



**SPECIAL PROVISIONS
FOR
AMENDED SOIL**

**Scott County
SB-IA-6492(602)--7T-82**

**Effective Date
August 19, 2014**

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This work includes all labor, materials, tools, equipment, transportation, protection, and supervision necessary and required to layout planting beds; excavating areas to receive amended soils and disposing of excess material offsite; furnishing all amended soil materials, mixing soil mechanically as specified and installing amended soil at locations shown on the plans; final grading for landscape plantings, and all testing.
 - 1. The amended soil specified under this section is also used for backfilling tree pit excavations, where it is incidental to the tree planting.
- B. The material and work specified in this section includes: topsoil, organic matter, sand, and all other items necessary to provide, prepare, install and grade the amended soil as detailed in the contract documents.

1.2 QUALITY ASSURANCE

- A. General: Ship materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials. Obtain any necessary permits for this work and pay any fees required for permits.
 - 1. Perform work in accordance with applicable requirements of the Iowa DOT Standard Specifications for Highway and Bridge Construction, Series 2012, and all local and state codes and ordinances.
- B. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

- C. Analysis and Standards: Package standard products with manufacturer have certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable
- D. Substitutions: If specified materials are not obtainable, submit proof of non-availability, together with proposal for use of equivalent material in compliance with Iowa DOT

1.3 SUBMITTALS

- A. Product Samples: Submit all samples in a re-sealable plastic bag.
 - 1. 1 pound of organic matter
 - 2. 1 pound of sand
 - 3. 1 pound of topsoil soil
 - 4. 1 pound of amended soil
- B. Source List
 - 1. Sand
 - 2. Organic matter
 - 3. Topsoil
- C. Material Data and Product Information
 - 1. Sand
 - 2. Organic matter
- D. Certifications
 - 1. Compost Manufacturer:
 - a. Proof that manufacturer is certified by the USCC and is in good standing.
 - i. Verification of current participation in the STA Program can be achieved by logging onto the USCC website at www.compostingcouncil.org
 - b. A Letter from the Manufacturer of the compost, certifying that:
 - i. They are fully permitted and are operating in compliance with Iowa State Regulations for the production and distribution of compost, including certification that the product being provide has met all requirements for pathogen destruction.
 - ii. That the sample provided is representative of the material that will be delivered.
 - iii. That they can supply a consistent supply of the material in the volume required.
 - iv. That they will provide verification of the volumes shipped or delivered for the project.
- E. Material Test Reports:
 - 1. General:
 - a. Submit reports from a qualified testing agency indicating and interpreting test results of amended soil samples for compliance with the following standards and with requirements indicated:
 - i. Organic Content and pH measurement of amended soil mix in compliance with NC-13 Soil Test Procedures.
 - ii. Gradation of amended soil mix in compliance with ASTM D 5268 for amended soil mix.
 - 2. Compost:

- a. Copy of the lab analysis, performed by a STA Program certified lab, verifying that the compost meets the product parameters listed in Table 1 of this section. The lab analysis should not be more than 90 days old.
- 3. Amended Soil:
 - a. Soil Analysis Test Results (see Article 1.6 in this Section) along with acceptable ranges for use as ornamental landscape planting soil.
 - b. Interpretations of test results and recommendations from testing agency for additional amendments to planting soil mix, if needed, shall be provided. Recommendations shall be for the successful establishment and sustainability of ornamental plants (trees, shrubs and ornamental grasses). If no additional amendments are needed, this shall also be stated.

1.4 SOIL-SAMPLING REQUIREMENTS

- A. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Engineer under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of three representative samples from varied locations as recommended by Testing Agency or where directed by Engineer for compost and amended planning soil mix.
 - 2. Procedures and Depth of Samples: According to testing agencies written recommendations.
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Engineer for their records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth and project name and location.

1.5 TESTING REQUIREMENTS

- A. Contractor shall be responsible for all testing as required by the construction documents.
 - a. Contractor shall engage a qualified testing agency or qualified testing agencies to perform soil analysis on the amended soil and compost.
 - i. A written report containing soil-amendment and fertilizer recommendations for the amended soil mix by the qualified testing agency performing the testing on the amended soil shall be provided along with the soil analysis.
 - a) The recommendations shall be based on the proposed ornamental horticultural plantings, and at minimum, shall provide both the acceptable and recommended ranges for each chemical and physical property.
 - ii. Testing agency shall identify and label samples and test reports according to sample collection and labeling requirements.
 - iii. The reports shall include the acceptable range (minimum and maximum), along with the test results.
- B. All testing and analysis shall be done according to standard laboratory protocol and shall be done in strict conformance with common, accepted industry standards, specifications and test methods for the type of testing being completed, unless otherwise specifically indicated. All testing methods and standards followed and complied with shall be clearly stated in the test reports.
- C. Amended soil: at minimum, amended soil testing shall include:
 - 1. Fertility Testing:
 - a. Fertility Index Value (FIVs)

- b. Soil reaction (acidity/alkalinity pH value)
 - c. Buffered acidity or alkalinity
 - d. Percentage of organic matter
 - e. Nitrogen (N) ppm
 - f. Phosphorus (P) ppm
 - g. Potassium (K) ppm
 - h. Magnesium (Mg) ppm
 - i. Manganese-availability ppm
 - j. Calcium (Ca) ppm
 - k. Sodium (Na) ppm and sodium absorption ratio
 - l. Zinc (Zn) ppm
 - m. Manganese (Mn) ppm
 - n. Boron (B) ppm
 - o. Copper (Cu) ppm
 - p. Iron (Fe) ppm
 - q. Electrical Conductivity (EC) mmhos/cm
 - r. Soluble-salts ppm
 - s. Hydrogen (H) %
 - t. Sodium (Na) %
 - u. Potassium (K) %
 - v. Magnesium (Mg) %
 - w. Calcium (Ca) %
 - x. Cation Exchange Capacity (CEC), calcium percent of CEC, and magnesium percent of CEC
 - y. Base Saturation (Sat) %
 - z. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 - aa. Other deleterious material, including their characteristics and content of each.
2. Physical Testing:
- a. Effective porosity
 - b. Gradation of amended soil mix in compliance with ASTM D 5268 for amended soil mix.
3. Chemical Testing:
- a. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 - b. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Compost: At minimum, compost testing shall include:
- 1. Lab analysis (Compost Technical Data Sheet), performed by a STA Program certified lab, verifying that the compost meets the product parameters listed in Table 1 of this section
 - Compost: Lab analysis (Compost Technical Data Sheet), performed by a STA Program certified lab, verifying that the compost meets the product parameters listed in Table 1 of this section
- E. Analyze and report all testing in compliance with accepted industry standards.

- F. Recommendations: Based on the test results of the amended soil, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory amended soil suitable for supporting healthy, viable plants of type specified to be planted. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, for micronutrients, and pH adjustment, all as applicable.
1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 square feet for 6 inch depth of soil.
 2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 square feet for 6 inch depth of soil.

1.7 DELIVERY, SHIPPING AND HANDLING

- A. General:
1. Deliver only materials that fully conform to these specifications or for which submittals have been approved for use by Engineer.
 2. Thoroughly clean stockpile and delivery areas in compliance with the pollution prevention plan and as directed by Engineer.
 3. Protect all materials from environmental and climatic conditions and deterioration during delivery, and while stored at site.
- B. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- C. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Do not move or handle materials when they are wet or frozen.
 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

1.8 UTILITY VERIFICATION

- A. The Contractor shall contact Iowa One Call (811 OR 1-800-292-8989) and the local utility companies for verification of the location of all underground utility lines in the area of the work. The Contractor shall be responsible for all damages resulting from neglect or failure to comply with this requirement.

PART 2 PRODUCTS

2.1 AMENDED PLANT SOIL MATRIX MATERIALS

- A. **Topsoil:** Topsoil shall be high quality soil consisting of the top 6 inches of field or pasture loam containing a good supply of humus and a high degree of fertility capable of sustain ornamental landscape plants (shrubs, trees and grasses). Do not use surface soil from ditch bottoms, drained ponds, and eroded areas, or soils which are supporting growth of noxious weeds or

other undesirable vegetation.

1. **Loam classification** shall be per Iowa Storm Water Manual (refer to Section 2E-1 for infiltration practices, page 9, Table 1).
 2. Typical of cultivated topsoil of the locality.
 3. Do not use material as topsoil that is stripped from the following sources:
 - i. Chemically contaminated soils.
 - ii. Areas from which the original surface has been stripped and/or covered over, has borrow pits, open mines, demolition sites, dumps, and sanitary landfills.
 4. A pH level between 6.0 and 7.5.
 5. Topsoil shall be free of admixture of subsoil and clay lumps, hard clods, stones or other debris larger than 1 inch in diameter.
- B. **Sand:** Sand shall be clean and free of dirt and other deleterious materials.
1. Concrete sand having a fineness modulus (FM) between 1.8 and 2.5
 2. Masonry sand is unacceptable.
- C. **Organic Matter:** A product of compost or locally available organic waste. Compost shall meet the requirements of Table 1, including the following:
1. Compost shall be well decomposed, stable, weed free organic matter source. It shall be derived from: agricultural, food or industrial residuals; bio-solids (treated sewage sludge); yard trimmings; source-separated or mixed solid waste. The product shall contain no substances toxic to plants, humans or animals and shall be reasonably free (<0.1% by dry weight) of deleterious material, rocks, plastic, glass, metal, or other man-made material or foreign matter. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived.
 - a. Processed or completed to reduce weed seeds, pathogens, and deleterious material.
 - b. Contain no paint, petroleum products, herbicides, fungicides, or other chemical residues that would be harmful to plant or animal life.
 2. Compost shall be certified through the U.S. Composting Council's (USCC) Seal of Testing Assurance (STA) Program.

Table 1: Compost Requirements

Parameters ¹	Reported as (units of measure)	General Range
pH	pH units	6.0 - 8.4
Soluble Salt Concentration (electrical conductivity)	dSm (mmhos/cm)	0 - 5
Moisture Content	%, wet weight basis	30 – 60
Organic Matter Content ²	%, dry weight basis	30 – 65
Particle Size	% passing a selected mesh size, dry weight basis	98% pass through 3/4" screen or smaller
Stability Indicator (<i>respirometry</i>) Carbon Dioxide Evolution Rate	mg CO ₂ -C per g OM per day	Rating of stable to very stable < 8
Maturity Indicator (<i>bioassay</i>) Percent Emergence Relative Seedling Vigor	Average % of control Average % of control	80+ 80+
Physical Contaminants (inerts)	%, dry weight basis	< 1
Chemical Contaminants ³	mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants ⁴ Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

¹ Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMECC, The US Composting Council)

² Alternative: Organic content greater than 25% by weight based on a loss on ignition test conforming to recommended chemical NCR-13 soil test procedures.

³ US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels = Arsenic 41ppm, Cadmium 39ppm, Copper 1,500ppm, Lead 300ppm, Mercury 17ppm, Molybdenum 75ppm, Nickel 420ppm, Selenium 100ppm, Zinc 2,800ppm.

⁴ US EPA Class A standard, 40 CFR § 503.32(a) levels = Salmonella <3 MPN/4grams of total solids or Fecal Coliform <1000 MPN/gram of total solids

PART 3 EXECUTION

3.01 PLANTING BED AREAS – IN PLACE MIXING OF AMENDED SOIL MIX

- A. Dig a 12 inch diameter by 12 inch deep hole at each plant bed area and fill the hole with water. If the hole drains within 24 hours, proceed as follows:
 - 1. Excavate planting beds to a suitable depth to allow for the finished settled depths as noted in the plans.

2. Till subgrade to a minimum 6 inch depth to insure a positive bond between subgrade and topsoil. Remove stones larger than 1 1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them offsite.
 3. Place and spread topsoil to a uniform 4 inch settled depth over the planting bed area.
 4. Where topsoil is spread, use a cultpacker, pulverizer, or similar tool to pulverize the soil and eliminate all lumps. Do not compact soil. Till topsoil into the top 2 inches of the subsoil to integrate the two.
 5. Place and spread remaining topsoil to a uniform 8 inch settled depth (for a total application of uniform 12 inch settled depth).
 6. Where topsoil is spread, use a cultipacker, pulverizer, or similar too to pulverize the soil and eliminate all lumps. Do not compact soil.
 7. On a clean topsoil surface, add 4 1/2 inches of organic matter and 1 1/2 inches of sand and till the amendments through the entire depth of topsoil.
 8. Provide an 18 inch settled depth of amended soil in all plant beds. Provide backfill for trees as shown on the plans.
- B. Protect paving, sidewalks, utilities, and existing plants during finish grading; repair or replace any items damaged by construction operations at no cost to Contracting Authority.
1. Equipment that may leave black tire marks should not be driven on sidewalk or paver areas, or mark must be removed, without damage to walks or pavers, prior to project acceptance.
- C. After placement, maintain surfaces to indicated finished grades; deposit additional topsoil or amended soil to repair settlement
- D. No heavy equipment shall be used within the planting bed areas. The incorporation of soil amendments and the associated earthwork shall be done using low ground-contact pressure equipment, or by excavators and/or backhoes operating adjacent to it.

3.02 PLANTING BED AREAS – OFF SITE MIXING OF AMENDED SOIL MIX

- A. Amended soil shall be mixed with the ratios of topsoil, organic matter, and sand as described in 3.01.
- B. Planting beds shall be prepared as described in 3.01

3.03 FINISH GRADING

- A. Prepare finish grade for planting with only light raking or scarifying required.
- B. Round finished surfaces at abrupt changes in slope.
- C. Should spot elevations for finished grades conflict with finished contours, the spot elevations shall govern.

- D. Finished grades to uniform levels or slopes between points where levels are given or between such points and existing grades.
- E. Positively drain all planting areas.
- F. Protect paving, sidewalks, utilities, and plants during finish grading; repair or replace any items damaged by construction operations at no cost to Contracting Authority. Equipment that may leave black tire marks should not be driven on sidewalk or paver areas, or marks must be removed, without damage to walks or pavers, prior to project acceptance.

3.04 MAINTENANCE & CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protection of graded areas:
 - 1. Protect newly graded areas from traffic and erosion.
 - 2. Keep free of trash and debris.
 - 3. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
 - 4. Keep public streets clean from soil, soil tracking, and debris at all times.
- C. Reconditioning Compacted Areas: Where completed graded areas are disturbed by subsequent construction operations, erosion and adverse weather, scarify surface, re-shape, and compact to required density prior to further construction at no cost to the Contracting Authority.
- D. Settling: Where settling is measurable or observable during general project warranty period, add topsoil or amended soil, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration at no cost to the Contracting Authority.
- E. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off-site. Retain subparagraph below if required; revise to suit Project.

PART 4 METHOD OF MEASUREMENT

4.01 MEASUREMENT:

- A. Method of Measurement: The Engineer will compute in cubic yards to the nearest 0.10 cubic yard the total volume of the amended soil installed in the planting beds using the surface dimensions (areas) and required depth, both as shown in the contract documents. Quantity is calculated by the depths and areas shown on plans. Shrinkage factor shall be considered incidental. Topsoil for inclusion in the Amended Soil mix should be included in this quantity. Contractor will be paid for plan quantity.
- B. The amended soil used for backfill of the trees will not be measured separately, as it is incidental to the tree.

PART 5 BASIS OF PAYMENT

5.01 PAYMENT

- A. Basis of Payment: Payment for Amended Soil will be at the contract unit price bid for cubic yards of amended soil prepared and installed according to the contract documents. This payment includes full compensation for all transportation, materials, tools, equipment, supervision, and labor required for plant bed preparation and to furnish, mix, test and install the amended soil at locations shown on the plans and in accordance with the Contract Documents.
- B. Unit Price for Amended Soil will include plant bed layout, plant bed preparation, furnishing all amended soil materials, mixing and installing amended soil, all required testing and final grading of all planting beds and tree rings.