MATERIAL SPECIFICATION AND GUIDELINES: PINEY POINT LIGHTHOUSE & MUSEUM LIVING SHORELINE PROJECT

STONEWORK

DESCRIPTION:

The Contractor shall furnish all necessary labor, equipment and materials and perform all operations in connection with the stonework as shown on the Drawings, as described in these Specifications and as directed by the Owner.

MATERIALS:

A. Geotextile:

The geotextile shall be a porous, plastic sheet of woven calendered and palmered filament yarn. The plastic yarn shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments resistant to deterioration due to ultra-violet and heat exposure. The fabric shall conform to the following minimum requirements:

PROPERTY	***TEST METHOD***	***CRITERIA***
AOS	ASTM D-4751	70 U.S. Standard Sieve Size
% Open Area	COE CWO-02215-86	4-6%
Tensile Strength	ASTM D-4632	250 Lb. All Principle Directions
Burst Strength	ASTM D-3786	450 psi
Puncture Strength	ASTM D-4833	120 lb.
Abrasion Resistance	ASTM D-4157/D-4158	60 lb.
Seam Breaking Strength	ASTM D-1683	225 lb.
Clogging resistance	AOS (mm)	>1 or 0.149 (mm) Gradient Ratio < 3.0
Water Permeability	ASTM D-4491	-0.01 cm/sec (Lateral Permeability)
Coefficient		Ultra-
Violet Stabilization	ASTM D-4355	90% retained strength

1. **Seams:** Seams of fabric shall be sewn with thread meeting or exceeding specifications given for plastic yarn and shall be bonded by cementing or alendaring. Seams shall be tested in accordance with method ASTM D-1683. The seam strength shall meet the strength specified herein but shall not be less than 90% of the tensile strength of the imaged fabric in any principal direction.

2. **Temporary Securing Pins**: Securing pins shall be 3/16 inch in diameter, of steel, pointed on one end and fabricated such that the held retains a steel washer of 1.5" diameter or more. Pins shall be no less than 18" in length.

3. **Acceptance of Fabric**: All plastic geotextile to be used shall be tested for compliance with the above specifications. The Contactor shall submit in duplicate a certificate or affidavit signed by a legally authorized person from the company manufacturing the

fabric. The certificates shall state that chemical, physical and manufacturing requirements are met as specified herein.

In addition, evidence of a service record shall be submitted of any filter fabric not previously approved by the Owner providing successful performance in projects of similar scope. Approval of geotextile shall be obtained from the Owner prior to installation.

B. ***Stone:***

1. General: All stone for the protection work shall be durable quarried stone as approved by the Owner. The stone shall be hard and angular, free from laminations, weak cleavages, and undesirable weathering, and of such character that it will not disintegrate from the action of air, salt water, freezing and thawing, and in handling and placing. Sedimentary stone will generally be unacceptable. Individual stones shall be approximately rectangular in cross section and free from thin slabby pieces having a maximum dimension more than three and one-half times the least dimension. All stone shall be supplied from the same quarry.

   The armor and chinking stone shall have a minimum unit weight of 160 lbs. per cubic foot.

2. The Contractor may incorporate existing stones into the proposed structure insofar as they meet the size and quality requirements in these specifications. Any existing bricks or concrete rubble within the footprint of the proposed structure shall be removed and disposed offsite by the Contractor.

C. **Stone Size:** Stone sizes for armor stone, chinking stone, bedding stone and washed cobble stone shall meet the following requirements.

1. Armor stone sizes shall be such that a minimum of 90% of the individual stones shall weight from 800 lbs. to 2,000 lbs. and shall be a well graded distribution of these sizes through these limits. Not more than 10% of the individual stones shall weight more than 2,000 lbs. A minimum of 50% of the armor stones (by volume) shall weigh more than 1,400 lbs. No armor stones shall be less than 800 lbs.

2. Chinking stone sizes shall be such that a minimum of 90% of the individual stones shall weigh from 100 lbs. to 300 lbs. Not more than 10% of the individual stones shall weigh more than 300 lbs. A minimum of 50% of the armor stones (by volume) shall weigh more than 200 lbs. No chinking stones shall be less than 100 lbs.

3. Bedding stone shall be approximately 3” up to15” in size. Bedding stones smaller than 3” will not be acceptable.

4. Washed cobble stone shall be approximately 2” in size. Washed cobble stone smaller than 2” will not be acceptable.

D. **Field Samples:** The Contractor shall supply samples of stone to be displayed at the site with appropriate individual weights marked as follows: 800 lbs., 1,400 lbs., and 2,000 lbs. These samples of stone shall be from the same quarry and of the same type of stone as that to be supplied for the job and shall be delivered to the site in advance of the time when placing the stone protection is expected to begin. Final approval of stone for the protection work will be based upon these samples. The Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval or disapproval of stone protection material under the requirements of these specifications.

E. **Certification:** The quarry shall submit to Owner a certificate indicating the following:

1. Stone Classification
2. Weight per cubic foot
3. That sizes stipulated in the specifications are being supplied to the site and source of stone shall be indicated.
4. Stone quality will meet all project specifications, including undesirable weathering and disintegration.

CONSTRUCTION METHOD:

A. **Foundation Conditions:** It should be expected that some settlement and displacement of the foundation (mud-waving) may occur during construction and should be taken into account in determining the total volume of stone required. No additional payment will be made for such additional stone required due to settlement or displacement.

B. **Alignment and Grading**: The geotextile, armor stone and chinking stone shall be placed within the limits and to the lines and grades shown on the Drawings or otherwise required by the Owner. The alignment of the structure(s) shall be laid out in accordance with the stake-out data shown on the Drawings. The structures shall extend no further outboard than is necessary to construct them to the lines, grades and limits shown on the Drawings. The subgrade surface shall be smooth-graded and free from any projections or abrupt changes which may cause damage to or bulging of the filter fabric.

C. **Slope Protection**: The Contractor shall schedule his operations so that the length of time newly graded areas are left exposed to wave action is minimized. Immediately prior to placement of geotextile, the stone backfill slopes shall be fine graded to a tolerance of plus three-tenths (0.3) of a foot from a smooth surface as measured by an approved template. The Contractor shall not prepare more subgrade than can be covered with stone by the end of each working day. Temporary protection for the exposed end of the subgrade shall be provided at the end of each working day.

D. **Geotextile:** The strips of geotextile shall be spread parallel to the major axis of the structure on the prepared foundation as shown on the Drawings. The fabric shall be loosely laid (not stretched) with no more than one overlap parallel to the major axis of the structure. The overlap shall be a minimum of 5 feet. Strips of cloth shall be spread in a manner such that the strip totally in contact with the soil shall be the upper strip. Overlaps perpendicular to the major axis of the structure shall be staggered a minimum of 5 feet. Rolls of as great a length as it is economical for the Contractor to handle shall be used whenever possible in order to minimize the number of overlaps perpendicular to the major axis of the structure.

E. **Temporary Securing Pins**: The geotextile may be temporally pinned in place with securing pins to prevent slippage during construction. The pins shall be retained until sufficient armor stones are set to hold the geotextile. The securing pins shall then be removed as additional armor stones are placed to relieve high tensile stress which may cause damage to the geotextile. Alternate anchoring may be used subject to the approval of the Owner.

F. **Armor Stone:** Armor Stone shall be placed in such a manner as to produce a well graded mass of rock with a minimum percentage of voids and shall be constructed to the specified lines and grades. Stones shall be placed so there is a well-graded distribution of the various sizes throughout the structure. Any oversize stones shall be placed at the toe of the structure. The finished structures shall be free from pockets of small stones and clusters of larger stones. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain interlocking and a well-graded distribution of stone sizes. After placement of armor stones, only surface voids at or near grade which are large enough to receive chinking stone shall be filled. The Contractor shall maintain the structures until accepted and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the Drawings.

G. **Sample Section:** At the start of construction, the Contractor shall construct a full sample section of stone, approximately thirty (30') feet in length, at a location agreed on in the field by the Owner and the Contractor. Wooden templates shall be placed at both ends of the section, so the Contractor and the Owner can verify that the section is in accordance with the plans. This sample section must be approved by the Owner prior to the start of any additional stone construction, and shall serve as the standard for further stone work. Flank walls shall not be considered as part of the sample section.

H. The Contractor shall anchor the proposed stone into the existing revetment as indicated on the Drawings. He shall remove stones from the existing revetment as necessary in order to make the connection into the proposed stone. New geotextile shall be installed as required lapping the new cloth with the existing cloth as applicable. Existing removed stones, meeting the specifications, can be reused in the proposed stone construction. The connection of the proposed stone to the existing revetment is incidental; therefore, no measurement for payment will be made for the connection.

MEASUREMENT:

No measurement for payment for this item of work will be made since the cost shall be included in the lump sum price bid.

- END OF SECTION –

SAND FILL

DESCRIPTION:

The Contractor shall provide all necessary equipment, labor and material required to perform the sand fill and grading to the lines and grades shown on the Drawings. Unsuitable or excess material shall be disposed of offsite by the Contractor.

MATERIALS:

A. Sand fill material shall be medium to coarse grained sandy soils classified as SW and SP in "ANSI/ASTM D-2487-69, Classification of Soils for Engineering Purposes". Crushed stone or slag will not be acceptable.

B. The sand fill material must contain less than 10% by weight passing the number 100 sieve, not more than 10% by weight retained on a number 4 sieve, with no stone having a diameter greater than one-half inch (1/2"). The material shall consist of rounded or semi-rounded grains with a median diameter of 0.6 mm (±0.25 mm).

C. Crushed stone or slag will not be acceptable. No frozen material, trash, roots, or other organic material will be permitted in the fill.

SAMPLE AND CERTIFICATION:

A. The Contractor shall furnish for approval, samples and gradation curves of the proposed sand fill to the Owner **prior to placement**. The cost for materials testing shall be included in the Contractor cost for furnishing the sand fill.

B. The Contractor shall obtain from an inspection firm acceptable to the Owner and submit to the Owner a certificate indicating the following:

1. Sand classification
2. Gradation curves
3. Weight per cubic yard
4. That materials stipulated in the specifications are being supplied to the project site

C. Additional samples and gradation curves shall be provided for approval by the Owner during the sand fill placement. Sample analysis will be required after placement of each 500 cubic yard increment of sand fill. Nothing in this specification precludes the Contractor from obtaining and analyzing samples of sand fill more frequently for the

Owner approval as it is being delivered and placed. The Owner will inspect sand fill materials as they are delivered to the site. Any materials not meeting specifications shall be entirely removed and disposed of off-site.

PLACEMENT:

A. The Contractor shall remove all excess waste materials, rubbish, construction debris, etc. from the construction site prior to placement of the sand fill.

B. The Contractor shall only place sand fill material along protected reaches of shoreline (landward of the newly constructed stone).

C. The Contractor shall place sand fill in all areas uniformly to the lines and grades shown on the Drawings. The finished surface shall be smooth, compacted, free of irregular surface changes, free of areas which may collect water or other debris and shall uniformly match the proposed sand fill template.

D. Cross sections used for verification of the design fill template shall be spaced no more than 50 feet apart and submitted to the Owner or Owner's Representative. Cross sections shall be plotted at a scale no smaller than 1" = 10'. The cross-sectional survey shall be performed by a licensed surveyor or by the Contractor, provided it is done in the presence of the Owner. All costs associated with construction surveys shall be included in the Contractor's lump sum price.

E. Acceptance of completed sand fill placement will be based upon the receipt of the plotted cross-sectional survey showing that the sand was installed to the proposed lines and grades shown on the Drawings.

F. The Contractor shall exercise extreme care to protect any existing structures when placing the sand fill. If any are damaged as a result of the Contractors construction activities, the Contractor shall repair them, at his own expense, to a condition equal to or better than that found at the time of Award of Contract. Repairs will be made to the satisfaction and approval of the Owner.

MEASUREMENT:

No measurement for payment for this item of work will be made since the cost shall be included in the lump sum price bid.

-END OF SECTION-

WETLAND PLANTINGS

DESCRIPTION:

The Contractor shall furnish all labor, materials, and equipment required to complete the wetland plantings in strict accordance with these Specifications and as specified on the Contract Drawings. Once the wetland plantings operation has been completed, the Contractor shall be responsible for replanting any areas, which do not show the proper density of grass for a period of one (1) year. The minimum acceptable density of surviving plants shall be 85% of shoreline planted.

MATERIALS:

A. **Fertilizer:** Fertilize each planting hole with 1.0 ounce of Osmocote 19-6-12 slow release fertilizer (3 to 4 month release) or approved equivalent placed in the hole at the time of planting.

B. **Plant Stock:** Prior to installing plants at the project site, the Contractor will be required to show proof from plant suppliers of a valid Maryland Nursery Inspection Certificate or Plant Dealers License (or comparable certification for out-of-state installers). All shipments of nursery stock into Maryland must be accompanied by a valid certificate of inspection issued at the state of origin, and acceptable to the Maryland Department of Agriculture Office of Plant Industries and Resource Conservation.

1. Spartina Patens Plant Stock: Plant stock shall be Saltmeadow Cordgrass (Spartina patens) grown in peat pots. Plants will be three to six months old and approximately 12 inches high. Individual pots will contain four or more plants

C. **Goose Exclusion Fence:** Goose exclusion fence shall consist of 2 inch by 2 inch wooden posts, 5 feet in length with 12ply cotton twine stretched taut between posts.

EXECUTION:

A. **Preparation:**

1. All areas that are to be planted shall be cleaned and removed of rough grass, weeds, and debris and the ground surfaces smoothed.

2. Plants held at the site shall be watered by sprinkling with river water at least once a day. Plants shall not be removed from peat pots. Planting shall be done with moist, but not saturated, root masses.

3. It will be the responsibility of the Contractor to maintain the vigor of the plants held at the site during site preparation work and construction.

B. *Planting:*

1. The planting season for wetland sprigging shall be accomplished between April 1 and June 30 or August 15 and October 15, during periods of low tide.

2. Spartina Alterniflora Soil Preparation and Planting:N/A

a. The proposed MHW (Elev. = + ___') shall be marked on the ground and plantings shall be made in rows parallel to and beginning at the MHW line elevation and extending to the stone. Rows shall be 18 inches apart and plants 18 inches apart from the Mid-tide (Elev. = +___ ') line to the MHW (Elev. = + ____') line.

b. Plantings shall be made by hand with dibble, spade or shovel by opening a hole at the planting site, placing the fertilizer and then the plant in the hole, closing the hole and firming the soil around the plant so that the surface soil level covers the top of the planting pot 1 to 2 inches.

C. Spartina Patens Soil Preparation and Planting:

a. The lower limit (Elev. = + 3') lines shall be marked on the ground and plantings shall be made in rows parallel to and beginning three feet (3.0') waterward of the MHW line extending to the limits shown on the Drawings. Rows shall be 18 inches apart and plants 18 inches apart from the lower limit (Elev. = + 3') line to the uplands limit of the wetlands planting.

b. Plantings shall be made by hand with dibble, spade or shovel by opening a hole at the planting site, placing the fertilizer and then the plant in the hole, closing the hole and firming the soil around the plant so that the surface soil level is ½ to 1 inch above the top of the planting pot root mass. If the soil at the planting site is not wet or damp, the plants shall be sufficiently watered with river water within 4 hours after planting.

GOOSE EXCLUSION MEASURES:

Goose exclusion measures shall be installed to protect new wetland plantings. The goose exclusion fence shall be 2-inch by 2-inch wooden posts, 5 feet in length, will be installed approximately 1.5 feet deep at about 10 foot intervals in a grid pattern throughout the planting area and along the perimeter of the planting area. Nylon string, minimum 18 gauge, will be stretched taut between posts, wrapped once around each post, and secured with staples. The first strand of string will be 6 inches above the ground level with 3 additional strands of string installed at even spacing higher up on the posts, for a total of 4 strands. The goose fence will be tied back into the fast land at the landward limit of the area of wetlands planting.

WETLANDS VEGETATION WARRANTY

The installation contractor will guarantee eighty-five percent (85%) survival of wetland species vegetation that is installed as part of the project every twenty-five (25) feet along the shoreline for a period of one (1) year from the date of acceptance.

MEASUREMENT:

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid

- END OF SECTION –

NATIVE TREE STOCK PLANTING

SCOPE

The work shall consist of furnishing and installing the proposed native tree stock and includes all labor, materials, tools and equipment to complete the work in accordance with these Specifications and the Native Plant Materials Table (Appendix A). All requirements of Section 710, Tree, Shrub, and Perennial Installation and Establishment of the Maryland Department of Transportation, State Highway Administration, "Standard Specifications for Construction and Materials" 2008, as amended, shall apply, except as specified herein.

REFERENCE DOCUMENTS

A. Plant Measurement Plant measurement size and grading shall be in accordance with the current edition of the American Standard for Nursery Stock as approved by the American Association of Nurserymen.

B. Standardized Plant Names The current edition of Standardized Plant names as adopted by the American Joint Committee on Horticultural Nomenclature shall be the authority for all plant names.

INSPECTION AND ACCEPTANCE OF TREE STOCK

A. Plants will be subject to inspection and the approval of the Owner, upon delivery at the planting site. Approval will be granted based on conformity to specification requirements as to quantity, size, health/quality, and species. Tree stock installation will be subject to the approval of the Property Owner.

B. Immediately after a rejection is issued, rejected tree stock shall be removed from the site by the Contractor. If the planting site has been disturbed, due to rejected stock, and that stock is not replaced by contract deadline, all such planting sites must be restored to their original condition (backfilled, smoothed out, and sod applied) by the Contractor at no additional cost to the Owner.

C. The Contractor shall provide the inspection certification from the Board or Department of Agriculture or other State Agency of the State within which the nursery, where the plants were grown, is located. Certification must be provided when the plants are delivered to the site for review and approval. Failure to provide valid and complete certification may result in rejection or postponement of work by the Project Inspector.

D. Guarantee

1. There is a one-time replacement warranty policy for all trees installed and accepted per this contract. This warranty provides for replacement of trees that die or whose health is severely impaired. The warranty period exists for (1) one year after the tree was initially accepted. Replacement costs shall be borne by the Contractor at no additional cost to the Owner.

2. The warranty for all replacement plants shall extend for an additional period of one year from the date of their acceptance after replacement.

3. Trees will be considered needing replacement if they are completely dead, if more than forty (40) percent of the crown is dead, or if the entire terminal leader has died back

4. Replacement Schedule: Trees determined to have died during the warranty period may be removed (cut at ground level and discarded) by the site manager once the review period has ended and agreement has been reached between the Owner and the Contractor. All trees determined to be dead must be replaced during the next planting season. Planting seasons include:

Spring:	March 15 – May 31*
Fall:	October 1 – November 17*

*Actual planting periods and deadlines will be within these seasons and as per the Planting Contract Specifications.

5. All acceptance review and installation requirements for initial installations apply to replacement trees, if necessary.

E. Tree Stock Replacements

Replacement trees shall be of the same size, quality, root form and species as specified in the Plant Materials Table (Appendix A), unless approved by the Owner.

MATERIALS

A. Planting Stakes and Appurtenances

1, Vertical stakes shall be rough sawn, straight grain hardwood reasonably free from knothole, bark, wane, warp and splits. Stakes for trees over ten feet tall shall be of 2 inches x 2 inches x 8 feet. Stakes for smaller trees shall be of 2 inches x 2 inches x 6 feet. Stake sizes are nominal.

2. Guying wire shall be pliable Number 12 or 14 gauge galvanized.

3. Rubber hose for stem protection shall be 5/8 inch or ¾ inch reinforced corded garden hose or the equivalent.

B. Mulch

1. All mulch shall be free of toxic substances or foreign materials that may harm plant life.

2. Mulch for tree planting shall be shredded hardwood bark.

C. Watering

Water provided by the Contractor and used for planting shall be obtained from fresh water sources and shall be free from injurious chemical and other toxic substances harmful to plant life.

D. Tree Stock

1. All trees shall be nursery grown

2. All plants shall conform in all respects to the ANA Specification for Nursery Stock (ANSI 260.1, current edition). Furthermore, trees shall have straight trunks unless otherwise specified. Branching shall begin at approximately 1/3rd the total height of the tree unless otherwise specified or accepted by the Owner.

3. Plants shall conform to the measurements specified in the Plant Materials Listing with the following exceptions:

   a. Plants larger than specified may be used if approved by the Owner, at no additional cost to the Owner. If the use of larger plants is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.

   b. Species substitutions may be made only upon the approval of the Owner.

4. Gender documentation must be provided for all deciduous nursery stock supplied (ie: non-parthenocarpic hollies)

5. All plants shall be healthy, vigorous, high quality, possess habit indicative of species, and be free from defects, infestations, and objectionable disfigurements. All plant material will be representative of the highest industry standards, and considered first class representatives of their species and variety.

6. All plant material shall be guaranteed to grow and appear in a way typical to the specified genus, species, & cultivars for one (1) full growing season. Failure of a lant to do so will be considered grounds for rejection or for reimbursement by

the Contractor to the Owner if payment has been issued.

7. Plants installed between bud break and leaf abscission shall be in full leaf. Defoliated, wind burned, and desiccated plants will be rejected immediately.

1. Digging and Preparing for Shipment

a. Balled and burlapped plants shall be dug with firm, natural balls of earth, of sufficient diameter and depth to include most of the fibrous roots.

b. Container grown tree stock shall have been grown in a container large enough for the root system to develop sufficiently to hold its soil together firmly. No trees shall be loose in the container, or found to have excessively circling roots (pot bound).

c. Plant material must be carefully loaded, secured and covered, and all plants and plant parts (root balls, stems, limbs, leaves) shall be adequately covered with a tarp for protection at all times from the sun, drying winds, or frost during the transporting process.

EXECUTION

A. Handling and Protection of Delivered Plants

1. During transportation, plants should be handled, secured and covered so as to prevent damage. Plants should never be thrown or bounced off a truck or loaded to the ground. All plants shall be handled in such a way as to minimize abrasions, scarring, or breakage. Any abrasions or breakage should be treated immediately as appropriate. Significant scarring should be treated by wound tracing and broken limbs should be removed according to proper standards (ref: ANSI A-300).

2. During the planting session, all plants and plant parts (root balls, stems, limbs, leaves) shall be adequately protected at all times from the sun, drying winds, or frost.

3. All trees which cannot be planted immediately upon delivery shall be set on well-drained ground and shall be well-protected with soil, wet straw, peat moss or other acceptable material. Trees stored on-site and above ground must be watered daily by the Contractor until such trees are installed and receive their final post –installation watering must also performed by the Contractor.

B. Planting Procedures

1. Excavation for Planting

a. The Contractor shall notify Owner's Project Inspector prior to beginning

operations. Required notice must be given by the Contractor during normal working hours (Monday – Friday, 8:00 am – 4:30 pm).

b. Excavations shall be made at each staked location as specified on the site maps.

c. Excavations shall be circular with sloping sides and a horizontal bottom. The sides of the slope shall be scarified, not glazed.

d. Excavations for trees shall be at least two feet greater in diameter than the ball of earth or spread of roots of the tree and sufficiently deep to comply with planting details or as directed by the Owner's Project Inspector.

e. If excavations are made in advance of planting, Contractor shall backfill to grade with the excavated soil and re-stake locations.

f. If adequate soil does not exist upon excavation of the planting site(s), the Contractor shall notify Maryland DNR Project Inspector immediately.

g. The Contractor shall remove from the site all excess soil, rocks, and other debris excavated from the planting site(s). Cease installation if presence of rocks at planting site is excessive; notify the project manager immediately so an alternative location can be determined.

2. Planting

a. The Contractor shall not plant trees with wire baskets still attached. Completely remove wire baskets.

b. Trees of the specified species shall be planted at the locations shown on the site maps unless otherwise directed by the Owner's Project Inspector.

c. The Contractor shall set trees exactly vertical and in the center of excavations at an elevation so that, after settlement (backfilling and watering), the top of the root ball will be one inch higher than the surrounding finished grade.

d. After setting balled and burlapped trees, the Contractor shall 1) cut and remove burlap around the top half of the balls, 2) remove balling and tying materials from the rootball and tree pit without damage to the soil ball; 3) backfill up to one-half the depth of the balls; 4) compact the excavated soil around the bases of the balls to fill all voids by tamping and thoroughly watering; 5) cover any remaining burlap, on the lower portion of the rootball, with at least two inches of soil; and 6) fill the remainder of the excavation with soil, tamp and water again. All the above must be completed within the same day of planting

e. When container grown trees are planted, the Contractor shall 1) remove the plant from the container but do not damage the root ball; 2) loosen the roots gently around the sides of the ball and cut or spread out any roots that are encircling the root ball; and 3) continue and complete planting steps as outlined for balled and burlapped trees,

f. Watering shall mean full and thorough saturation of backfill in the excavations. Watering must be performed on the day the trees are planted. The Contractor shall apply water by container or by using an open-end hose under low pressure only.

g. When planted, watered and fully settled, the trees shall be vertical and the top of the root ball shall be one inch higher than the surrounding surface.

h. Tree wrap shall not be used.

i. The Contractor shall 1) mulch completed plantings with the specified mulching material; 2) spread mulch evenly to a minimum thickness of three inches over the entire area of the filled excavation; and 3) pull mulch one inch away from stem of tree. Mulching shall be done the same day that the tree is planted.

j. The Contractor shall prune only dead or broken branches using clean, sharp pruning tools. Cutting leaders of trees is prohibited.

k. The Contractor shall stake designated trees within 24 hours of the day the trees are planted. Stakes shall be neat, secure and shall evenly support the tree to a true vertical line, parallel to the tree. Stakes should be placed directly opposite one another with the planted tree directly between the stakes. When installing stakes, the Contractor shall avoid damage to newly planted tree's branches and root ball. The Contractor shall install stakes just outside the root ball and into solid earth below the excavation bottom. Guy wires shall be covered with hose material where the wire is in contact with the trunk and branches. Guy wires shall be wrapped two full turns around the stakes. Wires shall be tightened enough to securely support the tree while allowing a two-inch side-to-side movement.

3. Cleanup After Planting

The Contractor shall remove all waste materials, including burlap pieces, containers, tree tags, and workers' refuse continuously and promptly from the project site.

MEASUREMENT

No Measure for payment for this item of work will be made since the cost shall be included in the lump sum price bid.

RESTORATION OF GRADED AND DISTURBED AREAS

DESCRIPTION:

The Contractor shall furnish all labor, materials and equipment required to complete the work described herein in strict accordance with these Specifications. When all construction-related activities are completed, upland permanent seeding shall be accomplished by the Contractor on all graded and disturbed areas in accordance with these Specifications. The responsibility of the Contractor is to accomplish the complete permanent seeding operation within seven (7) calendar days as to the surface of all non-wetland planting, disturbed or graded areas on the project site after completion of the grading work. Once the finished upland seeding operation has been accomplished, the Contractor shall be responsible for initial watering and subsequent maintenance of the seeded area. The Contractor will be required to re-seed any areas which do not show the proper density of vegetation.

PERMANENT SEEDING: (If Necessary)

A. Site Preparation: Grade as necessary and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring.

B. Seedbed Preparation: Apply 45 lbs. of 10-20-20 fertilizer per acre (1.0 lb/1,000 sq. ft.) harrow or disk into soil to a depth of 2 to 4 inches. Apply pulverized ground limestone at a rate of 90 lbs. per 1,000 sq. ft.

C. Seeding:

1. Apply Mix 1 with Coastal Panic Grass at 10 lbs./ac. and add Creeping Red Fescue at 15 lbs./ac. and add Partridge Pea at 4 lbs./ac. between Feb. 15 to June 15.

2. Apply seed uniformly with cyclone seeder, drill, cultipacker, seeder or hydroseeder (slurry includes seed, fertilizer, lime, cellulose fibers with binder and water) preferably on a firm, moist seedbed. Maximum seed depth shall be ¼" in clayey soil and not more than ½" in sandy soil, when using other than hydroseeder method.

3. Where feasible, except when a cultipacker seeder is used, the seedbed shall be firmed following seeding operations with a light roller.

D. Mulching:

1. Mulch Materials: Mulch materials shall be unweathered, unchopped small grain straw (preferably wheat) at the rate of 1-1/2 to 2 tons per acre, or 70 to 90 lbs. per 1,000 sq. ft. Oat straw may contain viable seeds which may provide serious competition for grass and legume seedlings unless clipped and will therefore not be allowed.

2. Spreading: Spread uniformly by hand or mechanically so that approximately 85% of the soil surface will be covered.

3. Anchoring: Mulch anchoring shall be accomplished immediately after placement of mulch to minimize loss by wind and water. The chemical binder, "Terra Tack MP" (without fiber) as manufactured by Grass Growers of Plainfield, New Jersey, or an approved equal product shall be applied to all mulched areas at the rate of 100 pounds of dry chemical material to one (1) acre. The dry chemical material shall be mixed with water prior to application, at the rate of one pound per two (2) gallons. Mixing procedures and method of application shall be in accordance with the manufactures latest technical bulletins.

E. Planting Season: Permanent seedbed preparation and seeding shall be accomplished between Feb. 15 to June 15.

TEMPORARY SEEDING (If Necessary)

A. Site Preparation: Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding and mulch application and anchoring.

B. Seedbed Preparation: Apply 45 lbs. of 10-20-20 fertilizer per acre (1.0 lb/1,000 sq. ft.) harrow or disk into soil to a depth of 2 to 4 inches. Apply pulverized ground limestone at a rate of 90 lbs. per 1,000 sq. ft.

C. Seeding:

1. Apply 40 lbs. per acre (1.0 lbs per 1,000 sq. ft.) of Annual Ryegrass between Feb 15 to April 30; August 15 to November 30. Apply 30 lbs. per acre of Foxtail Millet between May 1 to August 14.

2. Apply seed uniformly with cyclone seeder, drill, cultipacker seeder or hydro-seeder (slurry includes seed, fertilizer, lime, cellulose fibers with binder and water) preferably on a firm, moist seedbed.

D. Mulching and Mulching Anchoring: Mulching and mulch anchoring shall be accomplished in accordance with Division 6-2D of these Specifications.

E. Planting Season: Seedbed preparation and seeding shall be accomplished at any time of the year except when the ground is frozen. When the ground is frozen, the seeding shall be postponed until seedbed preparation can be accomplished as described.

MEASUREMENT

No measurement for payment for this item of work will be made since the cost shall be incidental to the completion of the project.

-END OF SECTION-