This statement shall include: Name and address of laboratory, date of test, lot number for each kind of seed and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished and, in case of a mixture, the proportions of each kind of seed. The minimum acceptable purity, germination, weed seed, and other crop seed are those of certified class seed.

Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.

Seed mixture shall contain not less than the specified percent of Pure Live Seed and shall be uniformly mixed by weight to one of the following formulas:

SEED CLASSIFICATION TABLE (Rate of Application of Pure Live Seed)

<u>Percent by Weight</u>	<u>Variety and Species of Grass Seed</u>	<u>Percent Pure Live Seed</u>
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NOTE: R = Rhizomatous Variety and B = Bunch Grass Variety

Class I

(For Pasture or Hayland, Fairly Level Surface)

(50 lbs./acre)

40	'MDN-759' Pubescent Wheat Grass (R)	85
40	'NORDAN' Crested Wheat Grass (B)	85
20	'PRIMAR' Slender (B) or 'OAHE' Intermediate Wheat Grass (R)	85

Class II
(Turfgrass For Sunny Areas)
(5 lbs./100 SY)

85	'PARK' Kentucky Blue Grass (R)	85
15	'ARCTARED' Creeping Red Fescue (R) or 'DURAR' Hard Fescue (R)	85

Class II
(Turfgrass For Shady Areas)
(5 lbs./100 SY)

60	'PARK' Kentucky Blue Grass (R)	85
40	'ARCTARED' Creeping Red Fescue (R) or 'DURAR' Hard Fescue (R)	85

Class III
(For Level Surface or Gentle Slopes)
(50 lbs./acre)

100	'LINCOLN' Smooth Brome Grass (R)	85
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Class IV
(For Slopes 3:1 or More)
(50 lbs./acre)

50	'LINCOLN' Smooth Brome Grass (R)	85
50	'NORDAN' Crested Wheat Grass (B)	85

Class V
(For Critical, Saline Area)
(25 lbs./acre)

40	'PARKWAY' Fairway Crested Wheat Grass (B)	85
20	'PRIMAR' Slender Wheat Grass (B)	85
40	'ROSANA' Western Wheat Grass (R)	85

Class VI

As specified on the plans or in the Special Provisions

When Class V seed mixture is specified, it shall be sown at the rate of 25 pounds per acre; 40 to 60 pounds of phosphorus and 20 to 30 pounds of actual nitrogen per acre shall be mixed into the upper 3 inches of the soil or spread on the soil prior to seeding or by means of fertilizer attachment on the drill. Fertilizer shall not be mixed with the seed.

When Class I, III, IV, or V seed mixture is specified and seeding is performed between August 20 and September 20, or when dormant seeding in late fall, 30 pounds of oats or rye seed per acre shall be added to the mixture as a nurse crop. This nurse crop shall be mowed before it reaches 6 inches in height.

If seed with the specified percentage of pure live seed cannot be obtained, additional seed may be used to bring the amount of live seed up to the amount specified. Seed and seeding mixtures shall be free of all prohibited noxious weed seed and shall not contain more than .5 percent by weight of restricted noxious weed seeds. Prohibited and restricted noxious weeds shall be those as classified by the State Seed Department.

1202-2.2 TOPSOIL. Topsoil shall consist of loose, friable, loamy topsoil that is free of excess acid and alkali. It shall be free from objectionable amounts of sod, hard lumps, gravel, sub-soil, or other undesirable material which will prevent the formation of a suitable seed bed. Topsoil shall, prior to being stripped, have demonstrated by the occurrence upon it of healthy crops, grass, or other vegetable growth that is of good quality, and that it is reasonably well drained.

1202-2.3 LIME. Lime, if specified, shall be ground limestone containing not less than 85 percent of total carbonates, and shall be ground to such fineness that 90 percent will pass through a No. 20 mesh sieve and 50 percent will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified by an approved testing laboratory on the basis of the two (2) sieve requirements above. Dolomitic lime or high magnesium lime shall contain at least 10 percent of magnesium oxide.

1202-2.4 FERTILIZER. Fertilizer, if specified, shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water soluble potash. They shall be applied at the rate and to the depth specified and shall meet the specified requirements of the applicable State and Federal laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds of hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied prior to seeding in one of the following forms:

- (a) A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- (b) A finely-ground fertilizer soluble in water, suitable for application by power sprayers;
or
- (c) A granular or pellet form suitable for application by blower equipment.
 - (i) Fertilizer shall not be applied after seeding.

- (ii) The fertilizer shall not be mixed with the seed, but it may be applied at the same time as the seed if a suitable fertilizer attachment on the equipment is used.
- (iii) The fertilizer may be mixed into the hydro-mulch mixture as it is applied.

1202-2.5 SOIL FOR REPAIRS. The soil for fill and topsoil of areas to be repaired shall be at least of equal quantity to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the ENGINEER before being placed.

1202-2.6 RESEEDING AND REPAIR. Damage caused from wind or water erosion, CONTRACTOR's operation, or traffic, which can be repaired with equipment normally used for seeding work, shall be repaired at the CONTRACTOR's expense. The CONTRACTOR shall make any repairs as directed by the ENGINEER prior to final acceptance.

1202-3 CONSTRUCTION REQUIREMENTS

1202-3.1 SEEDING DATES. Seeding shall be done at such times of the year when the climatic conditions of temperature and moisture are most adaptable for growth and work of this nature. It is preferred that seeding shall be accomplished before May 20 and after October 20 of each year. Plant after October 20 when there is no chance of fall germination as dormant seedings are made for spring germination. Also plant early enough in fall to allow at least forty (40) days for seedlings to develop before they go dormant in the fall, preferably before September 10. Planting between May 20 and September 10 will be allowed if adequate moisture can be provided.

1202-3.2 SEEDBED PREPARATION. The areas to be seeded shall be cleared of all debris, rank vegetation, and other material that is detrimental to the preparation of a seed bed. The areas thus cleared shall be shaped or bladed by approved equipment to the plan's cross section or to such cross section that best fits the existing conditions. The areas thus prepared shall be disked, harrowed, raked, or worked by some other approved method, into a reasonably smooth, even seed bed. The surface of the prepared seed bed shall be firm enough so that adult footprints are hardly visible and will limit seeding depth to a maximum of 3/4 of an inch. If rolling is necessary to secure this, it shall be done prior to the seeding and with an approved roller, the weight of which shall be dependant upon the particular soil conditions.

All slopes shall be worked on the contour, or as directed by the ENGINEER.

Fertilizer and/or lime, when specified, shall be spread and worked into the soil during the final preparation of the seed bed.

The CONTRACTOR shall take four (4) representative and suitably sized samples of the soils which are to form the seed bed and shall submit these samples to an approved testing laboratory for analysis and recommendation of fertilizer to be used. Sampling

and testing shall be done with sufficient promptness so as to avoid delaying the work. Test results shall be submitted to the ENGINEER.

1202-3.3 SEED APPLICATION. Seed shall be sown by means of a force feed drill with a grass seed attachment which provides a uniform flow and depth of seed placement (1/4 to 1/2 inches), except that on slopes steeper than three to one or on areas too small to be seeded with a force feed drill, seed may be sown by power sprayers, blowers, or other approved methods. Grass drills shall be calibrated to ensure proper seeding rates (pure live seed rate divided by purity and germination percentages) for calibrating the drill. The soil shall be repacked immediately after the seed is applied to firm the soil around the seed. All equipment shall be in good working order and shall be approved by the ENGINEER.

Kentucky Bluegrass shall be seeded a very shallow depth or on the surface and cultipacked.

No seed shall be sown during winds that are strong enough to prevent it from being properly imbedded into the surface.

No seed shall be sown in standing water or frozen ground.

When specified, mulching shall be applied immediately or within 24 hours after seed application in accordance with Section 1203.

1202-3.4 ESTABLISHING GRASS STAND. The seeded area shall be kept moist until it has germinated and its continued growth assured. In all cases, watering shall be done in a manner which will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface. Water will be considered incidental to the items "Seed."

All seeded areas shall be protected against traffic or other use by warning signs or barricades approved by the ENGINEER.

Additional watering during dry periods and mowing of seeded areas shall be performed until the stand is firmly established. Weeds or other undesirable vegetation shall be rotary mowed above the new grass seedlings before they reach a height of six inches, and the clippings shall be raked and removed from the area.

Broadleaf weeds shall be controlled by rotary mowing or by applying a post emergence herbicide in accordance with North Dakota State University Weed Control Guide and manufacturer's recommendations after majority of grass plants have three leaves or more and weeds reach a 4-inch height.

1202-3.5 GRASS STAND ACCEPTANCE. To determine adequacy of stands and to determine if reseeding or reinforcement seeding is required, the stand shall be evaluated by the ENGINEER and shall meet the following requirements before the grass stand is accepted: Seedling emergence shall be uniform over the entire area.

Stand counts shall indicate a density of at least 20 to 30 seedlings per square foot of area. Twenty seedlings per square foot for rhizomatous type species and 30 for a bunch type or a mixture of bunch type and rhizomatous type.

The CONTRACTOR shall furnish and replace without compensation therefor, any seed for areas that have not germinated, have died, or are damaged to the extent that replacement is required to conform to the requirements outlined above. The contract warranty period shall also apply to this item.

1202-3.6 MAINTENANCE OF ACCEPTED SEED STAND. The intent of this specification is to provide for maintenance of the new growth of grass beyond the date of grass stand acceptance. During the maintenance period, which is from the date of the grass stand acceptance to the date of acceptance of the contract for final payment, the grass stand shall be mowed, watered, fertilized, and/or protected from damage by erosion, traffic, or weeds in order to maintain a healthy regrowth of grass in the seeded area. This maintenance shall be paid for under a separate bid item from the seeding.

1202-4 MEASUREMENT AND PAYMENT

1202-4.1 SEEDING CLASS I. Seeding Class I shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class I" complete in place and accepted by the ENGINEER.

1202-4.2 SEEDING CLASS II. Seeding Class II shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class II" complete in place and accepted by the ENGINEER.

1202-4.3 SEEDING CLASS III. Seeding Class III shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class III" complete in place and accepted by the ENGINEER.

1202-4.4 SEEDING CLASS IV. Seeding Class IV shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class IV" complete in place and accepted by the ENGINEER.

1202-4.5 SEEDING CLASS V. Seeding Class V shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class V" complete in place and accepted by the ENGINEER.

1202-4.6 SEEDING CLASS VI. Seeding Class VI shall be measured by the square yard (SY) and paid for at the unit price bid for "Seeding Class VI" complete in place and accepted by the ENGINEER.

1202-4.7 GRASS MAINTENANCE. Grass Maintenance shall be measured by the lump sum (LS) and paid for at the unit price bid for "Grass Maintenance" complete in place and accepted by the ENGINEER.

SECTION 1203 – SODDING

1203-1 DESCRIPTION

This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the ENGINEER.

1203-2 MATERIALS

1203-2.1 SOD. Sod furnished by the CONTRACTOR shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials which might be detrimental to the development of the sod or to future maintenance. At least 70 percent of the plants in the cut sod shall be composed of the species stated in the special provisions, and any vegetation more than 6 inches in height shall be mowed to a height of 3 inches or less before sod is lifted. Sod, including the soil containing the roots and the plant growth shown above, shall be cut uniformly to a thickness not less than that stated in the special provisions.

1203-2.2 LIME. Lime, if specified, shall conform to the requirements of Subsection 1202-2.3.

1203-2.3 FERTILIZER. Fertilizer, if specified, shall conform to the requirements of Subsection 1202-2.4.

1203-2.4 WATER. The water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass. It shall be subject to the approval of the ENGINEER prior to use.

1203-2.5 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall conform to the requirements of Subsection 1202-2.5.

1203-3 CONSTRUCTION REQUIREMENTS

1203-3.1 GENERAL. Areas to be solid, strip, or spot sodded shall be shown on the plans. Areas requiring special ground surface preparation such as tilling and those areas in a satisfactory condition which are to remain undisturbed shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the ENGINEER before the various operations. The

CONTRACTOR shall demonstrate to the ENGINEER before starting the various operations that the application of required materials will be made at the specified rates.

1203-3.2 PREPARING THE GROUND SURFACE. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than 2 inches in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass covered areas. If any damage by erosion or other cause occurs after grading of areas and before beginning the application of fertilizer and ground limestone, the CONTRACTOR shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

1203-3.3 APPLYING FERTILIZER AND GROUND LIMESTONE. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate which will provide not less than the minimum quantity stated in the special provisions. These materials shall be incorporated into the soil at a depth of not less than 2 inches by disking, raking, or other methods acceptable to the ENGINEER. Any stones larger than 2 inches in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

1203-3.4 OBTAINING AND DELIVERING SOD. After inspection and approval of the source of sod by the ENGINEER, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches. Sod sections or strips shall be cut in uniform widths, not less than 10 inches, and in lengths of not less than 18 inches, but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The CONTRACTOR may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the CONTRACTOR's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, permission to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

1203-3.5 LAYING SOD. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the ENGINEER, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitchforks shall not be used to handle sod and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and insure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen when replacing it shall work from ladders or threaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately 1 inch below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with the pavement edges.

On slopes steeper than 1 vertical to 2½ horizontal and in V-Shaped or flat bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches in length and have a cross sectional area of not less than ¾ square inch. The pegs shall be driven flush with the surface of the sod.

1203-3.6 CLEANUP. After the staking has been completed, the surface shall be cleaned of loose sod, excess soil, or other foreign materials before watering.

1203-3.7 WATERING. Adequate water and watering equipment must be on hand before sodding begins and sod shall be kept moist until it has become established and its continued growth assured. In all cases, watering shall be done in a manner which will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

1203-3.8 ESTABLISHING TURF

(a) General. The newly placed sod shall be kept in good condition during the care period following placement. The care period after placement of the sod shall be 14 days' duration for sod placed during season before July 15 and after September 15; and shall be 21 days' duration for sod placed between July 15 and September 15.

The time between October 15 of any year and April 15 of the following year shall not be considered to be a part of the required care period for sod. Sod replaced after October 15 of any year, or sod placed at a time when the care period for that sod extends past October 15, shall show evidence of establishing growth after April 15 of the following year before its care period will be considered concluded.

Water shall be applied to the sod during the care period according to the following schedule:

Immediately after sod replacement	- 5 gals./sq. yd.
7 days after sod placement	- 5 gals./sq. yd.
14 days after sod placement	- 5 gals./sq. yd.

For sod placed between July 15 and September 15, an additional 5 gals./sq. yd. shall be applied 21 days after sod placement.

Water shall be applied by sprinkling or any method approved by the ENGINEER that prevents wasting the water by runoff from the sod area. If necessary to prevent runoff several hours of application of the water may be required. The amount of water to be applied may be reduced by the ENGINEER if in his opinion there has been enough rainfall to warrant a reduction.

The CONTRACTOR shall furnish and replace without any compensation therefor, any sod that dies or is damaged to the extent replacement is required during the care period. Replacement sod shall be installed under the same specification requirements as those for the original sod being replaced, including the care period.

Water will be considered incidental to the item "Sodding."

(b) Protection. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the ENGINEER.

(c) Mowing. The CONTRACTOR shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas. In the event that weeds or other undesirable vegetation are permitted to grow to such an extent that, either cut or uncut, they threaten to smother the sodded species, they shall be mowed and the clippings raked and removed from the area.

1203-3.9 REPAIRING. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the ENGINEER, and shall then be re-sodded as specified in Subsection 1203-3.5.

1203-4 MEASUREMENT AND PAYMENT

1203-4.1 SODDING. Sodding shall be measured by the square yard (SY) and paid for at the unit price bid for "Sodding" complete in place and accepted by the ENGINEER.

SECTION 1204 – MULCHING

1204-1 DESCRIPTION

This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the ENGINEER. The mulch is used to conserve moisture, prevent surface compaction or crushing, reduce runoff and erosion, control weeds, and help hasten establishment of plant cover.

1204-2 MATERIALS

1204-2.1 MULCH MATERIAL. Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Low graded, musty, spoiled, partially rotted hay, straw, or other materials unfit for animal consumption will not be acceptable. Mulch materials which contain matured seed of species which would volunteer and be detrimental to the proposed over seeding, or to surrounding farmland, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

(a) Hay. Hay shall be native hay, Sudan grass hay, broomsedge hay, legume hay, or similar hay or grass clippings. Average length shall be 10 inches. Leguminous plants shall not exceed 25 percent of the dry weight of the mulch.

(b) Straw. Straw shall be the threshed plant residue of oats, wheat, barley, rye, or rice from which the grain has been removed. Average length shall be 6 inches if anchored by asphalt or netting or 10 inches if anchored mechanically.

(c) Stalks. Stalks shall be the whole or shredded stems of corn, cane, sorghum, flax, sunflowers, potato vines, or other coarse stemmy material.

(d) Manure. Manure shall be fresh or partially decomposed strawy stable manure containing not over 25 percent of solid material by volume.

(e) Hay Mulch Containing Seed. Hay mulch shall be mature hay containing viable seed of native grasses or other desirable species stated in the special provisions or as approved by the ENGINEER. The hay shall be cut and handled so as to preserve the maximum quantity of viable seed. Hay mulch which cannot be hauled and spread immediately after cutting shall be placed in weather resistant stacks or baled and stored in a dry location until used.

(f) Manufactured Mulch. Cellulose-fiber or wood pulp mulch shall be products commercially available for use in spray applications. Wood cellulose fiber mulch shall consist of wood cellulose fiber pulp and fiber coatings which shall contain no germination or growth in inhibiting factors. This mulch shall be free of contamination from noxious weed seed, seed from other competitive plants, mold, or fungus. It shall be dyed an appropriate color to allow visual metering of its application, and shall have

the property of becoming dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fibers shall form a blotter-like ground cover that 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. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content. Suppliers shall certify, upon request of the ENGINEER, that laboratory and field testing of their product has been accomplished and that it meets the foregoing requirements and intent. Sampling and testing for moisture content will be in accordance with ASTM D2016, Over Drying Method.

(g) Asphalt Binder. Asphalt Binder material shall conform to the requirements of ASTM D977, Type SS-1 or RS-1, as appropriate.

(h) Mulch Blanket.

1. The excelsior blanket shall consist of a machine produced mat of curled wood excelsior of 80 percent 6-inch or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The top side of each blanket shall be covered with a 2-inch by 1-inch biodegradable mesh. The blanket shall be smolder resistant. The blanket shall be secured to the ground with wire staples .091-inch diameter or greater. Staples will be "U" shaped with legs 6 inches in length with a 1-inch crown.

The excelsior erosion blankets will be equivalent to the "Curlex" (trademark) blanket manufactured by the American Excelsior Company, Arlington, Texas.

2. Paper fabric blanket shall consist of a knitted construction of yarn interwoven with strips of biodegradable paper as manufactured by Gulf States Paper Corporation or equal. The paper strips and yarn shall degrade without residue. Staples shall be high carbon iron 6 inches to 12 inches long. Paper fabric shall be 0.05 to 0.30 pounds per square yard ($\pm 10\%$) per manufacturer's recommendation for fabric degradation timing to produce grass stand specified.

(i) Mulch Net. Mulch net shall consist of a biodegradable net made from extruded oriented polypropylene as manufactured by American Excelsior Company or equal. Mulch netting shall be stranded with approximately 5/8-inch by 3/4-inch mesh opening (maximum 1½ inches by 3 inches) to hold loose straw, hay, bark, wood chips, and other loose mulches in place.

(j) Hydro-Mulch. Mulch to be used shall consist of a wood cellulose fiber that has not been treated with any germination or growth inhibitive substances. The mulch shall be treated with a tack and fiber to enhance seed and mulch placement and adherence to the soil. The mulch shall be free of contamination from noxious weed seed and seed from competitive plants.

1204-2.2 INSPECTION. Within five (5) days after acceptance of the bid, the ENGINEER shall be notified of sources and quantities of mulch materials available, and the CONTRACTOR shall furnish him with representative samples of the materials to be used. These samples may be used as standards with the approval of the ENGINEER, and any materials brought on the site which do not meet these standards shall be rejected.

1204-3 CONSTRUCTION REQUIREMENTS

1204-3.1 MULCHING. Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding or within 24 hours. The spreading of the mulch may be by hand methods, blower, or other mechanical methods, provided a uniform covering is obtained. When spread by hand, the bales of hay must be torn apart, "fluffed up," and spread uniformly over the area. Mulches shall not be applied when velocities exceed 15 miles per hour. If excessive breakage of mulch occurs during spreading or anchoring, mulch shall be "wet down" with sprinkler or other suitable means.

Straw or hay shall be spread over the surface to form a uniform thickness to provide a loose depth of not less than 1½ inches nor more than 3 inches. Other organic material shall be spread at the rate directed by the ENGINEER. Mulch may be blown on the slopes, and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95 percent of the mulch in place on the slope shall be 6 inches or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall not be less than 1 inch nor more than 2 inches.

TABLE OF MULCH APPLICATION RATES

<u>Mulch</u>	<u>Anchoring Method</u>	<u>Rate (lbs/acre)</u>	<u>Rate of Asphalt Emulsion Track Gal/Acre</u>
Native or Tame Hay	Mulch Tiller	3000-4000*	-
Native or Tame Hay	Asphalt or Resin Emulsion	3000	300
Small Grain Straw	Mulch Tiller	4000-5000*	-
Small Grain Straw, Flax	Asphalt or Resin Emulsion	3000	300
Flax	Mulch Tiller	3000-5000*	-
Manure	None	30,000-40,000	-

Manure	Disk	60,000-80,000	-
Wood Cellulose Fiber	Hydraulic Spray Equipment	1500-2000	-
Hydro	Spray Equipment	2000	-

*Other methods as hand anchorage, netting, and peg and string method use 3000 lbs/acre.

1204-3.2 SECURING MULCH. The mulch shall be held in place by light disking, a very thin covering of topsoil, small brush, pins, stakes, wire mesh, asphalt, binder, or other adhesive material approved by the ENGINEER. Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. The CONTRACTOR is warned that in the application of asphalt binder material, he must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and that he will be held responsible for any such damage resulting from his operations.

(a) If the "Peg and String" method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5-foot centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.

(b) Mulch Nettings – Staple paper, cotton, or plastic netting to the soil surface according to manufacturer's recommendations.

(c) Hand Anchorage – With a square pointed spade, punch mulch into the surface soil in contour rows 12 inches apart.

(d) Mechanical Mulch Anchoring or Crimping -

1. Tools – Use a heavy, straight coulter type mulch tiller (Imco). The coulters should be 1/4-inch thick and be of sufficient diameter to prevent the frame from dragging the mulch. The edges should be dull so as not to cut the mulch during the anchoring operation. The edges may be serrated or smooth; if serrated, the scallops should not be more than 3 inches in length and 3/4 inch in depth. The rows or furrows made by the mulch tiller shall be spaced 6 to 12 inches apart. Penetration depth should be 2 to 3 inches. The mulch should not be covered with excessive amounts of soil. Limit to no more than two (2) passes by the mulch tiller. All mulching operations will be done on the approximate contour.

2. Site Preparation – When using a mulch anchoring tool, the seed bed must be loosened to a minimum depth of 3 inches prior to placing and anchoring mulch material. This is necessary for the 2- or 3-inch preparation required for mulch

anchorage. (Drill or seeding equipment used at this time must be equipped with depth bands as the ability to obtain a firm seed bed is improbable.)

(e) Asphalt Emulsion Mulch Tack – Asphalt emulsion shall be continuously applied with an emulsion spray system equipment with a mechanical mulch hay blower. Application temperature shall be 50°F or greater (air temperature). The asphalt shall be applied with a mechanical mulch blower equipped with an emulsion sprayer system having a heating unit.

(f) Resin Emulsion Mulch Tack – The resin shall be applied with a mechanical mulch blower equipped with an emulsion spray system having a heating unit.

(g) Wood cellulose fiber mulch shall be applied with hydraulic spray equipment at the rate of 1,500 to 2,000 pounds per acre. The fiber shall be added to the water slurry in a hydraulic seeder along with the proportionate quantities of seed, fertilizer, and other approved materials. All ingredients shall be mixed to form a homogeneous slurry. Using the color of the mulch material as a metering agent, one shall uniformly spray the slurry mixture on the prepared seed bed.

A non-toxic, organic soil stabilizer may be included or added to the wood cellulose fiber where there is a high probability of wind or water erosion. Application rates of such soil stabilizers will be at the manufacturer's recommendation rates.

Since this method is basically a broadcast (surface) application of seed, the mulched area shall be kept moist by sprinkler or other means for a period of thirty (30) days. Under conditions of extreme winds, some peeling may occur. The mulch also is subject to washing away under intense or prolonged rains. These factors should be considered in selecting this method of mulching.

(h) Mulch blankets may be primarily used to mulch small critical areas (such as ditch bottoms and slopes greater than 3:1) and shall be applied in accordance with the manufacturer's recommendations. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. In channels, the blankets shall be applied in the direction of the flow of water. On slopes, the blankets shall be applied across the slope. Ends and sides shall be butted snugly and stapled, in both instances.

The staples shall be driven vertically into the ground, spaced approximately 2 linear yards apart, on each side of the blanket, and one row in the center alternately spaced between each side. Use a common row of staples on adjoining blankets.

(i) If the "Asphalt Spray" method is used, all mulched surfaces shall be sprayed with asphalt binder material so that the surface has a uniform appearance. The binder shall be uniformly applied to the mulch at the rate of approximately 8.0 gallons per 1,000 square feet, or as directed by the ENGINEER, with a minimum of 6.0 gallons and a maximum of 10 gallons per 1,000 square feet depending on the type of mulch and the effectiveness of the binder securing it. Bituminous binder material may be sprayed on

the mulch's slope areas from either the top or the bottom of the slope. An approved spray nozzle shall be used. The nozzle shall be operated at a distance of not less than 4 feet from the surface of the mulch and a uniform distribution of the bituminous material shall be required. A pump or an air compressor of adequate capacity shall be used to insure uniform distribution of the bituminous material.

(j) If the "Asphalt Mix" method is used, the mulch shall be applied by blowing, and the asphalt binder material shall be sprayed into the mulch as it leaves the blower. The binder shall be uniformly applied to the mulch at the rate of approximately 8.0 gallons per 1,000 square feet or as directed by the ENGINEER, with a minimum of 6.0 gallons and a maximum of 10 gallons per 1,000 square feet depending on the type of mulch and effectiveness of the binder securing it.

(k) If the hydro-mulch method is used, the mulch shall be uniformly applied at the application rate shown and shall cover a minimum of 95 percent of the seedbed area. After application, the mulch shall permit percolation of water to the underlying soil.

1204-3.3 CARE AND REPAIR.

(a) The CONTRACTOR shall care for the mulched areas until final acceptance of the project. Such care shall consist of providing protection against traffic or other use by placing warning signs as approved by the ENGINEER, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

(b) The CONTRACTOR shall be required to repair or replace any mulching that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the ENGINEER, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the CONTRACTOR. However, once the CONTRACTOR has completed the mulching of any area in accordance with the provisions of the specifications and to the satisfaction of the ENGINEER, no additional work at his expense will be required, but subsequent repairs and replacements deemed necessary by the ENGINEER shall be made by the CONTRACTOR and will be paid for as additional or extra work.

1204-4 MEASUREMENT AND PAYMENT

1204-4.1 MULCHING. Mulching shall be measured by the square yard (SY) and paid for at the unit price bid for "Mulching" complete in place and accepted by the ENGINEER.