

SECTION 32 90 00
PLANTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work of this Section consists of furnishing and installing all planting materials required for landscaping hereinafter specified in locations as shown on the Construction Documents and includes, but not limited to, plants, seeding, sodding, soil treatment, and other items as listed.

1.2 EQUIPMENT

- A. Maintain all equipment, tools and machinery while on the project in sufficient quantities and capacity for proper execution of the Work.

1.3 RELATED WORK

- A. Section 31 20 00, EARTH MOVING, Stripping Topsoil and Stock Piling.
B. Section 01 45 29, TESTING LABORATORY SERVICES, Topsoil Testing.
C. Section 31 20 00, EARTH MOVING, Topsoil Materials.

1.4 SUBMITTALS

- A. Samples: Submit the following samples for approval before Work is started:

Inert Mulch	2.3 kg (5 pounds) of each type to be used.
Organic Mulch	2.3 kg (5 pounds) of each type to be used.
All pesticides required such as preemergence or post emergence herbicides, insecticides, or fungicides.	EPA approved labeling and MSDS sheet for each such product selected for use.

- B. Certificates of Conformance or Compliance: Before delivery, notarized certificates attesting that the following materials meet the requirements specified shall be submitted to the COTR for approval:
1. Plant Materials (Department of Agriculture certification by State Nursery Inspector from the state in which the plant material originates declaring material to be free from insects and disease).
 2. Fertilizers.
 3. Lime
 4. Peat

5. Sod

C. Manufacturer's Literature and Data:

1. Antidesiccant
2. Erosion control materials
3. Pre-emergent herbicide

D. Soil laboratory testing results and any soil amendment recommendations from the Contractor.

1. Organic Soil Amendment and Imported Topsoil: The Contractor shall provide a one cubic foot representative sample from each proposed source for testing, analysis, and approval. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the COTR. Testing reports shall include the following tests and recommendations.

- a. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) shall be performed by public extension service agency or a certified private testing laboratory in accordance with the current standards of the Association of Official Agricultural Chemists. A hydrometer shall be used to determine percent of clay and silt.
 - b. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 °C, plus or minus 5°C.
 - c. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and acidity (pH).
 - d. Tests, as specified, for gradation, organics, soil chemistry and pH shall be performed by a testing laboratory retained by the Department of Veterans Affairs as described in Section 01 45 29, TESTING LABORATORY SERVICES.
 - e. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for fertilizing and liming applications to support successful turf growth.
 - f. All tests shall be performed in accordance with the current standards of the Association of Official Agricultural Chemists.
2. Amended soil (in place): Following the incorporation of amendments and additives as recommend by soil testing report, the Contractor shall provide a minimum of six (6) samples per forty thousand

- (40,000) square feet, six inch (6") depth by three inch (3") diameter core samples of amended soil taken from the site for testing, analysis, and approval. The location of each sample shall be as directed by the COTR from areas designated as "Lawn" on the Construction Documents. No seeding or hydroseeding operations shall occur until acceptance of the amended soil samples has been obtained. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the COTR. Tests shall be as directed in paragraph 1.4 D.1.d. of this Section.
3. Seed: Submit a manufacturer's Certificate of Compliance to the Specifications with each shipment of each type of seed. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.
 4. Fertilizer: Submit four (4) certificates of analysis for each type of fertilizer.
 5. Hydro Mulching: Prior to the start of hydro mulching, submit a certified statement for approval as to the number of pounds of materials to be used per gallon of water.

1.5 DELIVERY AND STORAGE

A. Delivery:

1. Notify the COTR of the delivery schedule in advance so the plant material may be inspected upon arrival at the job site. Remove unacceptable plant material from the job site immediately.
2. Protect plants during delivery to prevent damage to root balls or desiccation of leaves. Protect trees during transport by tying in the branches and covering all exposed branches.
3. The use of equipment such as "tree spades" is permitted provided the plant balls are sized in accordance with ANSI Z60.1 and tops are protected from damage.
4. Deliver fertilizer and lime to the site in the original, unopened containers bearing the manufacturer's warranted chemical analysis, name, trade name or trademark, and in conformance to State and Federal law. In lieu of containers, fertilizer and lime may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

5. During delivery: Protect sod from drying out.

B. Storage:

1. Sprinkle sod with water and cover with moist burlap, straw or other approved covering, and protect from exposure to wind and direct sunlight. Covering should permit air circulation to alleviate heat development.
2. Keep seed, lime and fertilizer in dry storage away from contaminants.
3. Store plants not installed on the day of arrival at the site as follows:
 - a. Shade and protect plants from the wind when stored outside.
 - b. Heel in bare root plants.
 - c. Protect plants stored on the project from drying out at all times by covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material.
 - d. Keep plants, including those in containers, in a moist condition until planted, by watering with fine mist spray.

1.6 PLANTING AND TURFGRASS INSTALLATION SEASONS AND CONDITIONS

- A. Perform landscape planting operations within the following dates: From March 15 to June 15 for spring and from September 1 to November 15 for fall, but not before irrigation system installed, tested, and approved.
- B. Perform turfgrass installation operations within the following dates, but not before irrigation system installed, tested, and approved.
 1. Spring Planting: March 15 to June 15.
 2. Fall Planting: September 1 to November 15.
- C. No Work shall be done when the ground is frozen, snow covered, too wet or in an otherwise unsuitable condition for planting. Special conditions may exist that warrants a variance in the specified planting dates or conditions. Submit a written request to the COTR stating the special conditions and proposal variance for approval.

1.7 LANDSCAPE PLANT AND TURF ESTABLISHMENT PERIOD

- A. The Establishment Period for landscape plants and turf shall begin immediately after installation, with the approval of the COTR, and continue for a minimum of three (3) months during the growing season. When the full three (3) month establishment period cannot be achieved during the current growing season, the establishment period shall continue to the next growing season and shall begin again for a full

three (3) months. The Contractor shall be responsible for the health and maintenance of plants and turfgrass between growing seasons. Plants and turfgrass will not be accepted until after completion of the establishment period. During the Landscape Plant and Turfgrass Establishment Period the Contractor shall:

1. Water all plants and turfgrass to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is the equivalent of 1 inch of absorbed water per week either through natural rainfall or augmented by periodic watering. Apply water at a moderate rate so as not to displace the mulch, create any water ponding or runoff from the soil supporting the plants and turf. Prune plants and replace mulch as required.
2. Replace and restore stakes and eroded plant saucers as required.
3. In plant beds and saucers, remove grass, weeds, and other undesired vegetation, including the root growth, before they reach a height of 3 inches. After all unwanted vegetation has been removed and proper mulch quantities have been placed/restored, treat all mulched areas with pre-emergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to both early spring and early fall weed seed germination.
4. Spray with approved insecticides and fungicides to control pests and ensure plant survival in a healthy growing condition, as directed by the COTR in coordination with the MSN Agronomist.
5. Provide the following during turfgrass establishment:
 - a. Eradicate all weeds. Water, fertilize, overseed, and perform any other operation necessary to promote the growth of turfgrass.
 - b. Mow the turfgrasses as often as necessary prior to final acceptance. Begin mowing when cool season turfgrass is 4 inches high. For warm season turfgrasses mow at heights as appropriate for species and cultivar as directed by the COTR in consultation with the MSN Agronomist. Final mowing height is 3 inches for cool season turfgrasses and as appropriate for warm season turfgrasses and mow as often as necessary to maintain the proper height while never removing more than 1/3 of the total height of grass leaves in a single mowing. Mow any portion of the newly developing turfgrass stand that requires mowing without waiting for other areas of slowly developing seedlings to catch-up.

6. Replace dead, missing or defective plant material during the establishment period. Immediately replace each plant with one of the same size and species.
7. Replant any areas void of turfgrass.
 - a. Sod shall be evaluated for species and health thirty (30) days after laying the last piece of sod and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from the sod operation shall be living sod uniform in color and leaf texture. Bare spots shall be a maximum two (2) square inches. Joints between sod pieces shall be tight and free from weeds and other undesirable growth. Unsatisfactory areas shall be resodded within seven (7) days.
 - b. Seeding shall be evaluated for species and health thirty (30) days after final planting and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from the seeding operation shall be 98% coverage uniform in color and leaf texture. Bare spots shall be a maximum of one-half (0.5) square foot. Unsatisfactory areas shall be reseeded within seven (7) days.
8. Complete remedial measures directed by the COTR in consultation with the MSN Agronomist to ensure plant and turfgrass survival.
9. Repair damage caused while making plant or turfgrass replacements.

1.8 LANDSCAPE PLANT AND TURF ACCEPTANCE.

- A. Landscape plant and turf acceptance will occur after completion of the Landscape Plant and Turf Establishment Period. The Contractor shall have completed, located, and installed all plants and turfgrass according to the plans and specifications. All plants and turf are expected to be living and in a healthy condition at the time of inspection and acceptance. The Contractor shall make a written request for final inspection of the landscape plants and turf. Upon inspection when Work is found to not meet design intent and specifications, the PLANT AND TURF ESTABLISHMENT PERIOD shall be extended at no additional cost to the Government until work has been satisfactorily completed, inspected and accepted.
- B. Criteria for acceptance of landscape plants.
 1. Planter beds and earth mound water basins are properly mulched and free of weeds.

2. Tree support stakes are in good condition.
3. Total plants on site as required by specifications and required number of replacements have been installed.
4. Remedial measures directed by the Contracting Officer to ensure plant material survival and promote healthy growth have been completed.

C. Criteria for acceptance of turfgrass shall be as follows:

1. A satisfactory stand of grass plants from the sod operation shall be living sod uniform in color and leaf texture and well rooted into the soil below so that gentle pulling of the turfgrass leaves by hand does not dislodge the sod. Bare spots shall be a maximum two (2) square inches. Joints between sod pieces shall be tight and free from weeds and other undesirable growth.
2. A satisfactory stand of turfgrass plants from the seeding operation shall be 98% coverage uniform in color and leaf texture. Bare spots shall be a maximum of one-half (0.5) square foot.

1.9 PLANT AND TURFGRASS WARRANTY

A. All Work shall be in accordance with the terms of the Paragraph, "Warranty" of GENERAL CONDITIONS, including the following supplements:

1. A One Year Plant and Turfgrass Warranty will begin on the date that the Government accepts the plants and turfgrass but not before the end of the Landscape Plant and Turfgrass Establishment Period.
2. The Contractor will replace any dead plant material and any areas void of turfgrass immediately during the warranty period. A one year warranty for the plants and turfgrass that are replaced will begin on the day the replacement Work is completed and accepted.
3. Replacement of relocated plants, that the Contractor did not supply, is not required unless they die from improper handling and care during transplanting. Loss through Contractor improper handling, care, or negligence requires replacement in kind and size.
4. The Government will reinspect all replacement plants and turfgrass at the end of the One Year Warranty. The Contractor will replace any dead, missing, or defective plant material and turfgrass immediately. The Warranty will end on the date of this inspection provided the Contractor has complied with the Work required by this specification.

5. The Contractor shall remove stakes from plants having been installed for one year, unless otherwise directed by the COTR in consultation with the MSN Agronomist.

1.10 OPERATION AND MAINTENANCE (O&M) MANUALS

- A. Submit five (5) copies of the Operation and maintenance (O&M) Manuals for planting materials at the beginning of the LANDSCAPE PLANT AND TURF ESTABLISHMENT PERIOD. Include instructions indicating procedures during one typical year including variations of maintenance for climatic conditions throughout the year. Provide instructions and procedures for watering; promotion of growth, including fertilizing, pruning and mowing; and integrated pest management. O&M manuals shall include pictures of planting materials cross referenced to botanical and common names, with a description of the normal appearance in each session. Develop a water monitoring program for surface and ground water on the project site in accordance with ASTM D 5851 and consistent with the water management program utilized during construction operations.

1.11 APPLICABLE PUBLICATIONS

- A. NCA Handbook 3420 - Turfgrass Maintenance in VA National Cemeteries re-certified July 2008. The Agronomic and Horticultural practices specified in this handbook shall serve as the Contractor's official guide to all establishment and preliminary maintenance practices employed during this construction project.
- B. Specific to U.S. Dept. of Veterans Affairs and National Cemetery Administration the document titled "Cemetery Construction Requirements for Turfgrass and Landscape Plant Material Installation" Appendix TL as attached to this specification shall serve as Contractor's guide specific to this construction project.
- C. The publications listed below, form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. Use the latest edition of the referenced publication.
- D. American National Standards Institute (ANSI) Publications:
ANSI Z60.1.....Nursery Stock
ANSI Z133.1.....Tree Care Operations-Pruning, Trimming,
Repairing, Maintaining, and Removing Trees and
Cutting Brush- Safety Requirements

- E. Hortus Third, most current edition. A Concise Dictionary of Plants Cultivated in the U.S. and Canada.
- F. American Society for Testing and Materials (ASTM) Publications:
 - C136.....Sieve Analysis of Fine and Coarse Aggregates
 - C516.....Vermiculite Loose Fill Thermal Insulation
 - C549.....Perlite Loose Fill Insulation
 - D977.....Emulsified Asphalt (AASHTO M140)
 - D1557.....Test Methods for Laboratory Compaction of Soil
 - D2028.....Cutback Asphalt (Rapid-curing Type)
 - D2103.....Polyethylene Film and Sheeting
 - D5851.....Planning and Implementing a Water Monitoring Program
- G. Turfgrass Producers International:
 - Turfgrass Sodding.
- H. U. S. Department of Agriculture Federal Seed Act.
 - 1998.....Rules and Regulations

PART 2 - PRODUCTS

2.1 GENERAL

- A. All plant and turfgrass material will conform to the varieties specified or shown in the plant list and be true to botanical name as listed in Hortus Third.

2.2 ORGANIC SOIL AMENDMENT

- A. Existing topsoil on site will not be stripped and stockpiled since its organic content is low, unless otherwise directed by the COTR, or if topsoil layer contains greater than eight percent (8%) organic material. All areas to receive lawn or meadow seeding will require an organic soil amendment to increase organic content and water retention as well as enhance turf growth. Soils will be amended in-place after grading activities are completed to effectively create a topsoil horizon.
- B. Organic soil amendment will be spread and incorporated into the finished subgrade at the depths indicated on the Construction Documents in order to raise the organic content of the soil to a minimum of four percent (4%) and a maximum of six percent (6%). Contractor will allow for additional depth of the organic soil amendment to bring all grades to the required finished grades as per the grading plans.

1. Organic Soil Amendment shall be dark brown or black in color and capable of enhancing plant growth. Ninety-eight percent (98%) of the material should pass a one inch (1") screen. There shall be no admixture of refuse (i.e. noticeable inert contamination) or other materials toxic to plant growth.
2. Acceptable types of Organic Soil Amendments include peat moss, humus or peat, well rotted manure, various mature composts, and commercially available combinations thereof. Acceptable compost may be derived from natural organic sources such as food or animal residuals, yard trimmings, or biosolids. Organic Soil Amendment shall be free of all woody fibers, seeds, and leaf structures, plastic and other petroleum products, and free of toxic and non-organic matter. Unacceptable sole sources of organic matter include untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.
3. Organic Soil Amendment shall conform to the following minimum material requirements:

Test Parameter	Acceptable Ranges
Organic Matter	27% to 80%
pH	5.5-8.5
Ash	20-65%
Nitrogen	0.4%-3.5%
Phosphorus	0.2%-1.5%
Potassium	0.4%-1.5%
C:N Ratio	25-30:1
CEC	50-150 meq/100 g
Heavy Metals	Less than max. limits established by EPA 503
Inert Contents	< 1% by weight
Water-Holding Capacity	150-200%
Pathogen/Weed Seed Destruction	Proof of EPA minimum Heating requirements

4. Organic content to be determined by the loss of ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 °C, plus or minus 5°C.
5. Any topsoil stripped and stockpiled on the site may be used provided that, after testing and addition of necessary additives, it meets

the above specification. The Contractor shall provide additional Organic Soil Amendment as required to complete the required Work.

6. All Organic Soil Amendment proposed for use shall be tested for conformance to the specifications and results provided to the COTR/MSN Agronomist.

2.3 PLANTS

- A. Plants shall be in accordance with ANSI Z60.1, except as otherwise stated in the specifications or shown on the plans. Where the drawings or specifications are in conflict with ANSI Z60.1, the drawings and specification shall prevail.
- B. Provide well-branched and formed planting stock, sound, vigorous, and free from disease, sunscald, windburn, abrasion, harmful insects or insect eggs with healthy, normal, and unbroken root systems. Provide trees, deciduous and evergreen, that are single trunked with a single leader, unless otherwise indicated, display no weak crotches. Provide symmetrically developed deciduous trees and shrubs of uniform habit of growth, with straight boles or stems and free from objectionable disfigurements, and evergreen trees and shrubs with well developed symmetrical tops with typical spread of branches for each particular species or variety. Provide ground cover and vine plants with the number and length of runners for the size specified, and the proper age for the grade of plants specified. Provide vines and ground cover plants well established in removable containers, integral containers, or formed homogeneous soil sections. Plants shall have been grown under climatic conditions similar to those in the locality of the project. Spray all plants budding into leaf or having soft growth with an anti-desiccant at the nursery before digging.
- C. The minimum acceptable sizes of all plants, measured before pruning with branches in normal position, shall conform to the measurements designated. Plants larger in size than specified may be used with the approval of the COTR, with no change in the Contract price. When larger plants are used, increase the ball of earth or spread of roots in accordance with ANSI Z60.1.
- D. Provide nursery grown plant material conforming to the requirements and recommendations of ANSI Z60.1. Dig and prepare plants for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

- E. Balled and burlapped (B&B) plant ball sizes and ratios will conform to ANSI Z60.1, consisting of firm, natural balls of soil wrapped firmly with burlap or strong cloth and tied.
- F. Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers, but shall not be root bound.
- G. Make substitutions only when a plant (or its alternates as specified) is not obtainable and the COTR in consultation with the MSN Agronomist authorizes a change order providing for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of the Contract price.

2.4 LABELS

- A. Each plant, or group and bundles or containers of the same species, variety, and size of plant, shall be legibly tagged with a durable, waterproof and weather-resistant label indicating the correct plant name and size specified in the plant list. Labels shall be securely attached and not be removed.

2.5 TOPSOIL

- A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 1 inch in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 6.0 nor more than 7.0, and should be best suited to the region, climate and plant material specific to the project.
- B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet the general requirements as stated above. Amend topsoil not meeting the pH range specified by the addition of pH Adjusters.
- C. If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the COTR of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting the pH range specified by the addition of pH adjusters.

2.6 LIME

- A. Lime shall be agricultural limestone containing not less than 90 percent calcium and magnesium carbonates. Lime must be ground to such fineness that not less than 90% must pass No. 8 mesh and not less than 25% must pass No. 100 mesh. Moisture is not to exceed 10%.

2.7 SOIL CONDITIONERS

- A. Peat shall be a natural product of sphagnum moss peat, or peat moss derived from a fresh-water site conforming to Fed. Spec. Q-P-166, except as otherwise specified. Peat shall be shredded and granulated to pass through a 1/2inch mesh screen and conditioned in storage piles for at least six months after excavation.
- B. Coarse Sand
 - 1. Coarse concrete sand, ASTM C-33 Fine Aggregate, shall be clean, sharp, and free of limestone, shale and slate particles and of toxic materials.
- C. Perlite shall conform to ASTM C549.
- D. Vermiculite shall be horticultural grade and free of any toxic materials and conform to ASTM C516.
- E. Pine Bark shall be horticultural-grade milled pine bark, with 80 percent of the material by volume sized between 0.1 and 15.0 mm. (.004in. and .59in.).
 - 1. Pine bark shall be aged sufficiently to break down all woody material. Pine bark shall be screened
 - 2. pH shall range between 4.0 and 7.0.
 - 3. Submit manufacturer's literature for approval.
- F. Organic Matter shall be commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

2.8 PLANTING SOIL MIXTURE

- A. The planting soil mixture shall be composed of 3 parts topsoil, and 1 part peat moss.

2.9 PLANT FERTILIZERS

- A. Provide plant fertilizer that is commercial grade and uniform in composition and conforms to applicable State and Federal regulations.
- B. For new plant material, provide a uniform free-flowing granular complete analysis fertilizer containing a minimum of 10% by weight of

nitrogen, phosphoric acid and potash with a minimum of 50% of the nitrogen from a controlled release source such as sulfur coated urea.

2.10 TURFGRASS FERTILIZER

- A. Provide turfgrass fertilizer that is commercial grade, free flowing, uniform in composition, and conforms to applicable State and Federal regulations. Granular fertilizer shall bear the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 20% nitrogen (of which 50 percent shall be from a controlled release source such as sulfur coated urea), 5% available phosphoric acid, and 15% potash. Liquid starter fertilizer for use in the hydro mulch slurry will be commercial type with 50 percent of the nitrogen from a controlled release source such as sulfur coated urea.

2.11 MULCH

- A. Mulch shall be free from deleterious materials and shall be stored as to prevent inclusion of foreign material.
- B. Organic mulch materials shall be shredded hardwood:
 - 1. Straw for turfgrass seed bed mulch shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold or other objectionable material. Straw shall be in an air-dry condition and suitable for placing with blower equipment.
 - 2. Wood cellulose fiber mulch for use with hydraulic application (Hydro mulch) with fertilizer shall consist of specially prepared wood cellulose fiber, processed to contain no growth or germination-inhibiting factors, and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus three percent at the time of manufacture. The pH range shall be from 3.5 to 5.0. The wood cellulose fiber shall be manufactured so that:
 - a. After addition and agitation in slurry tanks with fertilizers, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogenous slurry.
 - b. When hydraulically sprayed on the ground, the material will form a blotter like cover.
 - c. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlying soil.

2.12 EROSION CONTROL

- A. Erosion control net and blanket shall be per the project SWPPP.

2.13 TREE BALL STAPLES (CONTAINER AND BALLED AND BURLAPPED MATERIAL)

- A. ManufacturerTree Staple, Inc.
139 South Street
New Providence, NJ 07974
Phone: 1-877-873-3749
Fax: (908) 464-8878
e-mail: sales@treestaple.com

Tree Caliper	Tree Staple Model	# Tree Staples Per Tree
1" - 2"	TS24 (24")	2 with up to a 16" root ball
2" - 4"	TS36 (36")	2 with a 24" root ball
4" - 6"	TS42 (42")	2-3 with a 30"+ root ball
6" - 8"	TS48 (48")	2-3 with a 36"+ root ball

2.14 EDGING

- A. Construct concrete mow curbs where indicated on plans. No artificial or constructed product shall be used to edge landscape beds that are bordered by turfgrass except where indicated on plans. Properly mulched beds shall be edged by the newly established turfgrass plantings that border and/or surround them.

2.15 WATER

- A. Water shall not contain elements toxic to plant life. It shall be obtained as specified in Section 01 00 00, GENERAL REQUIREMENTS, paragraph, Temporary Services at no cost to the Contractor.

2.16 ANTIDESICCANT

- A. Antidesiccant shall be an emulsion specifically manufactured for agricultural use that will provide a protective film over plant surfaces permeable enough to permit transpiration.

2.17 SOD

- A. Sod shall be nursery grown, certified sod as classified in the TPI Guideline Specifications to Turfgrass Sodding.
1. Sod shall be Turf Type Fescue.

2.18 HERBICIDES AND OTHER PESTICIDES

- A. All herbicides and other pesticides shall be properly labeled and registered with the U.S. Environmental Protection Agency. Keep all pesticides in the original labeled containers indicating the analysis and method of use.

PART 3 - EXECUTION

3.1 APPENDIX TL

- A. Appendix TL, "MASTER SPECIFICATIONS FOR NCA CEMETERY CONSTRUCTION, U.S. DEPARTMENT OF VETERANS AFFAIRS, National Cemetery Administration, Cemetery Construction Requirements for Turfgrass and Landscape Plant Material Installation" shall be the operational guide for the Following SPECIFICATION PARAGRAPHS 3.1 - 3.23. Any conflicts in wording or interpretation shall default to Appendix TL.

3.2 LAYOUT

- A. Stake plant material locations and bed outlines on project site for approval by the COTR before any plant pits or beds are dug. The COTR may approve adjustments to plant material locations to meet field conditions.

3.3 FINE GRADING AND ORGANIC SOIL AMENDMENT INCORPORATION

- A. Contractor shall obtain COTR's written approval of previously completed rough grading work prior to commencing organic soil amendment incorporation work.
- B. Immediately prior to dumping and spreading the approved organic soil amendment, the subgrade shall be cleaned of all stones greater than two inches (2") and all debris or rubbish. Such material shall be removed from the site. Prior to spreading of the organic soil amendment, subgrades which are too compact to drain water and too compact based upon compaction tests shall be ripped with a claw one foot (1') deep, pulled by a bulldozer two feet (2') on center, both directions. Contractor shall then regrade surface.
- C. Organic soil amendment material shall be placed and uniformly spread over approved finish sub-grades to a depth sufficiently greater than the specified depth so that after natural settlement and light rolling, the specified minimum compacted depth will have been provided and the completed Work will conform to the lines, grades and elevations indicated. Incorporate organic soil amendment by disc harrowing,

rototilling or other means in a uniform manner. The depth of incorporation shall be based upon the organic content of the tested and approved organic soil amendment, so as to produce a finished soil with an organic matter content of between four (4) and six percent (6%). Supply additional organic soil amendment material, after in-place testing and approval (see paragraph 1.4. E.1d), as may be needed to give the required organic matter content and finished grades under the Contract without additional cost to the Government.

- D. Disturbed areas outside the limit of Work shall be spread with four inch (4") minimum depth of organic soil amendment material to the finished grade.
- E. No subsoil or organic soil amendment material shall be handled in any way if it is in a wet or frozen condition.
- F. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Connect contours and spot elevations with an even slope.
- G. After organic soil amendment material has been incorporated into the subsoil, it shall be carefully prepared by scarifying or harrowing and hand raking. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over one and one half inch (1-1/2") diameter from the amended soil bed. The amended soil shall also be free of smaller stones in excessive quantities as determined by the COTR.
- H. The whole surface shall then be compacted with a roller or other suitable means to achieve a maximum dry density of 88 to 90 percent in accordance with compaction standards of ASTM D1557. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional organic soil amendment and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.

3.4 EXCAVATION FOR PLANTING

- A. Prior to excavating for plant pits and bed, verify the location of any underground utilities. Damage to utility lines will be repaired at the Contractor's expense. Where lawns have been established prior to planting operation, cover the surrounding turfgrass before excavations are made in a manner that will protect turfgrass areas. Barricade existing trees, shrubbery, and beds that are to be preserved in a

manner that will effectively protect them during the project construction.

- B. Remove rocks and other underground obstructions to a depth necessary to permit proper planting according to plans and specifications. Where underground utilities, construction, or solid rock ledges are encountered, the COTR may select other locations for plant material.
- C. Dig plant pits by any approved method so that they have vertical sides and flat bottoms. When pits are dug with an auger and the sides of the pits become glazed, scarify the glazed surface. See Appendix TL for required planting instructions for all container grown, balled and burlapped or boxed plants.
- D. Where ground cover and planting beds occur in existing turfgrass areas, remove turfgrass to a depth that will ensure the removal of the entire root system, with additional bed preparation as specified in the next paragraph.
- E. Where existing soil is to be used in place, till new ground cover and plant beds to a depth of 4 inches. Spread peat soil amendment uniformly over the bed to depth of 2 inches and thoroughly incorporate it into the existing soil to a depth of 4 inches using a roto-tiller or similar type of equipment to obtain a uniform and well pulverized soil mix. Where existing soil is compacted (former roadways, parking lots, etc.) till the soil down to a depth necessary to support the growth of new planting. During tillage operations, remove all sticks, stones, roots, and other objectionable materials. Bring plant beds to a smooth and even surface conforming to established grades.
- F. In areas of new grading where existing soil is being replaced for the construction of new ground cover and plant beds, remove 4 inches of existing soil and replace with topsoil. Plant beds shall be brought to a smooth and even surface conforming to established grades. Till 2 inches of peat soil amendment into the topsoil as specified.
- G. Using topsoil, form earth saucers or water basins for watering around plants. Basins to be 2" high for shrubs and 4" high for trees.
- H. Treat plant saucers, shrub, and ground cover bed areas, after mulching, with preemergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to both early spring and early fall weed seed germination. Plant ground cover

in areas to receive erosion control material through that material after material is in place.

3.5 SETTING PLANTS

- A. Handle balled and burlapped and container-grown plants only by the ball or container. Remove container-grown plants in such a way to prevent damage to plants or root system. Set plants plumb and hold in position until sufficient soil has been firmly placed around the roots or ball. Set plants so that the root crown is 1" higher than the surrounding grade. Plant ground cover plants after the mulch is in place. Avoid contaminating the mulch with the planting soil.
- B. Backfill balled and burlapped and container-grown plants with the native soil removed from the planting hole to approximately half the depth of the ball and then tamp and water. It is desirable to use 100% percent native soil to backfill the hole, but do not use unsuitable fill containing clay, rock or other unsuitable material. For balled and burlapped plants, carefully fold back the top half of the burlap and remove tying materials. Any wire caging or similar material, must be completely removed. Where plastic wrap or treated burlap is used in lieu of burlap, completely remove these materials before backfilling. Tamp and water remainder of backfill native soil; then form earth saucers or water basins around isolated plants with topsoil.

3.6 STAKING

- A. Stake plants as shown on the drawings and as specified.
- B. Install Tree Ball Staples per manufacturer's recommendations.

3.7 EDGING PLANT BEDS

- A. Uniformly edge beds using a sharp tool to provide a clear cut division line between the planted area and the adjacent turfgrass. Do not use any type of manufactured edging material. The properly mowed and maintained turfgrass will serve as edging for all landscape beds except as indicated on plans.

3.8 MULCHING PLANTS

- A. Mulch within 48 hours after planting and apply a preemergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to both early spring and early fall weed seed germination. Do not mulch in ground cover areas that shall have organic material placed before planting.

- B. Placing Organic Material: Spread a mulch of wood based origin to a uniform minimum thickness of 2-3 inches.
- C. Keep mulch out of the crowns of shrubs and off buildings, sidewalks, light standards, and other structures.

3.9 PRUNING

- A. Prune new plant material and indicated existing plant material in the following manner: Remove dead, broken and crossing branches. Make cuts with sharp instruments as close as possible to the branch collar. Do not make flush cuts. Do not make "Headback" cuts at right angles to line of growth. Do not pole trees or remove the leader. Remove trimmings from the site. Do not use any type of wound dressing on pruning cuts.

3.10 TILLAGE FOR TURFGRASS AREAS

- A. Thoroughly till the soil to a depth of at least 6 inches by scarifying, disking, harrowing, or other approved methods. This is particularly important in areas where heavy equipment has been used. Remove all debris and stones larger than one (1) inch remaining on the surface after tillage in preparation for finish grading. To minimize erosion, do not till areas of 3:1 slope ratio or greater. Scarify these areas to a one (1) inch depth and remove debris and stones.

3.11 FINISH GRADING

- A. After tilling the soil for bonding of topsoil with the subsoil, spread the topsoil evenly to a minimum depth of 6 inches. Incorporate topsoil at least 2 to 3 inches into the subsoil to avoid soil layering. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

3.12 APPLICATION OF FERTILIZER AND LIME FOR TURFGRASS AREAS

- A. Apply turfgrass fertilizer at a rate that will deliver 1 pound of nitrogen per 1000 sq.ft. In addition, adjust soil acidity as recommended by soil test results and add any soil conditioners as specified herein for suitable topsoil under PART 2, Paragraph 2.2A and B, and 2.5 TOPSOIL.
- B. Spread lime as recommended by the soil test results.
- C. Incorporate lime into the soil to a depth of at least 4 inches as part of the finish grading operation. Starter fertilizer should be lightly

mixed with the top ½ inch of soil. Immediately restore the soil to an even condition before any seeding or sod placement.

3.13 SODDING

- A. Accomplish sodding in accordance with the ASPA Guideline Specifications for sodding. Lay sod at right angles to slope or the flow of water. On slope areas, start at the bottom of the slope.
- B. After completing the sodding operation, blend the edges of the sodded area smoothly into the surrounding area. All sod should be rolled with a light- weight roller after being laid to eliminate air spaces between the sod and the firmed soil.

3.14 WATERING

- A. Apply water to the turfgrass areas immediately following installation at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 2 inches. Supervise watering operation to prevent run-off. Supply all pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations. Keep soil surface constantly moist, not wet, until turfgrass plants are well established.
- B. Contractor shall deep water all trees twice each week during the Plant Establishment Period, providing water penetration throughout the root zone to the full depth of the planting pits, as verified in the field by the COTR. Watering shall cease at the first hard frost in the fall and shall resume upon ground thaw in the spring.

3.15 PROTECTION OF TURFGRASS AREAS

- A. Immediately after installation of the turfgrass areas, protect against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

3.16 EROSION CONTROL MATERIAL

- A. Install and maintain erosion control material meeting the requirements of the SWPPP on the designated areas as shown and specified. Prepare, fertilize and vegetate the area(s) to be covered, as specified, before the erosion material is placed. Immediately following the planting operations lay the material evenly and smoothly and in contact with the soil throughout. Omit straw mulch from all seeded areas receiving the erosion control material.
- B. For waterways, unroll the material in the direction of water flow. When two or more strips are required to cover a ditch area, they shall overlap at least 4 inches. In case a strip is to be spliced lengthwise,

the ends of the strips shall overlap at least 6 inches with the upgrade section on top.

- C. When using erosion control material on slopes, place the material either horizontally or vertically to the slope with the edges and ends of adjacent strips butted tightly against each other.
- D. Staple each strip in three rows (each edge and center with the center row alternately spaced) with staples spaced not more than 4 feet longitudinally. When using two or more strips side by side on slopes, use a common row of staples on the adjoining strips. Staple all end strips at one foot intervals at the end. Firmly embed staples in the underlying soil.
- E. Maintenance shall consist of repairs made necessary by erosion, wind, or any other cause. Maintain, protect, repair, or replace the erosion control material until the Termination of the Plant and Warranty Period.

3.17 RESTORATION AND CLEAN-UP

- A. Where existing or new turfgrass areas have been damaged or scarred during planting and construction operations, restore disturbed area to their original condition. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. In areas where planting and turfgrass work have been completed, clear the area of all debris, spoil piles, and containers. Clear all other paved areas when Work in adjacent areas are completed. Remove all debris, rubbish and excess material from the station.

3.18 ENVIRONMENTAL PROTECTION

- A. All Work and Contractor operations shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

Appendix - TL
Master Specifications for NCA Cemetery Construction
U.S. Department of Veterans Affairs
National Cemetery Administration

Cemetery Construction Requirements for Turfgrass and Landscape Plant Material
Installation

(Updated July 2008 by NCA Chief Agronomist, A.Thomas Perkins, Ph.D.)

General Requirements

1. Existing Conditions: The Landscape Contractor shall be required to visit the site prior to submitting Bid Proposal to become familiar with all conditions affecting the proposed Work. The Landscape Contractor shall identify and review all underground utility locations prior to commencing Work and shall exercise extreme caution when working close to utilities and shall notify the COTR of apparent conflicts with construction and utilities so that adjustment can be planned prior to installation.
2. Layout, Grading and Soil Preparation: Per specifications, the Landscape Contractor shall be responsible for transporting, spreading and mechanically incorporating a 2 inch depth of organic material, such as peat moss or well decomposed compost into the surface 4 inches of tilled existing or replaced topsoil on all areas to be planted to either turfgrass or landscape plant materials such as trees, shrubs, flowers and ground covers. The Landscape Architect, Landscape Contractor, COTR, and NCA's Chief Agronomist (or appropriate MSN Agronomist as requested by the Chief Agronomist) shall review the extent of this Work prior to commencement of installation.
 - The Landscape Contractor shall be responsible for the collection and submission for testing of an adequate number of soil samples to fully characterize the soil fertility and pH profile of the soil at the site. Samples shall be submitted to a reputable soil testing laboratory several weeks prior to the commencement of any planting operations and copies of the soil analysis reports shall be provided to the COTR and NCA's Chief Agronomist or MSN Agronomist. The Landscape Contractor shall then be responsible for applying the soil analysis report recommended quantities of phosphoric acid, potash and/or limestone and thoroughly incorporating those materials to a minimum depth of 4 inches in the planting area topsoil.
 - The Landscape Contractor shall be responsible for accurately laying out the plant beds and turfgrass lawn areas by scaling the Construction Documents. Layout shall be painted or staked on the ground for review and approval by the COTR prior to excavation. Following approval of the layout, closely coordinate the installation of the irrigation system to conform to the approved layout.
 - The Landscape Contractor shall be responsible for cleanup and final grading of all areas to be established to turfgrass. The Landscape Contractor and COTR shall review the extent of cleanup and grading prior to commencing Work. All areas to be established to turfgrass whether by seeding, sodding or sprigging shall be raked smooth, removing and disposing of stones of 1 inch diameter or greater and fine graded to feather into the natural grade. The finished surface is properly described as fine textured and firm. The firmness test

requires that surface soil not be fluffy or powdery and will support the weight of an average adult person without creating a visible depression. This condition most often requires that the site be rolled with an appropriately weighted turfgrass roller. All areas shall be fine graded to achieve positive surface drainage without puddles or standing water.

- The Landscape Contractor shall be responsible for erosion control of sloped areas.
 - Weed Control: The Landscape Contractor shall be responsible for the elimination of all unwanted vegetation on the site prior to the commencement of planting operations. This shall be accomplished by applying glyphosate at the maximum label rate allowed by the EPA registered label for the total control of all types of perennial vegetation at least 2 weeks prior to the anticipated commencement of planting operations.
3. Plant Warranty: Contractor shall provide a one-year replacement warranty for all plant materials. Warranty shall cover plants that have died or partially died (thereby ruining their natural shape), but shall not include damage by vandalism, browsing, hail, abnormal freezes, drought or negligence by the VA. The Warranty is intended to cover Contractor negligence, insect infestations, plant disease and damage or shock to plants. Plants replaced under the Warranty will be warranted for one year from the date of replacement.

Plant Material Selection and Planting Requirements

1. The Landscape Plant Materials selected for all NCA Cemetery construction projects must be approved by the COTR in direct consultation with NCA's Chief Agronomist and appropriate MSN Agronomist. In general all plant material selections must be regionally adapted to the climatic conditions that exist at the site, be of appropriate mature dimensions to fit the planting location and be low maintenance species. This low maintenance requirement will generally exclude or at minimum severely limit the use of rose plants, wild flowers and ground covers. Any exceptions to these species exclusions/limitations must be specifically approved by the COTR in consultation with the NCA Chief Agronomist and appropriate MSN Agronomist.
2. Plants: All plants shall be nursery grown, Grade 1 plants meeting American Nursery and Landscape Association standards typical in shape and size for the species. Plants shall not be root-bound or loose in their containers. Handle all plants with care in loading, unloading, and transporting. Never pick-up or move tree species by grasping the trunk. This seriously damages the young bark tissue and often results in eventual tree death. Trees must be picked up or moved by lifting the root soil ball, box or container.
3. Planting Beds and Planting Pits: The Landscape Contractor shall fully excavate plant beds as required to accommodate an approximate 3 inch layer of mulch. Stones of 1 inch diameter or larger shall be removed and disposed of off-site. The optimum planting backfill material for all plant species is the topsoil retained from the excavated beds and/or pits. If the available topsoil is of very poor quality it can be amended by thoroughly mixing it with one part peat moss for every three parts of topsoil.

4. Planting Operations: Large container sizes, boxed or balled and burlapped plants shall be planted in pits no less than 2 and preferably 3 times as wide as the plants soil ball/container. The proper depth of the planting hole must allow placement of the plant soil ball on undisturbed soil that results in the location of the tree's root flare slightly above final soil grade. The root flare should never be placed at a location where it is below the finished soil grade. The Landscape Contractor shall be responsible for ensuring the placement of all plants with their best side facing the nearest Cemetery road. Use the total quantity of landscape plants per the landscape specifications and obtain final approval of plant material lay-out from the COTR in consultation with NCA's Chief Agronomist or appropriate MSN Agronomist.
5. Planting Bed Edging: No artificial material such as steel strips, bricks, or landscape timbers is to be installed as edging for finished plant beds or tree pit mulch surrounds. The turfgrass established at the site mowed at its proper maintenance height will serve as the edge material for all planting beds and tree pit mulch surrounds.
6. Mulch: Following planting and proper backfilling all planting beds and tree pits shall be mulched with an approximate 3 inch layer of shredded wood fiber mulch. Mulch must not be mounded at the base of newly planted trees, leaving an un-mulched area immediately adjacent to the trunk and the finished depth of the mulch at the edge of planting beds and tree mulch surrounds should be slightly below the anticipated turfgrass mowing height. This allows mowing maintenance equipment to pass above the mulch edge without interference or mulch disturbance.

Turfgrass Species Selection for Seeding, Sodding or Sprigging
General Considerations

1. Turfgrass species approved for use on NCA cemeteries are limited to a select number of regionally adapted species that deliver acceptable turfgrass quality and appearance when provided with a level of maintenance consistent with NCA's Standard Operating Procedures for Turfgrass and Landscape Maintenance as specified in NCA Handbook 3420. These species are divided into two broad categories based on regional climatic adaptation.
 - Cool Season Turfgrasses are best adapted to the cool humid climatic zones of the United States. They include Kentucky bluegrass, perennial ryegrass, fine fescue and tall fescue. No other turfgrass species are permitted.
 - Warm Season Turfgrasses are best adapted to the warm humid climatic zones of the United States and with adequate irrigation to the warm/hot arid or semi-arid areas of the southwestern United States. They include bermudagrass, St. Augustinegrass, centipedegrass, and bahiagrass.
 - Zoysiagrass is not generally an acceptable turfgrass species for NCA Cemetery use due to its extremely slow rate of growth and high maintenance costs. If unique environmental and growing conditions exist at a NCA construction site suggest that zoysiagrass should be considered as the recommended turfgrass species, a special waiver endorsed by the NCA Chief Agronomist and appropriate MSN Agronomist must be obtained in writing before approval of the planting plan. No other turfgrass species are permitted.

Specific Seed Mixture and Sod Composition Guidelines
Seed Mixtures: Composition is % by Weight

Cool Season: Preferred mixture - 50% perennial ryegrass (a blend of 2 regionally adapted cultivars)
30% Ky. bluegrass (a blend of 2 regionally adapted cultivars)
20% fine fescue (a blend of 2 regionally adapted cultivars)
Seeding Rate = 6 lb /1000 sq.ft. or 250 lb/acre

Secondary mixture - 50% tall fescue (a blend of 2 regionally adapted cultivars)

50% perennial ryegrass (a blend of 2 regionally adapted cultivars)

Seeding Rate = 10 lb/1000 sq.ft. or 450 lb/acre

Warm Season: Preferred mixture, sunny locations- seeded bermudagrass - use a blend that contains 2 or 3 cultivars from this list: Sunsport, Princess, Riviera, Southern Star, Blackjack, Savannah, Primo Blend

Seeding Rate = 2 lb/1000 sq.ft. (hulled seed)

Preferred species, shady locations- St. Augustinegrass - sod only

Secondary/low visibility - Centipedegrass or Bahiagrass

Bahiagrass Seeding Rate = 8 lb/1000 sq.ft. or 350 lb/acre (scarified seed)

Centipedegrass Seeding Rate = 2 lb/1000 sq.ft. or 100 lb/acre

Turfgrass Sod Composition:

On projects where commercially grown sod or plugs is specified select a turfgrass species composition that roughly approximates one of the above seed mixtures. Improved cultivars of St. Augustinegrass and Zoysiagrass should only be established by sodding, sprigs or plugs.

- - - END OF SECTION 32 90 00 - - -