Rec'd.
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REVEGETATION/RECLAMATION GUIDELINES

1. These guidelines should not be used in natural zones where the defined management objective is to maintain genetic integrity and diversity and/or preserve a dynamic ecosystem.

2. The guidelines and specification herein are for use in development zones where the defined management objective is to replace an existing or destroyed plant cover with a regionally native plant community.

3. Items 4-10 are biotic and abiotic attributes of plant communities that must be considered to determine ecological compatibility (ie: selection of target species based on site soil and environmental conditions) and develop specifications that will literally spell out the extent of work necessary to establish a target plant community.

4. Soil Testing: Soil testing to determine soil type(s) and chemistry is the "blood test" for properly determining and implementing site preparation activities to ensure a suitable surface and subsurface soil environment for revegetation. Individual soil samples should be taken from all areas to be revegetated after the disturbance to a depth of 8 inches for meadows and 24 inches at 6 inch increments for reforestation areas. and analyzed for: %sand, %silt, and %clay (mechanical analysis); %organic matter; pH; and soluble salts.

5. Soil/Site Preparation: Preparation of the areas prior to planting (ie: application of lime, organic matter, ripping/subsoiling and/or aerating) should be based visual observations of the soils physical condition and the soil test results. Specifically:

   A. Soil Physical Condition (Compaction): Soil compaction destroys all of the favorable soil physical characteristics (ie: structure, tilth, oxygen/carbon dioxide balance, soil microbiology, total and capillary pore space, water infiltration, water holding capacity etc.) and must be properly addressed prior to planting and/or sowing in order to ensure successful revegetation. There is no simple test to measure for compaction; however, common sense should prevail.

      1. Compacted Soils: If the existing area has turf that is sparse, stunted, anemic, weedy or was used as a construction staging and/or parking area and/or subjected to heavy visitor use, it likely that the soils are compacted and will require ripping and/or shatter aeration to prepare the soil for revegetation.

      2. Disturbed soils: If the areas are disturbed but

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District of Columbia
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not severely compacted, shatter aerification alone should be sufficient to prepare the soil for revegetation.

3. Undisturbed/Natural Soils: Undisturbed sites that are or were supporting healthy plant growth do not need to be cultivated prior to sowing seed.

B. Soil Texture and Structure: In general, if the soil has a mechanical analysis of 25-80% sand, 10-50% silt, and 5-40% clay, it would be acceptable for use provided the appropriate species are selected (refer to the Tree/Shrub and/or Forb/Grass mixtures). If at all possible, the existing topsoil and subsoil should be saved and stockpiled separately for use after the disturbance.

C. Soil Chemistry:

1. Soil Reaction (pH): In general, if the soil has a pH between 5.0-6.5 inclusive it would be acceptable for use. If the pH does not fall in this range it should be adjusted as follows:

Raising pH: Soil pH should be adjusted upward using calcic or dolomitic ground limestone in accordance with liming recommendation provided with the soil test results. Liming recommendations are generally given as pounds of ground limestone per 1000 square feet and will vary considerably based on soil types Do not apply more than 50 lbs/1,000 square feet (1 ton/acre) in a single application. If the liming recommendation exceeds 50 lbs/1,000 square feet retest the soil six months after application and apply additional lime if needed. Note: If the soil is shatter aerified up to 70. lbs/1000 square feet (1.5 tons per acre) can be applied in a single application. Note: Do not use burnt or hydrated lime as it can be caustic and burn plants.

Lowering pH: Soil pH should be lowered by applying elemental sulfur at the following rates to lower the pH by half a unit. Note: Do not use aluminum sulfate. Aluminum becomes more available with declining pH values and may lead to plant toxicity problems. If iron sulfate is used in place of elemental sulfur, apply according to the directions on the product label.

Sandy Loam Soils: 3 lbs/1,000 sq. ft.(130 lbs/acre)
Loam Soils: 4 lbs/1,000 sq. ft. (175 lbs/acre)

Clay Loam Soils: 5 lbs/1,000 sq. ft. (215 lbs/acre)

2. % Organic Matter: If the soil has at least 1 (-2)%, but not more than 5%, organic matter apply 135-175 cubic yards per acre (3-4 cubic yards/1000 square feet) using an approved manure spreader. Note: Soils identified as clay loams should not be amended with more than 135 cubic yards per acre while loam and sandy loam soils can be amended with up to 175 cubic yards per acre.

3. Soluble Salts (Soil Salinity): If the soluble salts exceeds 500 parts per million (ppm), seek assistance from a soil scientist. According to the University of Md Soil Testing Lab concentrations of 150-500 ppm are suitable for most plants; 600-940 ppm will result in stunting of most plants; 1050-1500 ppm may cause slight to severe burning; and greater than 1950 are excessive.

6. The native species and quantities and/or rates in the various Tree/Shrub mixtures provided herein should be used as a guideline only and adjusted for each specific site. The selection of target plant species and their respective proportions within the mixtures should adjusted based first on site soil and environmental conditions, and secondly on what was growing on the site before the disturbance or in adjacent natural areas. Selection to ensure ecological compatibility is the single most important factor in successfully establishing a target plant community. Disturbed soil systems may no longer be suitable for the native species that were growing on the site and it is more practical and cost effective to select species that are ecologically compatible with the site than attempt to amend the soils.

7. The following tree/shrub densities and/or grass/forb seeding rates should be used to ensure the successful establishment of a desired plant community.

A. Reforestation Areas:

1. Trees: For each acre plant 1700 total trees/shrubs per acre (40 plants per 1000 sq. ft.). Plant 1 large tree (1-1.5" caliper) for every 14 small (1 gallon container) trees. If this density must be reduced due to fiscal restraints, cut back on the small trees.

2. Forbs/Grasses: For each acre sow 4 pounds of forb seed and 10 pounds of grass seed*. Note: Rate is

Pure Live Seed (PLS) except where noted. Generally 10-50 lbs of bulk seed would equal 5-20 lbs of PLS (PLS = Percentage of purity x percentage of germination).

B. Meadow Grass/Forb Areas: For each acre sow 6 pounds PLS of forb seed and 20 pounds PLS of grass seed.*

C. Native Short/Tall Grass Areas: For each area sow 20 pounds (PLS) of seed per acre.*

* Note rate increase for erosion control on areas with a 3 to 1 slope or greater).

8. Areas to be revegetated should be clearly defined on the drawing(s), plant list(s), and bid schedule and include: the total area(s) in square feet or acres; the specific site/soil treatment(s) each area will receive prior to planting; and the genus species, sizes, quantities, and class of plants and/or Pure Live Seed by weight for each area. The Bid Schedule should include unit prices for all site/soil preparation required and trees/shrubs and/or grasses/Forbs to be planted/sown to ensure that you get competitive bids from responsible contractors.

9. Site preparation and planting operations should be initiated in accordance with the Installation, Maintenance, and Replacement Schedule and the Reclamation/Revegetation Planting Specifications during the planting season(s) identified for each species. Note: Plants simply can not adjust their growing requirements to administrative or contracting schedules. If you can not plant at the proper time, postpone to the next planting season.

10. Planting locations for trees should be staked in 20 x 20 ft. grids containing 15 deciduous trees of the same species (14 small trees/1 large tree) and 3 of the same understory species. Edge plantings should be reduced to 10 x 40 feet and include 18-20 of the same species. Within each grid, trees should be planted in a random pattern a minimum of 3 feet and a maximum of 8 feet on-center. <u>Do not space plants in equal distances from each other</u>.

Tree/Shrub Mix A. Moist, Sandy/Loam Soils

Trees	Plants/Acre
Acer rubrum (Red Maple)	
1 gal, 18-24"	280
1-1.25", 6-8 ft. B&B	20
Liquidambar styraciflua (Sweetgum)	
1 gal, 18-24"	280
1-1.25", 6-8 ft. B&B	20
Platanus occidentalis (Sycamore)	
1 gal, 3-5 ft.	280
1-1.25", 8-10 ft. B&B	20
Acer saccharinum (Silver Maple)	
1 gal, 18-24"	42
1-1.25", 6-8 ft. B&B	3
Fraxinus pennsylvanica (Green Ash)	
1 gal, 2-4 ft.	42
1-1.25", 8-10 ft. B&B	3
Quercus palustris (Pin Oak)	
1 gal, 2-3 ft.	42
1-1.25", 6-8 ft. B&B	3
Quercus phellos (Willow Oak)*	
1 gal, 2-3 ft.	42
1-1.25", 6-8 ft. B&B	3
Liriodendron tulipifera (Tulip Poplar)*	
1 gal, 3-4 ft.	42
1-1.25", 8-10 ft. B&B	3
Quercus bicolor (Swamp White Oak)*	
1 gal, 2-3 ft.	42
1-1.25", 6-8 ft. B&B	3
Betula nigra (River Birch)	
1 gal, 2-3 ft.	42
6-7 ft. single stem, B&B	3
Evergreens (Understory)	
Ilex opaca (American Holly)	
1 gal, 12-14"	200
Shrubs (Edge)	
Viburnum dentatum (Arrowwood)	
1 gal, 18-24"	285

Total Plants/Acre = 1,700

*** Do not plant in Fall**

Tree/Shrub Mix B. Moist, Heavy Clay Soils

Trees	Plants/Acre
Acer rubrum (Red Maple)	
1 gal, 18-24"	280
1-1.25", 6-8 ft. B&B	20
Liquidambar styraciflua (Sweetgum)	
1 gal, 18-24"	280
1-1.25", 6-8 ft. B&B	20
Platanus occidentalis (Sycamore)	
1 gal, 3-5 ft.	280
1-1.25", 8-10 ft. B&B	20
Acer saccharinum (Silver Maple)	
1 gal, 18-24"	84
1-1.25", 6-8 ft. B&B	6
Fraxinus pennsylvanica (Green Ash)	
1 gal, 2-4 ft.	84
1-1.25", 8-10 ft. B&B	6
Betula nigra (River Birch)	
1 gal, 2-3 ft.	84
6-7 ft. single stem, B&B	6
Evergreens (Understory)	
Viburnum prunifolium (Blackhaw)	
1 gal, 12-14"	100
Viburnum lentago (Nannyberry)	
1 gal, 12-14"	100
Shrubs (Edge)	
Viburnum dentatum (Arrowood)	320
1 gal, 18-24"	

Total Plants/Acre = 1,700

Tree/Shrub Mix C. Dry, Sandy/Gravely/Poor Soils

Trees	Plants/Acre
Fraxinus pennsylvanica (Green Ash)	
1 gal, 2-4 ft.	280
1-1.25", 8-10 ft. B&B	20
Celtis occidentalis (Hackberry)	
1 gal, 2-3 ft	280
1-1.25", 6-8 ft.	20
Quercus velutina (Black Oak)	
1 gal, 18-24"	280
5 gal, 5-6 ft.	20
Sassafras albidum (Sassafras)	
1 gal, 12-15"	140
3 gal, 4-5 ft.	10
Quercus rubra (Red Oak)	
1 gal, 2-3 ft	84
1-1.25", 6-8 ft. B&B	6
Evergreens	
Juniperus virginiana (Eastern Red Cedar)	
1 gal, 12-18"	100
Pinus virginiana (Virginia Pine)	
1 gal, 12-18"	100
Shrubs (Edge)	
Rhus coppalina (Winged Sumac)	
1 gal, 2-3 ft.	360

Total Plants/Acre = 1,700

Tree/ Shrub Mix E: Wetland Plantings

Trees	
Salix nigra (Black Willow)	
1 gal, 18-24"	100
Acer rubrum (Red Maple)	
1 gal, 18-24"	50
Betula nigra (River Birch)	
1 gal, 2-3 ft.	50
Shrubs	
Aluns serrulata (Alder)	
1 gal, 18-24"	500
Viburnum dentatum (Arrowwood)	
1 gal, 18-24"	500
Sambucus canadensis (Elderberry)	
1 gal, 24-36"	500

Total Plants/Acre = 1,700

Emergent Wetland Plants to be Planted in Single Species Clusters

Typha latifolia (Catttail)	
Peat Pot or Bare Root	4,400

Emergent Wetland Plants to Mixed Within the Planting Area

Carex lurida (Shallow Sedge)	
Peat Pot or Bare Root	1,100
Leersia orysoides (Rice Cut Grass)	
Peat Pot or Bare Root	1,100
Gyceria striata (Manna Grass)	
Peat Pot or Bare Root	1,100
Juncus effusus (Soft Rush)	
Peat Pot or Bare Root	1,100
Total Emergent Wetland Plants	8,800/acre

Note: Emergent plants planted within the shrub plantings should be planted at a density of 2,200 plants/acre.

Seed Mix A: Reforestation Grass/Forb Mix (Dry/Moist Areas)

Species	Common Name	Rate/acre Pure Live Seed
Grasses		
Andropogon scoparius	Little Bluestem	5 lb/acre
Festuca ovina	Blue Sheep Fescue	3 lb/acre
Lolium morifolium	Annual Rye Grass	2 lb/acre
	Total	10 lbs/acre
Forbes		
Coreopsis lanceolata	Lanceleaf Coreopsis	2.0 lb/acre
Coreopsis tinctoria	Plain Coreopsis	.5 lb/acre
Rudbeckia hirta	Black Eyed Susan	1.0 lb/acre
Aster laevis	New England Aster	.5 lb/acre
	Total	4 lbs/acre

Seed Mix B: Meadow Grass Forb Mix (Dry/Moist Areas)

Species	Common Name	Rate/acre Pure Live Seed
Grasses		
Andropogon scoparius	Little Bluestem	10 lb/acre
Festuca ovina	Blue Sheep Fescue	5 lb/acre
Lolium morifolium	Annual Rye Grass	5 lb/acre
	Total	20 lbs PLS/acre
Forbes		
Coreopsis lanceolata	Lanceleaf Coreopsis	2.5 lb/acre
Coreopsis tinctoria	Plain Coreopsis	1.0 lb/acre
Monarda fistulosa	Bergamot	.25 lb/acre
Rudbeckia hirta	Black Eyed Susan	1.0 lb/acre
Solidago rigida	Stiff Goldenrod	.25 lb/acre
Aster laevis	New England Aster	.50 lb/acre
Verbena hastata	Blue Verbena	.5 lb/acre

Total 6 lbs PLS/acre

Seed Mix C: Native Grass Mix (4-6 ft., Dry/Moist Areas)

Species	Common Name	Rate/acre Pure Live Seed*
Andropogon scoparius	Little Bluestem	6 lb/acre
Sorghastrum nutans	Indian Grass	4 lb/acre
Festuca ovina	Blue Sheep Fescue	4 lb/acre
Elymus canadensis	Canada Ryegrass	2 lbs/acre
Agrostis alba	Red Top	2 lbs/acre
Lolium morifolium	Annual Ryegrass	1 lb/acre
Panicum virgatum	Switchgrass	1 lb/acre

Total 20 lbs PLS/acre

Seed Mix D: Native Shortgrass Mix (2-3 ft., Dry/Moist Areas)

Species	Common Name	Rate/acre Pure Live Seed
Andropogon scoparius	Little Bluestem	9 lb/acre
Festuca ovina	Blue Sheep Fescue	6 lb/acre
Elymus canadensis	Canada Ryegrass	3 lbs/acre
Lolium morifolium	Annual Rye Grass	2 lb/acre

Total 20 lbs PLS/acre

Seed Mix E: Wetland Grass Mix (Wet Areas)

Agrostis alba	Red Top	5 lb/acre
Echinochloa crusgalli	Barnyard	5 lb/acre
Lolium multiflorum	Annual Rye Grass	1 lb/acre

Total 11 lbs PLS/acre

Note:

1. All rates are Pure Live Seed (PLS) except Verbena

hastata, Monarda fistulosa, and solidago rigida which shall be bulk seed. All seed shall have a minimum purity of 90% except Andriopogon scopiaris which shall have a minimum of 50% purity and Solidago rigida which shall be exempt from purity certification.

2. Native grass mixtures will germinate in 2-3 weeks but will take 2-3 years to fully establish.

3. Mixtures for erosion control on slopes 3 to 1 or greater should have the rates of sheep fescue (Festuca ovina) increased as a non-competitive nurse grass to no more than 20 lbs (PLS) acre.

REVEGETATION BID SCHEDULE

Item	Unit	Estimated Quantity	Unit Price	Total
A.	**Herbicide Application**			
1.	Mow all existing Vegetation to a height of 5-6 inches per acre	_____	_____	_____
2.	Apply Herbicide per acre	_____	_____	_____
3.	Mow all dead vegetation to a height of 3 inches per acre	_____	_____	_____
B.	**PREPARATION FOR PLANTING**			
1.	Application of Lime per lb/ton	_____	_____	_____
2.	Application of Sulfur per lb/ton	_____	_____	_____
3.	Application of Leaf Mold per cubic yard	_____	_____	_____
4.	Subsoiling/Ripping of planting areas per acre	_____	_____	_____
5.	Aeration of planting areas per acre	_____	_____	_____
C.	**PLANTING/SOWING**			
1.	Tree/Shrub Planting per tree/shrub	_____	_____	_____
2.	Grasses and Forbes mix by weight per area	_____	_____	_____

Note: The total amount of plants to be planted for each area shall be listed by genus, species, class, size, and quantity required and unit prices obtained.

Note: The total amount of seed to be sown for each area shall be listed by genus, species, and quantity by weight required and unit prices obtained.

3. Application of Straw Mulch
per ton

TOTAL FOR REVEGETATION

NATIONAL CAPITAL REGION
REVEGETATION COST ESTIMATES (1998)

Item	Unit	Estimated Quantity	Unit Price	Total
A.	**Herbicide Application**			
1.	Mow all existing Vegetation to a height of 5-6 inches per acre			
2.	Apply Herbicide per acre		$3-10/gallon $$1,000-$1,500/acre	
3.	Mow all dead vegetation to a height of 3 inches per acre		$1,500-1,800/acre for all three items	
B.	**PREPARATION FOR PLANTING**			
1.	Application of Lime per lb/ton		$200-300/ton	
2.	Application of Sulfur per lb/ton		$250-350/ton	
3.	Furnish/Place Topsoil		$18-22/cubic yard	
4.	Application of Leaf Mold per cubic yard		$20-25/cubic yard	
4.	Subsoiling/Ripping of planting areas per acre		$1200-2,500/acre	
5.	Aeration of planting areas per acre		$600-1,200/acre	
C.	**PLANTING/SOWING**			
1.	Tree/Shrub Planting per tree/shrub		1 gallon material - $12-20/each 1-1.25", B&B - 85-125/each	
2.	Grasses and Forbes			

	mix by weight per area	Varies with mix/site, generally runs about $800-1,000/acre	
3.	Application of Straw Mulch per ton	$200-300/ton	

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RECLAMATION/REVEGETATION PLANTING SPECIFICATIONS

PART 1: SCOPE

The work to be performed under this contract shall consist of providing all materials, labor, equipment, tools and services necessary to complete the installation of trees, shrubs, grasses and forbes in accordance with the areas indicated on the plans, items listed on the bid schedule, and the specifications herein. Therefore any items not specifically noted, but necessary for a complete installation, shall be furnished under this contract.

2.02 SPECIAL PROVISIONS

2.01 QUALITY ASSURANCE

A. All site preparation, planting and seeding shall be performed by individuals that have verifiable experience in conducting reclamation and restoration of native forests communities, natural meadows, and wetlands.

B. All work shall be under the direction and general supervision of a grounds maintenance foreman who possesses verifiable experience and technical competence in conducting reclamation work. The foreman shall be present at all times work is being preformed and shall be responsible for controlling the quality of work and inspecting all completed work to ensure that contract performance requirements are met. The foreman will be the primary contact with the Contracting Officers Representative (COR).

C. All work shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the states of Virginia and Maryland and the District of Columbia who posses verifiable experience and technical competence in applying herbicides to vegetated areas.The Certified Pesticide Applicator have verifiable work experience as a full time direct supervisor of herbicide application work crews and must be present on the job site at all times work is being performed or pesticides are being handled. The Certified Pesticide Applicator shall be the primary contact with the COR responsible for controlling the quality of work and inspecting all completed work to ensure that contract performance requirements are met.

D. All workers handling or applying herbicides shall, be registered as pesticide applicators and, through related training and on the job experience, be familiar with the safety and technical aspects of applying herbicides and equipment used in such operations.

E. All workers shall, through related training and on the job experience, shall be familiar with the technical aspects of reclamation and revegetation and equipment used in such operations. All workers shall abide by any code of ethics or professional conduct established by the Landscape Contractors Association MD-DC-VA.

F. A list of all crew supervisors and workers anticipated as part of the work crews as well as their positions (ie: tractor/mower operator, laborer), affiliation with the company, and related training and on the job experience shall be submitted.

G. All workers shall be recognizable as employees of the Contractor by wearing distinctive clothing bearing the name of the company or by wearing appropriate badges which show the Contractor's company name and employee name.

H. The Contractor shall submit copies of all licenses and certificates necessary for complying with Federal, State, and Municipal laws, codes, and regulations concerning the application of herbicides.

2.02 SCHEDULING AND COORDINATION:

A. Work under this contract shall be executed in accordance with the following schedule unless approved otherwise by the COR.

1. Herbicide Application: July 15-30
2. Soil Preparation for Planting: August 1-15
3. Sowing Grasses/Forbs: August 15 - September 15
4. Planting Trees/Shrubs: October 1 - November 15 for fall plantings and March 15 -April 15 for spring plantings.

B. Work shall only be performed under only under favorable weather and soil conditions as determined by the COR.

C. The contractor shall notify the COR 42 hours prior to beginning work. Work shall be performed between the hours of 7:00 a.m. and 3:30 p.m. Monday through Friday, legal holidays excluded, unless authorized in writing by the COR.

D. Work shall be scheduled and arranged so as not to interfere with normal activities of the park. Advanced notice will be given to the contractor if a conflict is expected. Any plant debris, personnel or equipment that would interfere with an activity or event shall be removed prior to the activity.

E. Once work begins the contractor shall be on the job site each day in which weather conditions are favorable.

F. All work within a designated area shall be completed, inspected, and accepted in accordance with the procedures stated herein before beginning work in another area.

G. The time stated for completion shall include final cleanup of the premises.

H. **If, at any time, the COR determines that the work is unsatisfactory or being conducted in an unsafe manner, the contractor will be notified and shall immediately cease all work activities.**

I. All approvals will be in writing.

2.03 REPORTS:

A. The contractor shall maintain a daily work log recording the quantities of trees, shrubs, grasses, and forbes installed and their locations. If requested a copy shall be filled with the COR on a daily or weekly basis.

B. The National Park Service will supply, and the contractor shall maintain, a daily pesticide use log for all areas treated. A copy shall be filed with the COR within 24 hours of application.

2.04 SAFETY:

A. All equipment must meet all federal OSHA, state and local safety requirements and must be properly licensed. A list of the equipment anticipated for use shall be submitted and include the make and model, year manufactured,, tag # if applicable, and date of last inspection. The name or logo of the contractor must be clearly displayed on all trucks used on the job.

B. All operations shall be conducted in accordance with all national and local safety codes, laws, rules, regulations and ANSI safety requirements.

C. All workers shall wear required safety equipment. All employees shall wear reflective, bright orange vests while working adjacent to roadways.

D. The Contractor shall provide, erect and maintain all necessary barricades, traffic cones, suitable and sufficient red lights, warning and danger signals and signs, and provide a sufficient number or watchmen and flagmen to insure the safe flow of traffic, protection of the work area and safety of the public in accordance with "Work Zone Traffic Control, Standards and Guidelines", U.S. Department of Transportation, Federal Highway Administration. All roadways must remain open to the public unless approved by the COR.

2.05 WORK AREA:

Contractor shall confine his work, the storage of materials and equipment, the parking of vehicles, and all other operations in connection with this contract to the areas approved by the COR. The public ways shall not be encumbered with any of the above or any unusual traffic situations created by reason of operations under this contract without the approval of the COR.

2.06 LAYOUT OF WORK:

All planting locations shall be subject to adjustment and approval on-site with the concurrence of the COR.

2.07 RESPONSIBILITY REGARDING EXISTING PLANT MATERIAL AND OTHER LANDSCAPE FEATURES:

The Contractor shall preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site which do not reasonably interfere with the construction. The root protection area is defined as an area equal to a radius of 1.5 feet for each inch of diameter at breast height (dbh) (ie: a 10 inch dbh tree will have a root protection area equal to 15 feet from the main trunk in all directions). Trees and shrubs that may be subject to construction activities within the root protection area shall be protected as directed by the COR. The Contractor shall be responsible for all unauthorized cutting or damage to trees and shrubs, including damage resulting from careless operation of equipment, stockpiling of materials or tracking of grass and other surfaced areas by equipment. Such damaged areas or materials shall be restored, repaired or replaced by the Contractor, as directed by the COR, at no expense to the National Park Service (NPS) prior to Initial Acceptance.

2.07 HEAVY EQUIPMENT:

Contractor shall not permit heavy equipment or vehicles or the stock piling of heavy materials in the defined root protection area. Limited activity may take place with the expressed permission of the COR in areas determined to be safe from excessive damage.

2.08 PATCHING OF PUBLIC SIDEWALKS, CURBS, GUTTERS, AND STREETS:

Contractor shall patch, repair or replace portions of sidewalks, curbs, gutters, streets, manholes, and the like that are damaged in connection with work under this contract or as a result of operations thereunder. Materials and methods shall conform to the current standards for the area damaged, match existing on-site materials, shall meet the approval of all cognizant officials and the COR. All damaged areas shall make smooth, satisfactory, and imperceptible transitions to existing adjacent work, and shall be performed without additional expense to the NPS.

2.09 RESPONSIBILITY REGARDING EXISTING UTILITIES AND STRUCTURES:

The existence and location of under ground utilities on the plans are not guaranteed and shall be investigated and verified in the field by the contractor before starting work. Excavation in the vicinity of existing structures and utilities shall be carefully performed. The Contractor will be held responsible for any damages to, and for maintenance and protection of existing utilities and structures. To locate utilities in the field, contact Miss Utility on 800-552-7001, forty (40) hours in advance of work.

2.10 AIR AND WATER POLLUTION CONTROL:

The Contractor shall take all necessary measures to prevent soil erosion, air and water pollution by any material and/or equipment used during construction. The Contractor shall keep the site clean and free of trash and debris including, but not limited to, pots, plastic labels, bags, etc. All debris shall be disposed of, off the site, at the end of each day unless otherwise directed by the COR.

2.11 CLEANUP AND RESTORATION:

The Contractor will be required to furnish all labor, materials, and equipment for daily cleanup and restoration of all disturbed areas or features which

have been damaged during the course of work. If so directed, the Contractor shall be prepared to sweep and wash paved surfaces daily or as needed. The Contractor shall also be responsible for replacing all damaged turf areas to the satisfaction of the COR.

2.12 RELATED WORK:

A. 02951: Tree Pruning, Removal, and Maintenance
B. 02952: Tree and Shrub Transplanting
C. 01533: Tree, Shrub, Lawn, and Soil Protection
D. 02926: Soil Modification, Topsoil, and Seeding
E. 02928: Soil Modification, Topsoil, and Sodding
F. 02953: Tree Root Pruning, Aeration and Fertilization
G. 02950: General Planting

PART 3: MATERIALS AND EQUIPMENT

3.01 Sprayers

A. Shall be leak proof and corrosion resistant. Galvanized (zinc coated) spray equipment is not permitted for use.

B. Shall be thoroughly cleaned and free of rust, residues, and particulate matter such as grit and sand.

C. Shall be equipped with properly fitting covers or hatch plates and a hand valve at the bottom of the tank for shut off in the event of a hose leak.

D. Shall be a boom type sprayer equipped with standard hoses and nozzles of the type most commonly used in applications of herbicides to non-plant surfaces.

E. Shall not have mechanical adjitators and all bypass lines shall terminate at the bottom of the tank.

3.02 Subsoiler/Ripper: Shall be a heavy duty soil ripper/subsoiler capable penetrating severely compacted soils to a depth of 16-22" such as the Taylor-Way Lift Type Tool Bar Subsoiler, or an approved equal (ie: shall have a single tool bar mounted on a three point hitch with 1-3, 1" x 8" x 24" adjustable subsoiler shanks with drop forged subsoiler points). Note: Chisel plows, disks, and bar sheer plows are not

acceptable equals for a heavy duty soil ripper/subsoiler.

3.03 Aerator: Shall be a heavy duty shatter aerifier capable of soil displacement to a depth of 8-12" such as a Taylor-Way Aerator, or an approved equal (ie: 9" solid shatter tines mounted on adjustable axles that can be angled to increase soil displacement).

3.04 Seeder: Shall be a drill seeder capable of calibrating and dispensing various sized, shaped, and textured seed mixtures into old vegetation stands on undisturbed surfaces such as a Truax Seeder or an approved equal (ie: three seed boxes with fluted dispensers and tubes to dispense small, medium, and/or large feathery, fluffy or stick like seeds without mash damage or bunched up seed; and a three tool bar assembly that allows seeding at controlled depths and ensures good soil seed contact. Specifically: Tool Bar 1 - equipped with coulters to slice through existing dead vegetation; Tool Bar 2 - equipped with two disks to open seed trenchers with a metal tube between the disks to dispense the seed into the trench; Tool Bar 3 - equipped with an assembly of rubber compaction wheels that presses seed covered with soil to ensure good seed soil contact. Note: Drop box, centrifugal force (spinners), and hydro seeders are not acceptable substitutes.

3.05 Tractor(s):

A. A 90-130 horsepower, hydraulically equipped tractor with wheel weights or filled tires to enable traction shall be used to pull the subsoiler/ripper
B. A medium sized, hydraulically equipped tractor with turf tires to preclude compaction shall be used to pull the agriculture and manure spreaders, shatter aerator, and seeder.

3.05 Herbicide: Shall be Roundup (Isopropylamine salt of Glyphosate), EPA Registration Number 524-308-AA.

3.04 Water: Shall be potable.

3.05 Imported Topsoil:

A. Topsoil shall be natural, surface soil, in a friable condition and contain less than 3 percent subsoil. The topsoil shall be free of hardpan material, stones and clods larger than 1/2 inch in diameter, sticks, tree or shrub roots, debris, toxic substances (ie. residual herbicides) and

other material detrimental to plant growth. The area and the topsoil shall be free of plant or plant parts of undesirable plants such as, but not limited to, bermudagrass, nut sedge, mugwort, johnson grass, quack grass, Canada thistle or noxious weeds as set forth in the Federal Seed Act.

B. Contractor shall notify COR of location of all sources of the topsoil and furnish the COR a certified report from the agricultural experiment station or approved agricultural laboratory of an analysis performed not more than 60 days prior to the date of submission. The topsoil shall be certified to meet the following requirements:

1. Shall be a natural, original surface soil of a sandy loam texture with a mechanical analysis of 60-65% sand, 15-25% silt and 10-15% clay.

2. Shall have at least 2%, but not more than 5%, organic matter.

3. Soil pH shall 5.5 to pH 6.5 inclusive unless otherwise specified.

4. Soil salinity by electrical conductivity measurement shall not exceed 500 parts per million (ppm) as determined by Black, Editor "Method of Soil Analysis", Part 2, published by the American Society of Agronomy, 1965.

5. The soil nutrient level shall be greater than 100 lbs/acre of magnesium, 150 lbs/acre of phosphorous, and 120 lbs/acre of potassium.

C. Agricultural limestone (see 3.11) at not more than 5 pounds per cubic yard of topsoil may be used to adjust an acidic condition and shall be thoroughly mixed by volume.

D. Topsoil which has been synthesized by blending materials which individually do not meet the requirements of this specification will not be accepted even though the resulting blend meets the organic matter, mechanical analysis, pH and soluble salts requirements.

E. The COR reserves the right to inspect and sample all topsoil at the source and at the time of delivery. These inspections will be made without cost to the Contractor.

F. Topsoil must not be delivered or handled in a frozen or muddy condition.

G. Shipment and delivery - All soil must be approved by the COR before delivery to site. Any material not meeting requirements of this specification will be rejected on or after delivery.

3.06 Plant Materials:

A. All plants shall be supplied from nurseries within U.S.D.A. Plant Hardiness Zone 6 or 7 and shall meet all requirements and recommendations of the American Standard for Nursery Stock (ANSIZ.60.1), sponsored by the American Association of Nurserymen, Inc, 1250 I Street, N.W. Suite #500, Washington, D.C. 20005, in effect on date of Invitation for Bid.

B. All plants must be nursery grown and not collected from the wild and inspected and certified at the nursery and/or growing site by authorized Federal and State authorities or inspectors as required by Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture, Washington, D.C. for necessary transportation of same, before removal from State or District in which nursery and/or growing site is located. Each shipment, invoice or order of stock must be declared and certified free from disease of any kind. All necessary inspection certificates must be filed with Contracting Officer prior to acceptance and payment.

C. All balled and burlapped (B&B) plants must meet the standards described under "Recommended Balling and Burlapping Specifications" of the American Standard for Nursery Stock. Specifically: dug by hand or with a mechanical tree digger in good condition, free of any hydraulic leaks, with all blades aligned and free of damage; wrapped firmly with untreated burlap; and bound carefully with untreated sisal or jute twine, cord or ungalvanized wire mesh, in a manner so as to not damage the bark, break branches, or destroy the natural shape. Note: All trees shall have a minimum ball diameter of 10 inches for each inch of caliper measurement and dug so that the root crown is a the top of the root ball. The caliper measurement is determined by taking the average of two trunk caliper measurements at right angles 6 inches above the root crown.

D. All containerized plants shall be grown in a

sand/pine bark mix and be of the size specified on the plant list. Peat/perlite/vermiculite mixes shall not be used and will be cause for rejection.

E. The genus, species and cultivar names shall agree with the nomenclature of the most current edition of "Hortus Third" by L.H. Bailey, Hortorium, Cornell University.

F. The National Park Service reserves the right to inspect, select and tag all plants before they are delivered to the job site. This inspection, if made, shall be at the nursery or growing site by the government without cost to the Contractor.

G. Shipment and delivery:

1. Contractor shall notify the COR, 48 hours in advance, when plants are to be delivered to the site and method of shipment and must furnish an itemized list of actual quantity and sizes. Plants shall not be delivered to the job site until the areas for planting are prepared in accordance with the specifications stated herein and approved by the COR.

2. All plants must be protected from weather and adequately packed to provide protection against climate and breakage during transit. When shipment is made by open vehicle, plant materials must be tied and covered to avoid windwhipping and dehydration. When shipment is made by closed vehicle, plants must be carefully packed and adequately ventilated to prevent "sweating" of plants during transit.

3. Care must be exercised at all times during the handling operations to prevent damage to bark, branches, and root system and to preclude cracked plant balls. Plants shall not be planted if the ball is cracked or broken either before or during planting operation.

4. Plants must be protected upon arrival at site by being thoroughly watered and properly maintained until planted.

5. <u>All</u> plants shall be labeled. Labels shall be durable and legible stating the correct botanical name and size in weather-resistant ink or embossed letters. Labels shall be securely attached to each tree in a manner

which will not restrict growth. Labels shall remain on the tree to be removed by the Contractor at final acceptance or if directed otherwise by the COR.

6. Plants shall not be planted until inspected and approved by the COR. Trees not meeting specifications for quality herein stated, or plants that show improper handling or arrive onsite in unsatisfactory condition will be rejected. All rejected trees shall immediately be removed and disposed of off site by the Contractor and shall be replaced with approved nursery stock of designated variety, size, age, etc., as specified under this contract without additional compensation.

H. Substitutions - It is the Contractor's responsibility to locate and/or arrange to have grown the plants specified. In the event the material has become unavailable, the Contractor is responsible for written documentation of availability problems. If a substitute is to be used, it must be approved by the National Park Service.

3.07 Seed

A. All seed shall be certified as Pure live Seed (PLS) except Verbena hastata, Monarda fistulosa and Solidago rigida.

B. Seed shall have a minimum purity of 90% except Andriopogon scopiaris which shall have a minimum of 50%. Solidago sp. shall be exempt from purity certification.

C. Certification for each seed type is to be conducted by an approved testing laboratory prior to the mixing of seed. The results of the seed certification shall be submitted to the COR for approval prior to delivery of seed to the site.

D. All seed are to be shipped and delivered in individual, sealed packages labeled as to total weight, % germination (PLS), and botanical name. Seed weights apply to properly cleaned seed that is free from all bracts, stems, fluff, and other foreign matter.

E. Seed shall be stored in rodent proof containers by the contractor until mixing and placement in the seeder.

3.08 Screened Leaf Mold

Shall be Leafgro as available through Maryland Environmental

Services, 2011 Commerce Park Drive, Annapolis, MD 21401, (301/261-8596), or approved equal, completely composted and free from all materials such as glass, paper, plastics, and shall meet the following specifications:

1.	pH	7.3-7.8
2.	Soluble Salts	4.3-9.9 mmhos/cm
3.	Nitrogen	1.5-2.7%
4.	Phosphourous	.2-.5%
5.	Potasium	.10-2%
6.	Water holding Capacity	110-140%
7.	Bulk Density	1,100-1,200 lbs./cu. yd.
8.	Moisture content	50-70%
9.	Organic Matter	38-46%
10.	Particle Size	100% passage through 3/8" mesh

Note: Composted sewage sludge shall not be used.

3.10 Shredded Hardwood Mulch

Shall be derived from recycled wood products and yard waste, aged; dark brown to black in color; have a particle size less than 3 inches; be neutral Ph; and free of sticks, stones, clay or any other matter injurious to plant growth.

3.11 Straw Mulch

Shall be oat or wheat straw or wood cellulose fiber, reasonably free from weeds, growth, germination-inhibiting ingredients or foreign matter detrimental to plant life, and in dry condition. Hay or chopped cornstalks are not acceptable.

3.12 Ground Limestone

Shall be calcic or dolomitic agricultural ground limestone containing at least 85% of total calcium and magnesium carbonates with 40% passing a No. 100 sieve and 95% passing a No. 8 sieve.

3.13 Elemental Sulfur

(Note: Need to develop a specification)

3.14 Mow Stakes

Shall be treated oak free from unsound or loose knots and rot and any injurious cross grain and sap wood, or any other defect; 2" x 2" by 4 ft., pointed at one end.

3.15 Submittals

A. Sources for all seed and plant materials within 14 days after award and specified certifications prior to delivery.

B. Sand/pine bark containerized tree/shrub growing media - 5 pounds within 14 days after award.

C. Leaf Mold - 5 pounds within 14 days after award.

D. Hardwood Mulch - 5 pounds within 14 days after award.

E. Fertilizer - 1 sample packet within 14 days after award.

G. Imported Topsoil - 5 pound within 14 days after award.
H. Straw Mulch - 2 pounds within 14 days after award.

I. Equipment list for all specified equipment - within 14 days after award.

PART 4: EXECUTION

4.01 Herbicide Application

A. General:

1. Existing turf weeds and exotic vines in all locations to be treated with a herbicide are to be cut to a height of 5 to 6 inches between and treated with herbicide between July 15-30.

2. A pre-herbicide application conference will be held prior to mixing or transporting any herbicides to the designated sites. The time, date, and location shall be agreeable to personnel of the Contractor and the Park Service who are responsible for the contractual requirements of both parties. Topics for discussion, but not limited to, will be scheduling and areas to be treated, handling, mixing, application of herbicides, sprayer capabilities (ie: pressure and nozzle types) and , safety etc. Participation at this conference is mandatory prior to beginning any applications of herbicide. After the conference the contractor shall notify the COR 48 hours prior to beginning any work.

3. The contractor will be responsible for procurement, handling, storage, and safeguarding of Roundup from the time of delivery through completion of applications. All operations will conform to manufacture's pesticide label instructions and the appropriate state requirements for storage, transportation, and

application of insecticides.

4. Herbicide Spill Plan: The contractor shall develop and submit a Herbicide spill plan to the Park Service for approval before any herbicides are delivered.

5. All herbicide applications shall be conducted under favorable weather as determined by the COR.

6. No applications shall be conducted when the winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow drift to occur. Avoid combinations of pressure and nozzle type that will result in fine particles (mist) which are more likely to drift.

7. The contractor shall be responsible for the calibration during calibration and characterization trials at a mutually agreed upon time and place before spraying begins. All applications shall be in accordance with the pressures and flow rates established during these trials.

7. All applications shall be properly directed to avoid drift and contact with non-target adjacent turf areas or desirable plants.

8. The contractor shall provide all routine maintenance to the spray system at times that will not interfere with he scheduled spraying. Only emergency repairs are to be performed during scheduled spray hours.

B. Calibration: Sprayer shall be calibrated to apply 40 gallons of spray per acre at 40 psi at tank gauge (boom nozzle pressure should approximately 38 psi during operation and approximately 42 psi in shut off mode).

C. Mixing:

1. Tanks shall be inspected before filling with water or herbicide.

2. All hoses for filling shall be equipped with anti-siphon valves to prevent back siphoning into water source.

3. Fill the spray tank with 1/2 the required amount of water. For high volume spray equipment add roundup at a rate of 8-10 quarts in 100 gallons of water (2-2.5%). For hand held or backpack

sprayers mix at a rate of 2-2.5 ounces (4-5 tablespoons) per gallon. After adding Roundup mix well before adding the remaining portion of water. When filling place the hose below the surface of the solution to prevent excessive foaming.

4. An approved dye shall be added so that sprayed areas can easily be delineated. Dye and rate shall be approved by the COR. Do not add additional surfactant or mix with any materials other than water and dye.

D. Application

1. Apply herbicide to specified areas at the calibrated rate (40 gallons/acre) so that the coverage is uniform and complete. Do not spray weed foliage to the point of runoff.

2. Spray valves shall be open only while sprayer is over target. The spray valve shall be closed at the end of each pass and for turning, loading, and site to site movement.

3. Herbicide is not to be applied to any non-target vegetation.

4. During spray applications it may be necessary to flush the spray system with water when the operation is delayed because of inclement weather or other factors. All flush water shall sprayed on a treatment site identified by the government at the contractor's expense.

5. Two (2) weeks after application mow the resultant dead vegetation to a height of 3 inches.

6. A second herbicide application shall be applied between August 1-15. The second application will target any turf or undesirable vegetation that was that was not eliminated during the first application.

Note: Soil stabilization is maintained by the dead grass and weeds that remain on the surface.

4.02 Soil Preparation for Planting:

A. Between August 1 - August 15 begin preparing the soil per the specified treatments in the order outlined in B-E below. Note: Once preparation for planting begins no vehicular traffic not directly associated with renovation shall be permitted into the modified soil areas once site preparation has begun.

B. Ripping/Subsoiling:

1. Areas shall be ripped with a heavy duty soil ripper/subsoiler pulled by a 90-130 horsepower hydraulically equipped tractor with wheel weights or filled tires to enable needed traction

2. Areas shall be ripped a minimum of 2 times to a minimum depth of 18" with the shanks mounted at 18" centers. If compaction is such that it is impossible to get to the 18" depth on the first rip, additional rips may be necessary. The entire area shall be ripped on the first pass to a minimum of 18" before beginning the second rip.

3. The second rip shall be at a 90 degree angle to the first pass.

C. pH Adjustment:

1. Raising pH: Apply ground calcic or dolomitic limestone per specifications at the specified rate(s) using an approved calibrated agriculture spreader pulled by a medium sized tractor hydraulically equipped tractor mounted with turf tires to preclude compaction. Do not apply more than 1 ton/acre (50 lbs/1000 square feet) without the approval of the COR. The use of burnt or hydrated lime is prohibited.

2. Lowering pH: Apply elemental sulfur per specifications at the specified rates using an approved calibrated agriculture spreader pulled by a medium sized tractor hydraulically equipped tractor mounted with turf tires to preclude compaction. The use of iron or aluminum sulfate is prohibited.

D. Addition of Organic Matter: Apply screened leaf mold per specifications at the specified rates using an approved using an approved calibrated manure spreader pulled by a medium sized tractor hydraulically equipped tractor mounted with turf tires to preclude compaction. spreader. The use of composted sewage sludge is prohibited.

E. Shatter Aerification:

1. Areas designated to be aerated shall be shatter aerated only when the soil is relatively dry as determined by the COR (ie: below field capacity but soft enough to permit penetration). Under no circumstances shall aeration be conducted when the

soil is at or above field capacity).

2. The aerator shall be weighted with 2,000 lbs of added weights on the frame and pulled with a medium size hydraulically equipped tractor with turf tires to preclude compaction.

3. Areas to shall be shatter aerated a minimum of 2 times. The first pass shall be at a 45 degree angles to the first rip. The second aeration shall be at 45 degrees angle to the second rip (ie: 90 degree angle to the first aeration).

4. On sloped or very small areas that will not permit the use of a heavy duty aerator, scarify all areas by hand using a thatching rake.

F. After preparation of the areas for planting, all areas shall be protected from pedestrian and vehicular traffic till the time of sowing/planting.

4.02 Sowing Grasses and Forbs

A. Between August 15 and September 15 sow all forbes and grasses on the specified areas as shown on the plans at the rates specified in the seed mix schedule.

B. Prior to seeding each seed box shall be calibrated to control the seed mixing and ensure seeding at the specified rate(s). Calibration shall be such that one pass accomplishes all seeding at a controlled depth. Calibration rates and controlled depths shall be approved by the COR before seeding.

C. Calcined clay (kitty litter) shall be added to small and/or textured seeds to facilitate seeding and improve uniform coverage at a rate of approximately 4 pounds of calcined clay per pound of seed. Addition of calcined clay and rate shall be approved by the COR before seeding.

D. The seeder shall be pulled with a medium sized hydraulically equipped tractor equipped with turf tires to preclude compaction.

E. If the area seeded did not have a vegetative cover that was killed with a herbicide treatment, immediately after sowing, the seeded area(s) shall be mulched with micro-shredded straw and tack at a rate of 2.5 tons/acre using a Fynn or Reinco straw blower or an approved equal capable of blowing 3-5 acres per hour.

F. Areas that are inaccessible and/or to wet to be seeded with a drill seeder shall be seeded with an approved rotary type spreader. Seed shall be sown individually at a rate equal to one half the rate specified in the seed mix schedule. Areas shall then be seeded a second time with the remaining seed. The second application is to be in a direction that is perpendicular to the first seeding application. Seeder, rates of application and addition of calcined clay shall be approved by the COR before seeding. Following seeding the area(s) shall be rolled with an approved roller. Areas that are inaccessible to a roller shall be scarified by hand using a thatching rake to ensure soil/seed contact.

4.04 Woody Tree/Shrub Planting:

A. Planting operations shall be conducted between October 1 - November 15 for fall plantings and March 15 -April 15 for spring planting and only under favorable seasonal and soil conditions as determined by the COR.

B. The Contracting Officers Representative (COR) will identify the planting locations, spacings, and method of planting by staking, flagging, painting or as otherwise required.

C. To prevent impacts on seeded areas, planting should be conducted so that the plants farthest from maintained turf areas are planted first, working back toward the turf areas. On slopes, begin at the top of the slope, working across the slope, and eventually down the slope. To prevent sloughing or endangering installed plants, no plant installer shall be working directly below another installer.

D. All tree planting locations shall be dug by hand 6 inches wider than the root ball diameter in all directions, circular in outline with the sides at a 45 degree angle and the bottom flat. Side walls shall be roughened and not glazed. If approved by the COR auguring planting holes will be permitted: however, the side walls must be roughened at 45 degree angles by hand.

E. All plants shall be handled only by the earth ball. Handling by the trunk or branches will be cause for rejection of that plant. All earth balls shall be firm and undamaged. Cracked or crushed balls shall be rejected.

F. Remove containerized materials from pots with roots

intact. Score on four sides with sharp knife or other sharp instrument and flare out the four quadrants on the lower third of the ball to prevent a girdled root system (Attachment A).

G. Set the plant so that the roots of the plant are surrounded by the soil below the mulch with the top of the ball is 1/4 - 1/2" (max) above the existing grade.

H. Backfill with a prepared mixture of 1/2 existing soil and 1/2 leaf mold and tamp to fill voids around ball.

I. For balled and burlapped plants, when the hole is half full, cut all twine and lay the burlap back off the top of the ball. Do not remove or pull the burlap and twine out from under the ball. Fold them back to the edge of the ball and cut the excess off 1/4 of the way down from the top. Backfill balance of the pit and tamp around the root ball (Attachment A).

J. The backfill shall be saucer-shaped 2-3" above the existing grade to catch and retain water, having a diameter equal to that of the planting hole. The backfill in holes on a slope shall be built up on the lower side only to catch and hold water. The tops of the root balls shall not be covered with backfill.

J. Mulch shall be applied to a loose measurement of 2-3" equal to the diameter of the planting hole to include the entire saucer. No mulch shall be applied around the trunk of the tree.

K. Watering: All plants shall be thoroughly watered immediately after planting, even if it is raining, to assure that the soil is brought to field capacity. This shall mean a full and thorough saturation of all backfill in the pits during the same day of planting. Apply water only by open end hose at a very low pressure to avoid air pockets and injury to the roots. No air pockets shall be left around the roots of any plants. When planted, watered, and fully settled, the plants shall be vertical.

L. Pruning: Any necessary pruning shall be done after the trees are in place as directed by the COR to remove any broken or damaged limbs, below the point of injury, with due regard for the natural form and growth characteristics of the species. The main leader is not to be cut.

M. After the planting is completed the contractor is to install mow stakes to delineate the boundaries of each reforestation area. Stakes shall be located 50 foot on center along the entire perimeter of the reforestation

area.

PART 5: INITIAL ACCEPTANCE, GUARANTEE, and FINAL ACCEPTANCE

5.1 Initial Acceptance

A. Initial acceptance will be given by the COR after an inspection and verification of the work performed as defined in the contract specifications. Acceptance can be on partially completed work if approved by the COR. The Contractor shall remove all tags and labels will t the time of initial acceptance or as directed by the COR.

5.2 Duration of Contractors Liability

A. After plants and/or seed has been installed and the COR has granted initial acceptance, the contractor shall be responsible for post planting management practices during the liability period in accordance with Attachment B: Planting, Maintenance and Replacement Schedule. During the liability period, the Contractor shall properly care for all seeded areas and plants installed performing watering, cultivating, and other maintenance tasks necessary to keep the trees in a live, healthy condition until final acceptance.

B. Insect and disease control will be the responsibility of the Government. The Contractor is responsible for periodically inspecting the materials during the guarantee period and shall notify the government in writing of any suspected problems.

C. Woody plants shall be considered unacceptable when the main leader has died back or 25% of the crown is dead. Plants that have died back into the crown or beyond the normal pruning line shall be replaced by the Contractor with the same size and species as the original during the next defined planting season at no additional expense to the Government.

D. The evaluation rate for forbes and grasses will be based on finding an average of 1 forb and 2 grass seedlings (from the seed schedule) per square foot over each designated area. Grass only areas shall have on the average a minimum of 6 grass seedlings per square foot Areas with less than the required density will be resown with an approved mix consisting of all or some of the parts of the original mix during the next defined planting season at no additional expense to the government.

E. With regard to planting woody plants and seeding forbes and grasses, the contractor will be responsible for a one time replacement only.

5.3 Final Acceptance:

Final Acceptance will be given at the end of the liability period.

5.4 MEASUREMENT AND PAYMENT:

A. The Contractor shall include with all invoices for payment an acceptance report signed by the COR or designated park representative. Failure of the contractor to obtain signed acceptance report(s) will release the government from any obligation to pay for services claimed but not documented by a signed acceptance report.

B. The amount to be paid will be based on the actual bid items completed and accepted. Quantities so measured will be paid for at the specified item bid price.

C. **The National Park Service reserves the right to conduct any testing or inspection it may deem advisable to assure that all work conforms to the specifications herein.**

REVEGETATION COAST ESTIMATES (1998)

Item	Unit	Estimated Quantity	Unit Price	Total
A.	**Herbicide Application**			
1.	Mow all existing Vegetation to a height of 5-6 inches per acre			
2.	Apply Herbicide per acre		$3-10/gallon $$1,000-$1,500/acre	
3.	Mow all dead vegetation to a height of 3 inches per acre			
			$1,500-1,800/acre for all three items	
B.	**PREPARATION FOR PLANTING**			
1.	Application of Lime per lb/ton		$200-300/ton	
2.	Application of Sulfur per lb/ton		$250-350/ton	
3.	Furnish/Place Topsoil		$18-22/cubic yard	
4.	Application of Leaf Mold per cubic yard		$20-25/cubic yard	
4.	Subsoiling/Ripping of planting areas per acre		$1200-2,500/acre	
5.	Aeration of planting areas per acre		$600-1,200/acre	
C.	**PLANTING/SOWING**			
1.	Tree/Shrub Planting per tree/shrub		1 gallon material - $12-20/each 1-1.25", B&B - 85-125/each	
2.	Grasses and Forbes mix by weight per area		Varies with mix/site, generally runs about $800-1,000/acre	
3.	Application of Straw Mulch per ton		$200-300/ton	