
NAVFAC IGS-02921 (MAY 2002)

Preparing Activity: LANTNAVFACENGCOM Based on UFGS-02921N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

SECTION 02921

TURF
05/02

NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

NOTE: This guide specification is intended for use where turf is required, including ground cover legumes grown from seed. Air Force Manual AFM 88-17 may be used for additional guidance regarding soils attributes and appropriate turf species for specific geographical areas.

NOTE: The following information shall be shown on the project drawings:

1. Clearly indicate all areas to be turfed and if more than one type of turf is specified, delineate areas for each type.
2. All draft turf specifications shall be submitted to the cognizant EFD Landscape Architect/Natural Resources Specialist for review to ensure that the specifications are in accordance with environmental conditions peculiar to the project areas.

Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the technical proponents, including their organization designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer

choices or locations where text must be supplied by
the designer.

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOD PRODUCERS ASSOCIATION (ASPA)

ASPA GSS (1988) Guideline Specifications for Sodding

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602 (1995; Rev. A) Agricultural Liming
Materials

ASTM D 4427 (1992) Peat Samples by Laboratory Testing

ASTM E 11 (1995) Wire-Cloth Sieves for Testing
Purposes

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909 Fertilizer

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 02935, "Landscape Maintenance" applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item is required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some

submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Recommended codes for Army projects are "RE" for Resident Engineer approval, "ED" for Engineering approval, and "AE" for Architect-Engineer approval. Codes following the "G" typically are not used for Navy projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-03 Product Data

Wood cellulose fiber mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

NOTE: In geographical locations that require certification, adjust testing requirements to suit local conditions.

Topsoil composition tests (reports and recommendations).

Plant tissue sample test

SD-07 Certificates

State certification and approval for seed

[Nursery] [Sod farm] certification for sods and sprigs. Indicate type of sod or sprig in accordance with ASPA GSS.

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 [Seed] [Sod,] [and] [Sprig] Protection

NOTE: If sprigs or sod are to be delivered in quantity over considerable distance, specify trucking in vans equipped with temperature control.

Protect sod and sprigs from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 [Fertilizer] [Gypsum] [Sulfur] [Iron] [and] [Lime] Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to applicable local requirements. Instead of containers, [fertilizer] [gypsum] [sulphur] [iron] [and] [lime] may be furnished in bulk bags with certificate indicating the above information or above information could be printed on the bag itself.

1.5.2 Storage

1.5.2.1 [Sod] [Sprig] Storage

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) to determine if specie used requires more water than is average for the geographical area.

Lightly sprinkle with water, cover with moist burlap, straw, or other approved covering; and protect from exposure to wind and direct sunlight until planted. Provide covering that will allow air to circulate so that internal heat will not develop. Do not store [sod] [sprigs] longer than 24 hours. Do not store directly on concrete or bituminous surfaces.

1.5.2.2 Seed, [Fertilizer] [Gypsum] [Sulfur] [Iron] [and] [Lime] Storage

Store in cool, dry locations away from contaminants.

1.5.2.3 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.5.2.4 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) to determine proper planting seasons for specie specified, for the optimum cover depth, and for the proper rate of application for sowing and drilling seed as this rate varies with the specie of seed used and local conditions. Allow for planting period in the construction completion time. Delete time restrictions for continuous growing conditions.

1.6.1 Restrictions

Do not plant when the ground is [frozen,] [snow covered,] muddy, or when air temperature exceeds [32] [____] degrees Celsius.

1.6.2 Seed Planting Dates

Generally Seed Planting Dates start from the Spring Season to the Fall Season.

Season 1	Season 2	Season 3
April 1st to June 30th	August 15th to October 15th	November 1st to March 15th

1.6.3 Sod Planting Dates

Sod Planting Dates shall be from Spring Season to Fall Season. Do not plant when temperatures are below 0 degrees Celsius.

Season 1	Season 2	Season 3
April 1st to June 30th	August 15th to October 15th	November 1st to March 15th

1.6.4 Sprig Planting Dates

Sprig Planting Dates shall be from Spring Season to Fall Season. Do not plant when temperatures are below 0 degrees Celsius.

Season 1	Season 2	Season 3
April 1st to June 30th	August 15th to October 15th	November 1st to March 15th

1.7 TIME LIMITATIONS

1.7.1 Seed

Apply seed within twenty four hours after seed bed preparation.

1.7.2 Sod

Place sod a maximum of thirty six hours after initial harvesting, in accordance with ASPA GSS.

1.7.3 Sprigging

Perform sprigging a maximum of thirty six hours after initial harvesting.

1.8 QUALITY ASSURANCE

1.8.1 Plant Tissue Sample Test

Major and minor nutrients.

PART 2 PRODUCTS

2.1 SEED

NOTE: Seed mixtures vary by region and year depending upon availability and current local recommendations. The specific species and varieties used should be based on recommendations of the micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant. Add to or revise the composition schedules below.

2.1.1 Classification

Provide [I.C.Q. Laboratory Approved] seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with applicable seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the [Contracting Officer] [_____].

2.1.2 Composition

	[Name of Grass or Legume Botanical and Common		
	Min.	Min. Percent	Max.
	Percent	Germination	Percent
Seed	Pure Seed	and Hard Seed	Weed Seed
[_____]	[_____]	[_____]	[_____]

[Name of Grass or Legume Botanical and Common

Seed	Min. Percent Pure Seed	Min. Percent Germination and Hard Seed	Max. Percent Weed Seed
[_____]	[_____]	[_____]	[_____]
[_____]	[_____]	[_____]	[_____]

2.1.3 Seed Mixture

NOTE: For LANTNAVFACENCOM projects, specify as follows depending on project location.

<u>[Planting Season]</u>	<u>Variety</u>	<u>Percent (by Weight)</u>
Mid Spring to Mid Summer	Cynodon Dactylon (Hybrid Bermudegrass)	30
	Festuca Commutata	70
Early Fall to Winter	Poa Trivialis (Rough Bluegrass)	100

Proportion seed mixtures by weight. Seeding during Season 3 is for temporary ground cover which must later be replaced by Season 1 plantings for a permanent stand of grass. The same requirements for turf establishment apply for Season 1 as for Season 3.

2.2 SODS

NOTE: The specific species and varieties used should be based on recommendations of the micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant.

Lay sod from [Spring (May)] to [Summer (August)] for warm season spring planting and from [early fall (September)] to [late fall (early December)] for cool season fall planting.

2.2.1 Classification

Certified as classified in the American Sod Producers Association Guideline Specifications ASPA GSS for sodding. Machine cut sod at a uniform thickness of 19 mm within a tolerance of 6 mm, excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will be rejected. [After sod has been harvested and prior to delivery to site, each piece of sod shall be processed using a high pressure hydraulic washing with water leaving no soil or substrate attached to the roots.] [Wood pegs and wire staples for anchorage shall be as recommended by sod supplier.]

2.2.2 Composition

Botanical Name	Common Name
Cynodon dactylon	Tifway (T-419) Hybrid Bermudagrass

Final selection of hybrid bermudagrass to be installed shall be verified with the Contracting Officer at the time of installation.

2.4 SPRIGS

NOTE: The specific species and varieties used should be based on recommendations of the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant. Modify sod thickness as required for species specified.

Healthy living stems, stolons, or rhizomes and attached roots of locally adapted grass without adhering soil, including two to three nodes and from 100 to 150 mm long, obtained from heavy and dense sod. [Obtain sprigs from designated areas on the project site.] Provide sprigs which have been grown under climatic conditions similar to those in the locality of the project. Coordinate harvesting and planting operations to prevent exposure of sprigs to the sun for more than 30 minutes before covering and moistening. Sprigs containing weeds or other detrimental material or that are heat damaged will be rejected. Sow sprigs from [April] to [June] for warm season planting and from [August] to [October] for cool season planting.

2.5 TOPSOIL

NOTE: If topsoil properties are included in another section of Division 2, delete this paragraph and include a cross-reference to the appropriate section. Otherwise, select appropriate paragraphs on topsoil. Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant for soil properties appropriate for the plant materials to be planted. Where suitable topsoil is available within limits of the work area, stripping and stockpiling of topsoil should be included in the applicable section of Division 2 of the specification. If suitable topsoil is not available within the limits of the work area, it should generally be the Contractor's option to either treat the soil of the graded areas with fertilizer and supplements so as to be conducive to turf establishment and maintenance, or to transport topsoil to the project site. Modify pH range for specified turf and geographical requirements.

2.5.1 Existing Soil

Modify existing soil to conform to the requirements specified in paragraph entitled "Composition."

2.5.2 On-Site Topsoil

Reusable surface soil stripped and stockpiled on site if requirements specified for topsoil in paragraph entitled "Composition" are met.

2.5.3 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be [furnished by the Contractor] [obtained from topsoil borrow areas indicated].

2.5.4 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, Chemical Analysis Method described in Soil Survey Investigation Report. Maximum particle size, 19 mm, with maximum 3 percent retained on 6 mm screen. Other components shall be within the following percentages:

	Partical Size	
Silt	25-50	0.002-0.05 mm
Clay	10-30	less than 0.002 mm
Sand	20-35	0.25-2.00 mm
pH	6.5-7	
Soluble Salts	600 to 800 ppm maximum	

2.6 pH ADJUSTERS

NOTE: Prior to including these provisions in project specifications, tests of on-site topsoil should be made to determine its suitability and the possible need for pH adjusters or soil conditioners. Allow Contractor option for type of conditioner unless soils tests dictate otherwise.

2.6.1 Lime

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine the required percentages of carbonates, calcium, and magnesium for the project area.

[Commercial grade [ground] [hydrated] [N-value 120-135] [or] [burnt] [N-value 150-175] limestone containing not less than 50 percent of total oxides, [70] percent calcium and [30] percent magnesium oxide, gradation, as follows: Minimum 75 percent passing 150 micrometers sieve and 100 percent passing 850 micrometers.]

[ASTM C 602, commercial agricultural limestone containing a minimum of [_____] percent of total carbonates, [70] percent calcium, and [30] percent magnesium. Provide the following ASTM E 11 gradation: minimum 86 percent passing the 850 micrometers and 28 percent passing the 150 micrometers.

2.6.2 Aluminum Sulfate

Aluminum Sulfate shall not be used. (Due to potential for aluminum toxicity)

2.6.3 Sulfur [Wetable powder]

100 percent elemental.

2.6.4 Iron as Iron Sulfate [Wetable powder]

100 percent elemental.

2.7 SOIL CONDITIONERS

NOTE: Prior to including these provisions in project specifications, tests of on-site topsoil should be made to determine its suitability and the possible need for pH adjusters or soil conditioners. Allow Contractor option for type of conditioner unless soils tests dictate otherwise.

Provide singly or in combination as required to meet specified requirements for topsoil. Soil conditioners shall be nontoxic to plants.

2.7.1 Peat [Sphagnum, Canadian Peat Moss]

[Sphagnum moss peat] [Peat moss] [Hypnum moss peat] [Reed-sedge peat] [Peat humus] derived from a freshwater site and conforming to [ASTM D 4427] as modified herein. Shred and granulate peat to pass 13 mm mesh screen and condition in storage pile for minimum 6 months after excavation.

2.7.2 Sand [Coarse grade]

Clean and free of materials harmful to plants.

2.7.3 Perlite [Coarse]

Horticultural grade.

2.7.4 Vermiculite

NOTE: Not recommended since it has a tendency to hold large quantities of water. If required, use only horticultural grade and not the insulation grade.

[Horticultural grade] [Shall not be used].

2.7.5 Rotted Manure [Well decomposed] with Low Salt Index]

NOTE: Manure is recommended as an additive to improve soil for planting only. It is not recommended as a mulch due to odor and, unless worked well into soil, would encourage surface rooting and weed growth.

Composted, horse or cattle manure containing maximum 25 percent by volume of straw, or other bedding materials. Manure shall be free of stones, sticks, and soil, viable weed seed, and other materials harmful to plants.

2.7.6 Composted Derivatives

Ground bark, nitrolized sawdust, humus, or other wood green waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.7.6.1 Particle Size

Minimum percent by weight passing:

4.75 mm	95
2.36 mm	80

2.7.6.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.7.7 Calcined Clay

Granular particles produced from montmorillonite clay calcined to minimum temperature of 650 degrees C to the following gradation: minimum 90 percent passing 2.36 mm screen, 99 percent retained on 250 micrometers screen and, maximum 2 percent passing 150 micrometers screen. Bulk density: 650 kg maximum per cubic meter.

2.7.8 Gypsum

Coarsely ground gypsum comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through a 850 micrometers screen, 100 percent passing through a 1.18 mm screen.

2.8 FERTILIZER

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant for recommended fertilizer mixture for local conditions. Controlled release fertilizer is preferred.

2.8.1 Pre-Plant Fertilizer Mixture

Fertilizer mixtures not to exceed one percent granular dust and CID A-A-1909, as specified below.

2.8.1.1 Fertilizer "A"

Organic, granular fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

- [5] percent available nitrogen
- [2] percent available phosphorus
- [4] percent available potassium
- [[2] percent sulfur]
- [[2] percent iron]

2.8.1.2 Fertilizer "B"

Synthetic, granular, controlled-release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

- [15] percent available nitrogen
- [10] percent available phosphorus
- [15] percent available potassium
- [[2] percent sulfur]
- [[1] percent iron]

2.8.1.3 Fertilizer "C"

Controlled release fertilizer, to use with [hydroseeding] [and] [hydrosprigging] , composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and containing the following minimum percentages, by weight, of plant food nutrients.

- [24] percent available nitrogen
- [10] percent available phosphorus
- [11] percent available potassium
- [[3] percent sulfur]
- [[6] percent iron]

2.9 SURFACE TOPDRESSING

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine choice of mulch most suitable for the project area. Specify only one type of mulch.

NOTE: Specify depending on project location:

<u>Location</u>	<u>Mulch Type</u>
Newly seeded turf areas	Light coating of Canadian Peat or dry hay

Free from, noxious weeds, mold, and other deleterious materials.

2.9.1 Humus

95 percent decomposed vegetable matter and wood fiber with a particle size of 6 to 13 mm.

2.9.2 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment.

2.9.3 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Provide only marsh hay for lawn areas.

2.9.4 Wood Cellulose Fiber Mulch

NOTE: Wood cellulose fiber mulches have been successful on level areas or on slopes with slight grades where sufficient moisture is present to obtain a quick germination of grass seed. The material should be hydraulically applied at the following rates: Areas up to and including 3 to 1 slopes, at the rate of 1,120 kg per 10,000 sq. m; areas steeper than 3 to 1 at the rate of 1,568 kg per 10,000 sq. m. It should not be specified for slopes 2 to 1 or greater in areas where drought may prevent germination of the seed or where runoff from heavy rains may cut gullies through the fiber mulch.

In these areas use erosion control materials such as specified in paragraph entitled "Erosion Control Material."

Use recovered materials of either paper-based (100 percent) or wood-based (100 percent) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 3.5 to 5.0. Use with hydraulic application of grass [seed] [and] [sprigs] and fertilizer.

2.10 WATER

NOTE: Identify location of water tap or other source of water on the drawings.

Source of water to be approved by Contracting Officer, suitable quality for irrigation.

2.11 EROSION CONTROL MATERIALS

NOTE: Specify erosion control where water concentrates and flows across areas at velocities which create an erosion hazard. Allow Contractor option for type of erosion control material, unless project specific requirements dictate otherwise.

NOTE: If Section 01561 "EROSION AND SEDIMENT CONTROL" is utilized delete requirements for erosion control materials.

2.11.1 Net

[Heavy, twisted jute mesh], [plastic net], [biodegradable paper fabric with knitted yarns], [standard weave burlap], [loose weave burlap or plastic nets].

2.11.2 Blanket

[Fiber] [Excelsior] [roll up fabric blanket].

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Extent of Work

Provide soil preparation, [fertilizing,] [seeding,] [sprigging,] [and] [surface topdressing] of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.2 Soil Preparation

NOTE: Choose one of the following options

NOTE: Elevation of subgrade will vary depending upon the needs for additional topsoil, sod, or other treatment.

[Remove existing topsoil to a minimum depth of [50] mm and stockpile. After areas have been brought to finish subgrade elevation, thoroughly till to minimum depth of [150] mm by scarifying, disking, harrowing, or other methods approved by the Contracting Officer.. Remove debris and stones larger than 25 mm in any dimension remaining on surface after tillage. Spread stockpiled topsoil evenly to provide positive drainage. [Provide off-site topsoil to meet indicated finish grade.] Do not spread topsoil when [frozen or] excessively wet or dry. Thoroughly mix subgrade [and] topsoil [and off-site topsoil to a depth of [200] mm by disking, harrowing, tilling or other method approved by the Contracting Officer. Correct irregularities in finished surfaces to eliminate depressions. Protect finished prepared soil areas from damage by vehicular or pedestrian traffic.]

[[Provide off-site topsoil to meet indicated finish grade.] After areas have been brought to indicated finish grade, incorporate [fertilizer] [pH adjusters] [soil conditioners] into soil a minimum depth of [150] mm by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 25 mm in any dimension remaining on the surface after tillage. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.]

3.1.2.1 [pH Adjuster Application Rates

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant and specify amounts applicable for the project area.

Apply pH adjuster at rates as determined by laboratory soil analysis of the soils at the job site. For bidding purposes only apply at rates for the following:

[Lime [[0.02] kg per square meter [[-21.5] kg per 100 square meters .]

[Sulfur [[0.054] kg per square meter [[5.4] kg per 100 square meters]

[Iron [[0.054] kg per square meter [[5.4] kg per 100 square meters.]

3.1.2.2 [Soil Conditioner Application Rates

NOTE: Check with local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant and specify amounts applicable for the project area.

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the job site. For bidding purposes only apply at rates for the following:

[Peat [[0.16] cubic meters per square meter [[16.0] cubic meters per 100 square meters.]

[Sand [[0.05] cubic meters per square meter [[1] cubic meters per 100 square meters.]

[Perlite [[0.08] cubic meters per square meter [[8.00] cubic meters per 100 square meters.]

[Vermiculite [[0.08] cubic meters per square meter [[8.00] cubic meters per 100 square meters.]

[Rotted Manure [[0.08] cubic meters per square meter [[8.00] cubic meters per 100 square meters.]

[Compost Derivatives [[0.16] cubic meters per square meter [[16.0] cubic meters per 100 square meters.]

[Calcined Clay [[0.05] cubic meters per square meter [[5.0] cubic meters per 100 square meters.]

[Gypsum [[0.125] cubic meters per square meter [[12.5] cubic meters per 100 square meters.]

3.1.2.3 [Fertilizer Application Rates

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant and specify amounts applicable for the project area. Two fertilizer applications may be required when hydroseeding with wood fiber mulch.

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site. For bidding purposes only apply at rates for the

following:

[Urea] [Organic Fertilizer [[0.002] kg per square meter [[0.2] kg per 100 square meters.]

[Synthetic Fertilizer [[0.003] kg per square meter [[0.3] kg per 100 square meters.]

[Hydroseeding Fertilizer [[0.003] kg per square meter [[0.3] kg per 100 square meters.]

[Hydrosprigging Fertilizer [[0.005] kg per square meter [[0.5] kg per 100 square meters.]

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine proper planting seasons for specie specified, for the optimum cover depth, and for the proper rate of application for sowing and drilling seed as this rate varies with the specie of seed used and local conditions. Allow for planting period in the construction completion time. Delete time restrictions for continuous growing conditions.

NOTE: Delete the last two lines of this paragraph when hydroseeding is selected as the only seed application method.

Immediately before seeding, restore soil to proper grade and thoroughly moisten soil to a depth of 150 mm. Do not seed when ground is muddy [frozen] [snow covered] or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Seed Application Method

3.2.2.1 [Broadcast and Drop Seeding

Use broadcast or drop seeders. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of [6] [_____] mm in clay soils and [13] [_____] mm in

sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.]

3.2.2.2 [Drill Seeding

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine proper planting seasons for specie specified, for the optimum cover depth, and for the proper rate of application for sowing and drilling seed as this rate varies with the specie of seed used and local conditions. Allow for planting period in the construction completion time. Delete time restrictions for continuous growing conditions.

Use [cultipacker seeders] [grass seed drills] [_____]. Drill seed uniformly to average depth of [13] mm.

3.2.2.3 [Hydroseeding

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine rate of application. This rate will vary due to site requirements for fertilizer, mulch material, and rates of seeding.

First, mix water and fiber. Fiber shall be added at 1120 kilograms dry weight per 10,000 square meters. Then add and mix seed and fertilizer to produce a homogeneous slurry. When hydraulically sprayed on the ground, material shall form a blotterlike cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

3.2.3 Surface Topdressing

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine rate of application. This rate will vary due to site requirements for fertilizer, mulch material, and rates of seeding.

NOTE: Delete this paragraph when hydroseeding is used on the project.

Spread [straw] [hay] [humus] over seed bed area to an even depth of [13]mm. Take precautionary measures to prevent topdressing materials from spilling onto pavements, utilities structures, or planter beds.

3.2.4 Rolling

NOTE: Normally the roller weight should not exceed 134 kg per m of roller width. Light rolling is needed on newly seeded and sprigged areas to firm the seed or sprigs into contact with the soil for optimum germination and growth. However, excessive soil compaction beyond this firming action will reduce the desirable percentages of air and water spaces in good growing topsoil.

Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding [134] [_____] kg per m for each foot of roller width. [If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.]

3.2.5 Erosion Control Material

NOTE: Specify erosion control where water concentrates and flows across areas at velocities which create an erosion hazard. Allow Contractor option for type of erosion control material, unless project specific requirements dictate otherwise.

Install in accordance with manufacturer's instructions.

3.2.6 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of [150] mm without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 SODDING

3.3.1 Placing

Place sod a maximum of 36 hours after initial harvesting, in accordance with Guideline Specifications for sodding as modified herein. Thoroughly moisten areas to be sodded immediately prior to placing sod.

3.3.2 Spot Sodding

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine spacing of pieces of sod and method of seed application as it will vary depending on specie specified and local conditions.

Cut sod into plugs [50] mm square or [50] mm in diameter. Place individual pieces of sod on [45] mm centers and press firmly into soil by foot pressure or by tamping. [Overseed for erosion control on 3 to 1 or greater slopes and drainage ways in spot sodded areas. Apply seed in accordance with applicable portions of paragraph entitled "Seed Application Method" at the rates in accordance with paragraph entitled "Seed Composition."]

3.3.3 Sodding Slopes and Ditches

For slopes 2:1 and greater, lay sod with long edge parallel to slope. For V-ditches and flat bottomed ditches, lay sod with long edge parallel to flow of water. [Anchor each piece of sod with wood pegs or wire staples maximum 600 mm on center.] [On slope areas, start sodding at bottom of the slope.]

3.3.4 Finishing

After completing sodding, blend edges of sodded area smoothly into surrounding area.

3.3.5 Rolling

NOTE: Normally the roller weight should not exceed 134 kg per m of roller width. Light rolling is needed on newly seeded and sprigged areas to firm the seed or sprigs into contact with the soil for optimum germination and growth. However, excessive soil compaction beyond this firming action will reduce the desirable percentages of air and water spaces in good growing topsoil.

Immediately after sodding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding [134] kg per m for each foot of roller width.

3.3.6 Watering

Start watering areas sodded as required by daily temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to minimum depth of [150] mm.

3.4 SPRIGGING

3.4.1 Rate

NOTE: Modify sprig spacing as required for species specified. Species such as T. Septemberine, Zoysia, and Centipede grasses that cannot be entirely covered with soil should be specified to be planted

with portion of the sprig exposed.

Perform sprigging a maximum 36 hours after initial harvesting. Inspect sprigs for heat damage during planting operation. Plant groups of sprigs at [300] mm maximum intervals. Limit the interval between dropping sprigs and covering with soil as required by temperature and wind conditions.

3.4.2 Planting

NOTE: Check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant to determine the preferred method of planting for local conditions. Specify one method of planting.

NOTE: Choose one of the following options.

[Broadcast sprigs by hand, manure spreader, or other suitable devices over prepared surface. Force sprigs into soil to a depth of approximately 100 mm with disk harrow or other approved equipment.]

[Plant sprigs in furrows spaced a maximum 300 mm apart. Immediately after opening furrows, place sprigs. Fill furrows so that surface is flush with designated grade and a live portion of each sprig is exposed.]

[Plant to a depth of approximately 100 mm and cover sprigs so that surface is flush with designated grade and a live portion of each sprig is exposed.]

First, mix water and fiber. Fiber shall be added at 1120 kilograms dry weight per 10,000 square meters. Then add and mix seed and fertilizer to produce a homogeneous slurry. When hydraulically sprayed on the ground, material shall form a blotterlike cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch. Cover shall allow rainfall or applied water to percolate to underlying soil.]

3.4.3 [Overseeding

NOTE: Seeding is normally not required for sprigged areas. Under certain conditions it may be specified to obtain a quick cover. If additional seed is required, check with the local micro-biological and chemical analysis laboratory (I.C.Q.) or certified turf consultant for rate of application. This rate varies due to local conditions and specie specified.

Apply seed in accordance with applicable portions of paragraph entitled

"Seed Application Method" at rates in accordance with paragraph entitled "Seed Composition".]

3.4.4 Rolling

NOTE: Normally the roller weight should not exceed 134 kg per m of roller width. Light rolling is needed on newly seeded and sprigged areas to firm the seed or sprigs into contact with the soil for optimum germination and growth. However, excessive soil compaction beyond this firming action will reduce the desirable percentages of air and water spaces in good growing topsoil.

Immediately after completion of sprigging operations [and additional seeding], roll planted area with cultipacker or roller not exceeding [134] kg per m for each foot of roller width. [If sprigging is performed by hydrosprigging, rolling may be eliminated.]

3.4.5 Watering

Apply water at the time of sprigging operations at a rate sufficient to ensure thorough wetting of soil to a depth of [150] mm.

3.5 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.6 [RENOVATION OF EXISTING TURF AREA

3.6.1 [Aeration

Upon completion of weed eradication operations and Contracting Officer's approval to proceed, aerate turf areas indicated , by approved device. Core, by pulling soil plugs, to a minimum depth of [80-100] mm. [Leave all soil plugs, that are produced, in the turf area.] [Remove all debris generated during this operation off site.] [After aeration operations are complete, topdress entire area [7 mm [13 mm] depth with the following mixture:

[[85] percent sand]
[[8] percent humus]
[[3] percent gypsum]
[[2] percent organic fertilizer]
[[2] percent synthetic fertilizer]

Blend all parts of topdressing mixture to a uniform consistency throughout.] Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean all soil plugs off of other paving when work is complete.]

3.6.2 [Vertical Mowing

Upon completion of aerating operation and Contracting Officer's approval to proceed, vertical mow turf areas indicated, by approved device, to a depth of [6 mm [13 mm] above existing soil level, to reduce thatch build-up, grain, and surface compaction. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work is complete. Remove all debris generated during this operation off site.]

3.6.3 [Dethatching

Upon completion of aerating operation and Contracting Officer's approval to proceed, dethatch turf areas indicated, by approved device, to a depth of [6 mm [13 mm] below existing soil level, to reduce thatch build-up, grain, and surface compaction. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work is complete. Remove all debris generated during this operation off site.]

3.6.4 [Overseeding

Apply seed in accordance with applicable portions of paragraph entitled "Seed Application Method" at rates in accordance with paragraph entitled "Seed Composition".]

3.7 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --