

SECTION 02220 – CU-SOIL STRUCTURAL SOIL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This item includes all work required to furnish and place CU-Soil (a structural soil) to the depths and locations shown on the plans or as directed by the Engineer. This structural soil is an aggregate/soil/tackifier hydrogel mixture designed to meet engineering requirements for proctor density and CBR values to support pavement, while allowing better drainage and increased soil volume, supportive of tree growth. Work shall cover all costs for spreading, rough grading, and fine grading of the structural soil.

1.2 SUBMITTALS

- A. Submittals shall comply with Section 013300 – Submittal Procedures.
- B. Action Submittals:
1. Shop Drawings: Product labels/data sheets.
 2. Proof of product license

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The structural soil shall conform with “CU-Soil” as patented by Cornell University, Patent #5,849,069. CU-soil is a mixture of crushed stone, clay loam and Hydrogel which is a potassium propenoate-propenamide copolymer. Licensed producers include the following:
- Frank Paolangeli, Ithaca, New York; (607) 273-8139; Cell: (607) 279-0315
 - Sultana Sand & Stone, Inc., Brooktondale, New York; (607) 539-7868; Contact: Mr. Kim Whetzel
 - East Coast Mine, Quogue, NY
 - Tully Environmental Co. d/b/a/ Evergreen Recycling of Corona, NY
 - Ascape Landscape, New City, NY
 - Or Approved Equal.
1. The CU-Soil mix shall have a moisture content of 10% (AASHTO T-99 optimum moisture).
 2. The pH of the material shall be between 5.5 and 6.0.
 3. Gradation: The structural soil material shall consist of three components mixed in the following proportions by weight:
 - a. Crushed Stone: 100 parts
 - b. Clay Loam: 20 parts
 - c. Hydrogel: 0.03 parts

4. Crushed Stone shall be granite or sandstone (no limestone shall be used) and shall be narrowly graded from 19mm to 38mm, highly angular with no fines and in the following proportions:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
38mm	90 to 100
25mm	20 to 55
20mm	10

5. Clay loam shall meet the following requirements:

- a. Not less than 25% or more than 30% of the clay loam by weight shall be sand. 100% of the sand fraction shall pass the 2mm sieve and 100% shall be retained by the 50 um sieve.
- b. Not less than 20% or more than 40% of the clay loam by weight shall be silt. The particle size distribution for the silt shall be 2um to 50um.
- c. Not less than 25% or more than 40% of the clay loam by weight shall be clay. The particle size distribution for the clay shall include all particles smaller than 2um.
- d. Not less than 2.75% or more than 5% of the clay loam by weight shall be decayed organic matter (humus) as determined by ASTM F-1647. If organic amendments are needed to obtain the specific organic matter content of the topsoil, the organic matter source shall be peat, composted leaves (leaf mold) or other approved organic amendments. Peat shall be sphagnum peat having ash content not exceeding 15%, as determined by ASTM D-2974. Leaf mold must be substantially free of sticks, stones, roots, plastic, glass, metal, and other debris. One-hundred (100%) percent of the leaf mold must pass a 0.5inch screen. The leaf mold chemical analysis shall conform to the following:
 - i. The soluble salt content (conductivity) must be less than 150 MHOS per cubic meter for a 1:5 leaf mold to water ratio.
 - ii. The pH shall not exceed 6.8.
 - iii. The carbon/nitrogen ratio shall fall between 12:1 and 25:1.

6. The Hydrogel/Wetting Agent shall be potassium propenoate-propenamide copolymer hydrogel such as:

- a. Gelscape, Amereq Corporation, NY
- b. Soilmoist, JRM Chemical Inc., Cleveland, OH
- c. Supersorb, Aquatrols Corporation, Cherry Hill, NY
- d. Or Approved Equal

PART 3 – EXECUTION

3.1 SITE QUALITY CONTROL

- A. Do not proceed with the installation of the CU Soil material until all walls, curb footings and utility work in the area have been installed. Confirm that the sub-grade is at the proper elevation and

compacted as required. Sub-grade elevations shall slope parallel to the finished grade.

- B. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete, washout silts or other material harmful to plants have been spilled into the sub-grade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required sub-grade compaction.
- C. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use ½” plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.
- D. Do not deliver or place soils in frozen, wet, or muddy conditions. Material shall be delivered at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Protect soils and mixes from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter the site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.

3.2 PLACEMENT

- A. The structural soil shall be placed to the line and grade shown on the plans or as directed by the Engineer.
 - 1. Install CU-soil in 6-inch lifts and compact each lift. Compact all materials to 90 95% compaction from a standard AASHTO Compaction Curve (AASHTO T 99).
 - 2. No placement or compaction shall occur when moisture content exceeds 2 percent above the optimum compaction moisture content as determined by AASHTO T 99 (ASTM D698).
 - 3. Protect CU Soil during delays in compaction with plastic or plywood as directed by the Engineer.
 - 4. Field tested permeability shall be within 0.5 and 1.0 inches per hour.
- B. After the initial placement and rough grading of the CU Soil but prior to the start of the fine grading, the contractor shall request the review of the rough grading by the Engineer. The Engineer reserves the right to conduct infiltration/permeability testing prior to continuance of work.
- C. The Contractor shall set sufficient grade stakes for checking the final grades. Adjust the finish grades to meet field conditions as directed. Fill all dips and remove any bumps in the overall plane of the slope.
- D. All fine grading shall be inspected and approved by the Engineer prior to the installation of other items to be placed on the CU Soil.

END OF SECTION