SECTION 32 91 10
PLANTING SOIL

PART 1 – GENERAL:

1.1 DESCRIPTION

A. This section includes planting soils for trees, shrubs, groundcovers and lawn.

1.2 REFERENCES AND STANDARDS

A. The following references and standards are used:
   1. ASTM: American Society of Testing Materials
   2. USDA: United States Department of Agriculture
   3. AASHTO: American Association of State Highway and Transportation Officials

1.3 SUBMITTALS

A. Contractor to submit samples and soil tests for topsoil in accordance with Division 1 and the following. No material shall be ordered until the required samples, certificates, manufacturer's literature, and test results have been approved by the Engineer. Material delivered on site shall match the samples. Location of source of soil shall be labeled for each sample.

B. Soil Testing shall be carried out by an approved Maryland soil testing laboratory.
   1. The laboratory shall have a minimum 5 years' experience with the tests protocols of the USDA.
   2. Provide a particle size analysis including the following gradient of mineral content:

USDA Designation	Sieve in mm
Gravel	+ 2 mm
Very Coarse Sand	1-2 mm
Coarse Sand	0.5-1 mm
Medium Sand	0.25-0.5 mm
Fine Sand	0.1-0.25 mm
Very Fine Sand	0.05-0.1 mm
Silt	0.002-0.05 mm
Clay	minus 0.002

   3. Provide a chemical analysis including the following:
      a. pH and Buffer.
      b. Percent organic content by oven dried weight.
      c. Nutrient levels by parts per million including nitrogen, phosphorous, potassium, magnesium, manganese, iron, zinc and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil.
      d. Soluble salts by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
      e. Cation Exchange Capacity.
   4. Provide a physical analysis of the following:
      a. Water permeability in inches per hour with the sample compacted at a specific compaction.

C. All testing and certification shall be the sole responsibility of the Contractor.

D. Submit the particle size analysis for all sands and light weight aggregate.

E. Submit the manufacturer's particle size analysis, pH, and certificate of length of composting period for organic materials.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver or place soils in frozen, wet or muddy conditions.

1.5 EXAMINATION OF CONDITIONS

A. All areas where planting mix is to be placed shall be inspected by the Contractor before starting work and all defects such as incorrect grading, compaction, and inadequate drainage shall be reported to the Engineer prior to beginning this work.

PART 2 – PRODUCTS:

2.1 TOPSOIL

1. Topsoil shall comply with the following:
   a. Topsoil in all areas shall be original surface friable loam topsoil of uniform quality, free from gravel and stones retained on a 50 mm (2") sieve, heavy clay, frozen clods, lumps, plants, roots, sticks, and foreign materials harmful to plant growth, such as 2" or larger fragments of hot mix, concrete pavement, and/or surface treatment; suitable for germination of seeds and the support of vegetative growth.
   b. Topsoil in all areas shall be 99.9% free of noxious perennial weeds and completely void of Johnsongrass (Sorghum halapense) as determined through prior soil tests.
   c. Topsoil shall contain no less than 5% or more than 10% organic matter.
   d. Soil texture: Clay loam to sandy clay loam soil with the following particle size distribution:

Approximate Particle Distribution	
Gravel	Less than 10%
Coarse	30%-60%
Fine Sand	5%-15%
Very Fine Sand	5%-10%
Silt	15%-25%
Clay	25%-30%

   e. Mineral Requirements as per AASHTO standards:

Magnesium – Mg	100+ units
Phosphorus - $P_2 0_5$	150+ units
Potassium - $K_2 0$	120+ units

Soluble salts/Conductivity –

- Not to exceed 900 ppm/0.9 mmhos/cm (in soil)
- Not to exceed 3000 ppm/2.5 mmhos/cm (in high organic mix)

Note: For unusual soil conditions, the following optional tests are recommended with levels not to exceed:

Boron	3 lbs per acre
Manganese	50 lbs per acre
Potassium (K_2O)	450 lbs per acre
Sodium	20 lbs per acre

B. ADDITIVES

1. Mix Vitera Gelscape with backfill at the rate of 1 oz. per caliper inch (or 1 oz. per ft. of ball diameter). Also spread 1/2 oz. as the plant is placed in the hole. Replace half of the treated soil and water thoroughly. Finish filling the hole and water again. Viterra Gelscape shall be as manufactured by Ameriq, tel: (800) 832-8788, or approved equal.
2. Incorporate endo and ectomycorrhizal fungi packets into the planting soil as per manufacturer's specifications. Endo and ectomycorrhizal fungi packets shall be as man-

ufactured by Horticultural Alliance, Inc., tel: (800) 628-6373, or approved equal. Save packages for inspection by Owner's Representative.

C. MASONRY SAND
   1. Masonry sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.75 or greater.
   2. Sand shall be clean, sharp, natural sands free of limestone, shale, and slate particles.
   3. Provide the following distribution size:

Sieve	Percent passing
3/8"	100
Nos. 4	95-100
No 8	80 -100
Nos. 16	50-85
Nos. 30	25 -60
Nos. 50	10-30
Nos. 100	2-10

D. ORGANIC MATTER:
   1. Leaf matter and yard waste composted sufficiently to break down all woody fibers, seeds and leaf structures, free of toxic, non organic matter. Organic Matter shall be commercially prepared compost "Uaja Compost" by Bluemont Quarry or "Leaf Gro Compost", or approved equal.
   2. Pine Bark:
      a. Horticultural grade milled pine bark, with 80% of the material by volume sized between 0.1 mm – 15.0 mm.
      b. Pine Bark must be aged at least for 9 months and shall be screened.
      c. Pine Bark shall be Pro Base, as manufactured by Scott, Inc., Wakefield, Virginia, or approved equal.

E. FERTILIZER
   1. Fertilizer shall be an approved product and comply with Maryland and Federal fertilizer laws. Manufacturer's certificate of compliance shall be submitted to the Engineer for approval.
   2. Fertilizer shall be formulated to mix well into topsoil and plant mix and shall provide a controlled release of nitrogen continuously for a period of no less than 9 months and no more than 12 months.
   3. The fertilizer shall be completely water soluble at a rate dictated by soil test results.

F. SULPHUR
   1. Sulphur shall be commercially granulated 96% pure sulphur, delivered in containers with manufacturer, material and analysis clearly labeled on the containers.
   2. Sulphur used to lower a soil pH above 7.0 shall be ferrous sulphate.

G. LIME
   1. Agricultural limestone shall contain a minimum of 85% carbonates. Minimum graduation shall be as follows:

Sieve	Passing Rate
No. 10 Mesh	100%
No. 20 Mesh	98%
No. 60 Mesh	55%
No. 100 Mesh	40%

PART 3 – EXECUTION:

3.1 SOIL MIXING AND QUALITY CONTROL TESTS

A. Quality control in terms of soil mixing and shredding equipment shall be the responsibility of the Contractor. All equipment used shall be of adequate capacity and capability to maintain the required quality control.

B. To ensure that sufficient time is given for final quality control testing as work progress, an adequate amount of material shall be mixed in advance of the time the material is to be placed on site. Piles of approximately 50 cubic yards shall be created to store the planting mix. Each pile shall have a number denoting the necessary test results for quality control purpose. Plastic sheeting shall be used to protect the soil piles from inclement weather conditions. Avoid contamination from existing soils below.

3.2 SITE PREPARATION

A. The Contactor shall notify the Engineer of any subsurface conditions that might affect the quality of work and the time required to complete it.

B. All underground utilities that will be affected due to the work carried out shall be located prior to installing the topsoil and planting mix. All new utility work shall be completed before installation of topsoil and planting mix.

C. All excavation to the proposed grade shall be carried out according to the Contract Drawings. Care shall be taken not to over excavate compacted subbases of adjacent hardscape areas.

D. The Contractor shall make sure the subgrade slopes parallel to the adjacent grade, or to towards the proposed subsurface drain lines, as shown on the Contract Drawings.

E. All subsurface drains, irrigation lines, and risers shall be installed and tested prior to installing soil. The subgrade and the installed drainage shall be approved by the Engineer before proceeding with the work.

F. Adjacent walks and utilities shall be protected from damage and/or staining from soil using methods deemed suitable. A clean-up process shall be carried out at the end of each day to prevent any soils from damaging the adjacent sidewalks. Any damage incurred caused by the soil installation process shall be repaired at the Contractor's expense.

3.3 TOP SOIL INSTALLATION PROCESS

Top soil shall be placed at the lawn and planting bed locations shown on the plans to a total depth of 12" for all groundcover, grasses and vines, and 24" total depth for all perennials, trees and shrubs, or as directed by the Engineer.

A. Till the subsoil into the bottom layer of the planting mix as follows:

1. Loosen the soil of the subgrade to the depth indicated on the plans, or to a depth to achieve the percentage of existing soil specified as part of the soil mix. Since existing soil is part of the mix, provide enough loose existing soil for mixing.
2. Spread a layer of plant mix over the existing loose soil. Thoroughly mix the plant mix and the existing soil.
3. The tilled area shall be protected from compaction. In case compaction does occur, the area shall be tilled again.
4. Install the amended soil mix in lifts of 8-10" to the depths shown on the plans, or described in these specifications. Soil mix shall be spread on these areas to a depth sufficiently greater than that specified on the plans, so that after natural settlement has taken place, the work will be in reasonable conformity with the lines, grades, and elevations shown on the plans.
5. Phase installation to make sure that equipment does not travel over already placed soil to prevent compaction.
6. Maximum compaction of each lift shall be 85% and not less than 80%.
7. Over compaction shall be determined by a field percolation test. Dig a hole 10" in diameter and 10" deep. Fill the hole with water and let it drain completely, imme-

diately fill the hole with water and measure the rate of fall in the water. In the event the water drains at a rate of less than 1" per hour, till the soil to a depth to break the over compaction.

8. The Owner's Representative shall determine the required number and locations of percolation tests.
9. Installation operation shall be stopped if subgrade is frozen or wet.
10. Soil shall be thoroughly soaked after installation prior to planting and sodding. The standing period for the soaked soil shall be 3 days after which the initial settled grades shall be reset.
11. All final grades shall be as per the Contract Drawings and shall have positive drainage towards inlets and drainage structures.
12. All site grading shall be approved by the Owner's Representative before installation of mulch, sod and plants.

3.4 GENERAL CLEAN UP

A. Upon completion of this section, final cleaning shall be done within the limits of the project, and shall consist of completely cleaning the project of excess material, sweeping pavements and structure of rubbish, the removal of any unused material which will mar the appearance of the contract, and repairing any areas as determined by the Engineer as not meeting specifications.

END OF SECTION