



SECTION 329120 - EXPANDED SHALE, CLAY & SLATE (ESCS) STRUCTURAL SOIL FOR TREES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section Includes:

- 1. ESCS Structural Soil for the entire site including within the right-of-way.

- B. Related Sections:

- 1. Section 312000 "Earth Moving" for excavation, filling and backfilling, and rough grading.
 - 2. Section 319100 "Planting Soils" for plants.
 - 3. Section 329300 "Plants" for border edge restraints.
 - 4. Section 334600 "Subdrainage" for subsurface drainage.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Standardized topsoil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- D. Subgrade: Surface or elevation of subsoil remaining after excavation. It can also be the top elevation of a fill or backfill.
- E. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- F. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.
- G. ESCS Lightweight Aggregates manufactured by the Rotary Kiln method using select components of shale, clay or slate.

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1.4 ESCS STRUCTURAL SOIL DESCRIPTION

- A. ESCS Structural Soil bridges over drainage aggregate layer without the need for geotextile fabric.
- B. ESCS Structural Soil is compacted to provide aggregate-to-aggregate contact for structural support of pavements.
- C. Soil and organic blend in voids between ESCS lightweight aggregates retains plant-available water and nutrients.
- D. Soil and organic blend in voids between ESCS lightweight aggregates provides medium for plant root growth.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Expanded Shale, Clay and Slate (ESCS) Structural Soil: Include manufacturer's installation instructions.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 - 1. Product Certificates: May include soil amendments and fertilizers from the manufacturer.
 - 2. Material Test Reports: For imported or manufactured topsoil.
- B. Submit manufacturer's technical product data and certified laboratory test results for the following:
 - 1. ESCS Lightweight Aggregate- as per regional Lightweight Aggregate Manufacturer
 - 2. Soil Component- as per regional Lightweight Aggregate Manufacturer
 - 3. Backfill Topsoil- by others
- C. Sample: Provide one (1) quart of each kind of ESCS Structural Soil in heavy duty clear resealable plastic freezer storage bags labeled, "ESCS Structural Soil", and the type and the project name.

1.7 QUALITY ASSURANCE

- A. Provide structural soil mix prepared by a firm that is regularly engaged in the production of the specified items.
- B. Preinstallation Conference: Conduct at the Project site.

1.8 DELIVERY, STORAGE AND HANDLING

- A. When stockpiling finished planting mix, cover with plastic tarps to prevent drying out or soil separation from rainfall.
- B. Install ESCS Structural Soil within 48 hours of mixing.

- C. Do not deliver or place soil in frozen, wet, or muddy conditions.

PART 2 – PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS

- A. Provide an ESCS Structural Soil using the components listed below:
 - 1. ASTM C330 Expanded Shale, Clay or Slate (ESCS) Lightweight Aggregate
 - 2. Soil Component
 - a. ESCS Structural Soil components various by region and availability. Percentages of ESCS lightweight aggregate, gradation of ESCS lightweight aggregate, and final blending percentages of ESCS lightweight aggregate and soil varies by manufacturer.
- B. Provide ESCS FROM:
- C. Compaction: When calculating the volume necessary for the project, add approximately 18% to the calculated volume to allow for compaction which occurs during installation due to driving small equipment over the product, in addition to the natural settling process.

2.2 ESCS STRUCTURAL SOIL COMPONENTS

- A. ESCS Lightweight Aggregate
 - 1. Gradation: supplied by manufacturer
 - 2. Conform to the quality requirements of ASTM C330 Standard Specifications for lightweight Aggregates for Structural Concrete
- B. Soil Component:
 - 1. Texture: 40 – 65% sand
15 – 25% silt
20 – 35% clay
2 – 5 % organic matter
 - 2. Soil Component is for mixing with ESCS Lightweight Aggregates and not to be confused with “Planting Soil” specified in Division 32 “Plants”.

3.0 PREPARATION

- A. General:
 - 1. Structural Soil is shown in a public right-of-way or easement. Obtain approvals from proper authorities before and after placing ESCS Structural Soil.
- B. Preparing Subgrade:
 - 1. The subgrade shall be prepared according to the following procedure:
 - a. Remove all organic matter, debris, loose material and large rocks.

- b. Dig out soft and mucky spots and replace with approved suitable material.
- c. Loosen hard spots; uniformly compact subgrade to 90% of its maximum dry density (ASTM D698).

C. Perforated Underdrain System (if specified):

- 1. Install underdrain system, with sock or soil separator fabric, according to drawings and connected to storm drain.

3.3 INSTALLATION OF ESCS STRUCTURAL SOIL

A. General:

- 1. Install the soil drains and compact the structural soil under and around each pipe.
- 2. Wooden tree pit forms may be used.

B. Placing and Compacting Structural Soil

- 1. Place ESCS Structural Soil mix in lifts not exceeding 12 inches deep. Compact using a vibratory plate, performing a minimum of two passes, of not less than 10 seconds per pass, before moving to the next adjacent location. Additional passes if required by the field engineer. Continue placing and compacting in 12-inch lifts until the specified depth is reached.
- 2. For large spaces, a vibratory steel roller weighing no more than 12 tons static weight shall be used. Compacted lifts should not exceed 12 inches. The minimum number of passes is two and the maximum number is four. Additional passes are required if the field engineer determines additional compaction is necessary to insure stability.

3.4 CONCRETE PLACEMENT

- A. The concrete subbase for the unit pavers shall be placed as specified directly on the approved compacted ESCS Structural Soil.

3.5 TREE PIT PREPARATION

A. Tree Pit Excavation:

- 1. Excavate the tree pit using the following procedure:
 - a. Excavate the ESCS Structural Soil to a depth equal to the height of the root ball of the tree to be planted. Remove the ESCS Structural Soil to within no more than one foot of the edge of the paved area.
 - b. Place the tree in the pit and backfill as described below as soon as possible. No tree pit shall remain excavated for more than 2 hours unless forms are used.

B. Tree Pit Backfill Planting Mix:

- 1. Backfill tree pit using the following procedure:
 - a. Remove any wooden forms. Immediately place the tree in the pit as detailed and replace the excavated structural soil with the following:

- i. A 50-50% mix of ESCS Structural Soil excavated from the tree pit and approved topsoil.
- b. Hand tamp the planting mix in 12-inch lifts until the pit is filled to the specified grade.
- c. Do not use excavated soil as engineered fill to support paving or structures. Excess excavated ESCS Structural Soil may be used for other planting backfill operations.

3.6 CLEANING AND PROTECTION

- A. Contractor shall use rubber-tired machines or take other precautions with the approval of the field engineer to protect the brick paving surfaces if planting occurs after brick pavers are installed.
- B. Broom clean paved areas and cover stockpiled material after each day's operations.

END OF SECTION 329120