

**SECTION 02820
TURF ESTABLISHMENT**

1.0 GENERAL

A. Description

Turf establishment shall include, but not necessarily be limited to, soil preparation, seeding, fertilizing, mulching, liming as required, over seeding, and refertilizing all areas disturbed by construction and where designated for turf establishment in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Clearing and Grubbing: Section 02110
2. Sodding: Section 02830
3. Soil Stabilization Matting: Section 02850

C. Quality Assurance

The Commission will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.

2.0 MATERIALS

A. Materials Furnished by the Commission

1. The Commission will not furnish any materials for turf establishment.
2. The Contractor may purchase water for hydroseeding or turf irrigation from the Commission's potable water system. The Contractor shall contact the Commission to coordinate its use.

B. Contractor's Options

1. Fertilizer may be furnished in either dry or liquid form unless otherwise noted.
2. Mulch may consist of straw, hay, salt hay, or wood cellulose fiber unless otherwise noted.

C. Detailed Material Requirements

1. Ground Limestone

Ground limestone shall contain not less than 80% calcium and magnesium carbonates. Dolomitic or magnesium limestone shall contain at least 10% magnesium as magnesium oxide. The limestone shall be ground to meet the following size gradation:

<u>Sieve Sizes</u> <u>U.S. Standard</u>	<u>Percent Passing</u> <u>by Weight</u>
No. 10	100
No. 20	98
No. 100	50

2. Fertilizer

- a. Fertilizer analysis shall be 5-10-10. It shall be a standard commercial grade fertilizer meeting the requirements of all State and Federal regulations and standards of the Association of Official Agricultural Chemists. Commercial fertilizer shall provide the minimum percentage of available nutrients specified.
- b. Fertilizer shall be furnished in bulk or new, clean, sealed, and properly labeled bags. Fertilizer failing to meet the specified analysis may be used as determined by the Commission providing sufficient materials are applied to comply with the specified nutrients per unit of measure without additional cost to the Commission.

3. Seed

- a. Seed lots must be state certified and blended under the supervision of the Maryland Department of Agriculture (MDA), Turf and Seed Section.
- b. All seed and labeling must fully comply with the Maryland Seed Law and these Specifications.
- c. Each container shall have permanently affixed to it an accurate analysis tag and a certification tag.
- d. All seed lots to be used in this mixture shall have been pretested by the Maryland Seed Laboratory to insure compliance with Specifications.
- e. A quality control sample of the delivered mixture may be submitted to the Maryland Seed Laboratory for testing prior to payment and any lots found not to comply with the Specifications shall be returned at the Contractor's expense.
- f. The Engineer's representative shall collect all seed certification tags and/or sod certification prior to the beginning of any seed or sod work.
- g. No seed shall be used after date of expiration.
- h. Certified grass seed shall consist of

Spring (Feb. 1 - May 1) and Fall (Aug. 15 - Nov. 1)

General: Kentucky 31 Tall Fescue @ 1.37 pounds/1,000 square feet (60 pounds per acre)

Shade: Kentucky 31 Tall Fescue @ 0.69 pounds/1,000 square feet (30 pounds per acre) and Red Fescue @ 0.69 pounds/1,000 square feet (30 pounds per acre)

Summer (May 2 - Aug. 14)

General: Kentucky 31 Tall Fescue @ 1.37 pounds/1,000 square feet (60 pounds per acre) and Weeping Love Grass @ 0.05 pounds/1,000 square feet (2 pounds per acre)

Shade: Kentucky 31 Tall Fescue @ 1.37 pounds/1,000 square feet (60 pounds per acre) and Weeping Love Grass @ 0.11 pounds/1,000 square feet (5 pounds per acre)

- i. All seed varieties shall meet the following minimum specifications:
- 1) Minimum Purity 98%
 - 2) Minimum Germination 85%
 - 3) Maximum Other Crop 0.1%
 - 4) Maximum Weed Seed 0.1%
 - 5) Noxious Weeds None
- * Must be free of ryegrass, timothy, orchard grass, bentgrass, Canada bluegrass, clover, or any other contaminant which shall be unsightly and uncontrollable.
- ** Must be free of dock, cheat, chess, chickweed, crabgrass, plantain, and black magic.
- *** Must be free of all Maryland prohibited and restricted noxious weeds.

4. Mulch

- a. Mulches shall be free of clay, stones, foreign substances, plant parts of Canada Thistle and Johnsongrass, and reasonably free of other weed seeds. Mulches containing Canada Thistle and Johnsongrass shall not be used for any purposes.
- b. Straw, hay, and salt mulches shall not contain sticks larger than 1/4-inch in diameter or other materials which would prevent matting down during application. No straw, hay, or salt hay mulches shall be used within 48 hours after cutting. Straw, hay, and salt hay shall be free from mold and other objectionable material and shall be in an air-dry condition suitable for placing with mulch blower equipment.
- c. The following mulches may be acceptable by visual inspection provided they meet the above and following requirements:
 - 1) Straw: Straw shall consist of thoroughly threshed wheat, rye, or oat straw.
 - 2) Hay: Hay shall consist of native grasses or other plant material approved by the Commission. Hay shall be free of noxious weed seeds as specified in the Maryland Seed Law.

- 3) Salt Hay: Salt hay shall consist of well cured beach grasses or other approved material.
- 4) Wood Cellulose Fiber: Wood cellulose fiber shall consist of cellulose processed into a uniform fibrous physical state. Wood cellulose fiber shall contain a green dye that will provide easy visual inspection for uniformity of the slurry spread. The wood cellulose fiber, including dye, shall contain no germination or growth inhibiting properties. The material shall be manufactured and processed in a manner that the wood cellulose fiber will blend with seed, fertilizer, and other additives to form a homogeneous slurry. The wood cellulose fiber shall perform satisfactorily in hydraulic seeding equipment without clogging or damaging the equipment. The manufacturer shall certify that wood cellulose fiber meets the following requirements:

<u>Requirements</u>	<u>Specification Limits</u>
Particle Length	Approximately 3/8 inch
Particle Thickness	Approximately 3/64 inch
Net Dry Weight Content	Minimum stated on bag
pH, ASTM D778	4.0 to 8.5
Ash Content, ASTM D586	1.6% maximum
Water Holding Capacity	90% minimum

The material shall be delivered in packages of uniform weight not exceeding 75 pounds net weight and bear the name of the manufacturer, the net weight, and a supplemental statement of net weight content.

- 5) Mulch Binder

Mulch binder shall be emulsified asphalts or wood cellulose fiber meeting the requirements of Section 02820.2, Article C, Paragraph 4, Item c, 4).
- 6) Water

Water used in the planting or care of vegetation shall be free from oil, acids, alkalis, salts, or any substance injurious to plant life. Water from streams, lakes, ponds, or similar sources shall not be used unless the source is approved by the Commission.

D. Material Storage Note: Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

3.0 EXECUTION

A. Seeding Seasons

Seed shall be sown as specified above as soon as the soil is dry enough to allow proper penetration of a seedbed. Extensions beyond the time periods specified may be granted by the Commission, depending upon weather conditions for the period in question. Any planting outside of these seasons shall be solely at the Contractor's risk and shall not be subject to compensation until stabilization has been accomplished in accordance with these Specifications. No seeding shall be done on frozen ground or when the temperature is 32°F or lower.

B. Schedule of Procedure

The Contractor shall begin his work at a point or points approved by the Commission. When topsoil is required for areas to be seeded, all topsoiling shall be completed before seeding operations are started.

C. Soil Preparation

Topsoil shall be placed at a minimum depth of four inches (4") or as otherwise directed, in areas to be seeded. Topsoil may be stripped from the areas to be excavated, stored, protected and reused. If additional topsoil is required, it shall be of good quality and generally should be selected from cultivated farm fields. Should the pH of the topsoil be less than 6.2, lime shall be spread and raked in at the rate of one (1) ton per acre. All topsoil shall be free of stones and of lumps larger than one inch (1") in diameter. It shall be raked fine, and then fertilized with quick acting fertilizer according to manufacturer's specifications. The fertilizer shall be raked in and the area shall be rolled with a two hundred and fifty (250) pound roller.

D. Seeding

Seeding shall consist of soil preparation and application of seed, fertilizer, and mulch. Seed application shall be by either of the following application methods as the Contractor may elect:

1. Dry Application Method

- a. Ground Limestone: Ground limestone, shall be applied, at rates as determined by soil test or no less than 50 pounds per 1000 square feet, separately before the application of any fertilizer or seed on seedbeds which have previously been prepared. Where ground limestone is required to be worked in, the seedbed shall again be properly graded and dressed for seeding. Limestone shall be worked into seedbeds as follows:

Seedbed	Depth of Limestone Incorporation
4 inches of topsoil	3 inches
2 inches of topsoil	2 inches
Subsoil, serrated cut slopes and other non required topsoiled areas 3:1 and steeper	Incorporation not required

- b. Fertilizer: Fertilizer of the analysis 5-10-10 shall be applied to topsoiled areas at a rate of 50 pounds per 1000 square feet.

- c. Seed Application: Strip seeding along trench excavations, etc., shall be applied at a rate of 6 pounds per 1,000 sq. ft. Seed in large areas, around buildings, along streets, etc., shall be applied at rates specified herein. After seeding, the areas shall be lightly raked and rolled. Areas which do not "catch" shall be reseeded at an interval of fourteen (14) days, which shall continue until a satisfactory growth of grass is established over the entire area.
2. Wet Application Method
- a. General: Apply seed and fertilizer (ground limestone, if required) by spraying the material on previously prepared seedbeds in the form of an aqueous mixture using the methods and equipment described herein. The rates of application shall be the same as those specified for the Dry Application Method.
 - b. Spraying Equipment: The spraying equipment shall have a water tank equipped with a bar or liquid level gage calibrated to read in increments not larger than 50 gallons over the entire range of the tank capacity. The gage shall be mounted to be visible to the nozzle operator. The tank shall also be equipped with an agitation system capable of keeping all the solids in the mixture in complete suspension at all times until used.
 - c. Ground Limestone
 - 1) Ground limestone, if required, shall be sprayed separately from mixtures of seed and fertilizer on areas flatter than 3:1. The water-limestone mixture shall contain a maximum of 600 pounds per 100 gallons. The water limestone mixture shall be applied at a minimum rate of 1000 gallons per acre. The water-limestone mixture shall be worked into the topsoil. After working the ground limestone into the topsoil, the seedbed shall again be properly graded and dressed.
 - 2) Ground limestone shall not be required to be applied separately on slope areas 3:1 and steeper. The water-seed-fertilizer and limestone mixture shall be applied at a minimum rate of 1000 gallons per acre in the relative proportions specified so that these combined solids do not exceed 600 pounds per 100 gallons.
 - d. Application
 - 1) Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which ground limestone, if required, has been incorporated. Seed and/or fertilizer shall be mixed together with water in the relative proportions specified so that these combined solids do not exceed 300 pounds/100 gallons. The water-seed-fertilizer mixture shall be applied at a minimum rate of 1000 gallons/acre.
 - 2) All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All seed mixtures in aqueous agitation shall be used within eight hours after mixing, except for leguminous seed which shall be used

within one hour after mixing. Seed mixtures not utilized within the time limits shall be wasted and disposed of at locations acceptable to the Commission.

- 3) The mixtures shall be applied by high pressure spray equipment which shall always be directed upward into the air so the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in a manner to produce erosion or runoff.
- 4) Particular care shall be exercised to insure that application is made uniformly at the prescribed rate and to guard against misses and overlaps. Proper predetermined quantities of the mixture, as specified, shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or collecting containers over the area at intervals and observing the quantity of material deposited thereon.
- 5) The spray method shall not be used during periods of high winds which prohibit satisfactory spray patterns.
- 6) Seed and fertilizer applied by the spray method need not be raked into the soil.
- 7) Any spray or residual which disfigures or otherwise damages existing structures or vegetation shall be thoroughly cleaned from the damaged surface.

E. Mulch Application

1. Mulch materials shall be furnished, hauled, and evenly applied on the area shown in the Contract Documents and/or as directed by the Commission. All mulch shall be applied within 48 hours after seeding. Mulch applied by hand shall provide a loose depth of not less than 1.5 inches nor more than 3 inches. Mulch applied by the blowing method shall provide a loose depth of not less than 1 inch nor more than 2 inches, and 95% of the mulch shall be 6 inches or more in length. Mulch applied by the above methods shall achieve a uniform distribution and depth so no more than 10% of the soil surface is exposed. Mulch applied either by hand or the blowing method shall be spread evenly over all seeded areas at the rate of 2.0 tons per acre.
2. If the mulch is to be secured with a mulch anchoring tool, the rate shall be 2.5 tons per acre. If the tracking method is used, the rate of mulch shall be 1.5 tons per acre.

F. Securing Mulch

Mulch may be secured by any of the following methods except the mulch anchoring tool. This method may be used with written Commission approval. Where mulch has been secured with either an asphalt binder or wood cellulose fiber binder, 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 seeded area and that he will be held responsible for any such damage resulting from his

operations. He will be required to place temporary protective covers over existing signs just before seeding and mulching. The covering shall be immediately removed after seeding and mulching operations are completed.

1. Peg and String Method

If the peg and string method is used, the mulch shall be secured by 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 driven nearly flush to the ground to draw the twine down tight onto the mulch.

2. Spray Method

If the spray method is used, all mulched surfaces shall be sprayed with the selected binder material so the surface has a uniform appearance. Mulch binder may be sprayed on the mulched slope areas from either the top or the bottom of the slope. A spray nozzle of approved design must be used. The nozzle shall be operated at a distance of not less than 4 feet from the surface of the mulch. Uniform distribution of the binder material will be required. A pump or an air compressor of adequate capacity shall be used to insure the uniform distribution of binder material.

a. Asphalt Binder

Asphalt mulch binder shall be uniformly applied to the mulch at the rate of approximately 8.0 gallons per 1000 square feet, or as directed by the Commission. The minimum-maximum rates of application shall be 6 and 10 gallons per 1000 square feet depending on the type of mulch and the effectiveness of the binder securing it.

b. Chemical Binder

Wood cellulose fiber used as a binder shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons.

3. Mix Method

If the mix method is used, the mulch shall be blown onto the area by a mulch blower; and the binder material shall be sprayed into the mulch as it leaves the mulch blower. For rates of application, see Spray Method above.

4. Anchoring Tool Method

If the mulch anchoring tool method is used, the mulch shall be incorporated into the soil to a minimum depth of 2 inches by equipment and a method acceptable to the Commission.

5. Tracking Method

If the tracking method is used, the mulch shall be incorporated into the soil with a bulldozer having steel cleats with a minimum depth of 1.5 inches. The equipment used and the method of tracking shall be acceptable to the Commission. Upon

completion of tracking, the mulch shall be further secured as described for the spray method.

G. Wood Cellulose Fiber

Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,500 pounds per acre. The wood cellulose fiber shall be mixed with water at a maximum rate of 50 pounds of wood cellulose fiber per 100 gallons. This wood cellulose fiber will be permitted to be used in the following areas when approved, and as directed, by the Commission:

1. Narrow disturbed areas up to 8 feet wide adjacent to pavement where traffic created gusts of wind could cause problems with straw;
2. Deep or high slope areas inaccessible to straw application by a mulching machine.

H. Repair of Defective Areas

1. The responsibility for maintaining treated areas shall be as follows. Until the Project is finally accepted, the Contractor will be required to repair or replace any seeding or mulching that is defective or damaged. When, in the judgment of the Commission, such defects or damages are the result of poor workmanship or failure to meet the requirements of the Contract Documents, the cost of necessary repairs or replacement shall be borne by the Contractor. However, once the Contractor has completed the seeding and mulching of any area in accordance with the provisions of the Contract Documents and to the satisfaction of the Commission, no additional work at his expense will be required. Subsequent repairs and replacements deemed necessary shall be made by the Contractor and will be paid for as additional work or extra work.
2. When either the Dry or Wet Application Method is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density. If, when the Contract has been completed, it is not possible to make an adequate determination of color, density and uniformity of such stand of grass, payment for the unaccepted portions of the areas will be withheld until these requirements have been met.

4.0 METHOD OF MEASUREMENT

- A. Except when used as a contingent item or noted otherwise, measurement for turf establishment will not be made, as it shall be included in the unit quantity item for utility installation.
- B. When used as a contingent item or noted otherwise, measurement for turf establishment will be made on the surface area, measured in place, acceptably established.

5.0 BASIS OF PAYMENT

A. General

1. Except when used as a contingent item or noted otherwise, payment for turf establishment will not be made, as it shall be included in the unit quantity item for utility installation.

2. When used as a contingent item or noted otherwise, payment will be made at the unit price bid. The price bid shall include furnishing all labor, tools, equipment, and materials necessary to complete the work as shown and specified in strict accordance with the Contract Documents.
 3. Payment will made for contingent items when approved by the Commission.
- B. Turf Establishment
1. Payment for turf establishment will be made per square yard at the contingent prices established in the bid form. The price shall include all traffic control and incidental items to complete the turf establishment.

****END OF SECTION 02820****