

## **SECTION 329113**

### **SOIL PREPARATION**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

A. Section Includes:

1. Components of planting mediums.
2. Testing and certification of components.
3. Mixing of planting mediums.
4. Transporting of mediums.
5. Soil and soil amendments products including all imported landscape soil as required to make-up deficiencies in quantity of stockpiled native topsoil available on site.

##### **1.2 DEFINITIONS**

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- D. Topsoil: Soil with organic content suitable for sustaining the growth of a soil stabilizing groundcover such as turf. Topsoil is spread over prepared subgrade.
1. Stockpiled Native Topsoil: Topsoil stripped from the site prior to rough grading work to be spread and amended as specified (When available). No onsite soil may be used as topsoil unless approved by Landscape Architect. Soil cut from non organic layers will not be considered for use as topsoil.
  2. Imported Landscape Topsoil: Off-site topsoil imported and stockpiled to be spread and amended as specified.

##### **1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated, furnish manufacturer's literature, certifications, sources, samples, and laboratory analytical data.
1. Organic amendments.
  2. Topsoil.

3. Sand.
4. Mulch.
5. Plant bed mix.
6. Fertilizer.
7. Soil amendments.
8. Pre-emergent herbicide.

#### **1.4 QUALITY ASSURANCE**

- A. Testing: Soil testing laboratory shall be approved by Owner. Soils laboratory shall be capable of providing all tests outlined in this section and shall provide recommendations and rates of applications per 1000 sq. ft. for soil amendments, soil chemistry, and soil placement.
1. All costs for testing shall be paid for by Contractor.
  2. Materials to be Tested:
    - a. Stockpiled Native topsoil - 3 samples minimum from at least 3 different locations within the stockpile.
    - b. Imported Landscape soils - 3 samples minimum from at least 3 different locations within the stockpile.
  3. Agricultural Test Reports: Stockpiled Native Topsoil, Imported Landscape Soils, and Subgrade Soil shall be tested as follows:
    - a. Fertility (as expressed in measures of pH, salinity, nitrates, ammonium, phosphate, potassium, calcium, and magnesium).
    - b. Agricultural Suitability (sodium absorption ratio, sodium acetate and extractable calcium).
    - c. Particle Size: Classify the soil by USDA standards including particle size and organic content notations. Lab reports to conform to material specification description for sieve sizes.
    - d. Heavy metals (cadmium, lead, arsenic, aluminum).
    - e. Soils lab may require additional tests due to field conditions.
  4. Fertility Considerations: In the event of nutrient inadequacies, provisions shall be made to add required materials in soils to overcome inadequacies prior to planting.
  5. Imported Landscape Topsoil: Test for herbicide contamination.
  6. Certificates: Certify strict compliance with accepted soil mixes and amendments, including rate of application.

### **PART 2 - PRODUCTS**

#### **2.1 NATIVE LANDSCAPE TOPSOIL**

- A. Stockpiled Native Topsoil

1. Quantity: Approximate quantity of stockpiled native topsoil will not be known until demolition and rough grading have been completed under Civil Work.
2. Stockpiling: Stockpile stripped topsoil onsite.
3. Composition: Fertile, friable, well-drained soil, of uniform quality, free of stones over 1-inch diameter, sticks, oils, chemicals, plaster, concrete and other deleterious materials.
4. Analysis: Obtain an agricultural suitability analysis of the proposed topsoil from an accepted, accredited Testing Agency at Contractor's cost.
5. Test Results: Request Testing Agency to send one (1) copy of test results directly to Landscape Architect and one (1) copy to the Owner. Imported topsoil shall be amended per soils analysis report.

## 2.2 IMPORTED TOPSOIL

### A. Grading:

Sieve Size	Percent Passing Sieve
25.4 mm (1")	95-100
9.5 mm (3/8")	85-100
53 Micron (270 mesh)	10-30

### B. Chemistry - Suitability Considerations:

1. Salinity: Saturation Extract Conductivity (ECe x 103 @ 25 degrees C.) less than 4.0.
2. Sodium: Sodium Absorption Ratio (SAR) less than 9.0.
3. Boron: Saturation Extract Concentration less than 1.0 PPM.
4. Reaction: pH of Saturated Paste: 6.0- 7.5.

### C. Pests: The population of any single species of plant pathogenic nematode shall be fewer than 500 per pint of soil.

### D. Fertility Considerations: Soil to contain sufficient quantities of available nitrogen, phosphorus, potassium, calcium, and magnesium to support normal plant growth. In the event of nutrient inadequacies, provisions shall be made to add required materials to overcome inadequacies prior to planting.

### E. Source of above shall be approved and conformity of material shall be laboratory verified for each 100 cubic yards of material delivered to the site.

### F. Composition: Fertile, friable, well drained soil, of uniform quality, free of stones over 1 in. diameter, sticks, oils, chemicals, plaster, concrete and other deleterious materials.

## 2.3 PINE BARK MULCH

### A. Finely ground decomposed pine bark.

- B. White wood or filler material is not allowed.
- C. Submit sample for approval.

## **2.4 SAND**

- A. Grading: Clean bank sand free of deleterious materials and clumps larger than 1 inch in diameter.
- B. Planting Bed Mix/Tree Backfill: Sharp sand.

## **2.5 CHEMICAL ADDITIVES**

- A. The following soil components listed shall be applied at rates shown as determined by soil tests. Till additives into existing soil for all grassed areas.
  - 1. Gypsum: Agricultural grade product containing 80 percent minimum calcium sulphate. Apply at a rate of 6lbs./1000 sq. ft.
  - 2. Boil Sulphur: Agricultural grade sulphur containing a minimum of 96 percent sulphur. Apply at a rate of .2 lbs./1000 sq. ft.
  - 3. Apply the following micronutrients at the rates shown:
    - a. Zinc: .05 ounces/1000 sq. ft.
    - b. Manganese: .05 ounces/1000 sq. ft.
    - c. Copper: .05 ounces/1000 sq. ft.

## **2.6 PLANTING MEDIA**

- A. Thoroughly mix planting media in the following proportions:
  - 1 part sharp sand
  - 1 part topsoil
  - 1 part pine bark mulch
- B. The ratio of mix components may be altered during Contract period to meet site conditions found different in various Project areas.
  - 1. Chemical additives – determined by soil tests.
  - 2. Maintain pH at 6.5 to 7.5.

### **PART 3 - EXECUTION**

#### **3.1 SOIL MOISTURE CONTENT**

- A. Do not work soil when the following conditions occur:
  - 1. Moisture content is so great that excessive compaction will occur.
  - 2. When it is so dry that dust will form in air or where clods will not break readily.
  - 3. When it is frozen.
- B. Apply water if necessary to bring soil to optimum moisture content for tilling and planting.

#### **3.2 CLEARING AND CULTIVATION**

- A. Clearing: Clear all planting areas of stones 1-1/2 in. diameter and larger, weeds, debris and other extraneous materials prior to soil preparation work.
- B. Cultivation of Subgrade:
  - 1. Verification:
    - a. Verify that subgrades for installation of stockpiled native topsoil and imported landscape soil have been established under rough grading and have been approved by the landscape architect. Do not spread landscape soil prior to acceptance of subgrade work.
    - b. Depth: Verify that subgrades are 4-inch minimum below finished grades, + 1 inch. Report all variations.
  - 2. Cultivation: Rip or cultivate rough grade in all lawn and planting areas to a depth of 4 inches immediately prior to spreading stockpiled native topsoil or imported landscape soil.

#### **3.3 SPREADING, DEPTH, AND AMENDING OF IMPORTED LANDSCAPE SOIL**

- A. Sequence: Existing soil subgrade cultivation and amending to be approved prior to spreading stockpiled native topsoil or imported landscape soils.
- B. Install stockpiled topsoil in low areas to bring the rough grade to within plus or minus 1 foot.
- C. Place in lifts of 3 inches maximum where necessary.

### **3.4 MIXING**

- A. Till soil amendments into existing soil for grassed areas with the use of mechanical tiller to a depth of 4 inches.
- B. Mix soil base, amendments, and chemical additives by mechanical means. Do not mix additives with excavated material at the plant pit site.
- C. Mechanical means should thoroughly mix all amendments with soil or soil-less base.
- D. Soil and sand bases shall be completely pulverized and free of lumps or aggregated material. Moisture content of base materials shall not be such that chemical granular or pelletized additives become dissolved before thorough mixing.
- E. Mix media in quantities of not less than 50 cubic yards or mix total quantity required if less than 100 cubic yards. Contractor shall be responsible for continuity between batches.
- F. The Contractor shall keep in storage, at his own expense, sufficient quantities of mix to repair any settling or to adjust grades throughout the warranty period.

### **3.5 FIELD QUALITY CONTROL**

- A. Landscape Architect reserves the right to take and have a Soils Testing Laboratory analyze soil samples at the site.
- B. Immediately remove rejected materials from site. Replacements are subject to all specified requirements.
- C. Contractor shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the Drawings or Specifications, obstructions on the site, or prior work done by another party, which Contractor feels precludes establishing proper drainage shall be brought to the attention of Landscape Architect in writing for correction or relief of said responsibility.

**END OF SECTION 329113**