



Iowa Department of Transportation

SPECIAL PROVISIONS FOR PLANTING SOIL

Pottawattamie County
IM-NHS-029-3(102)48--03-78

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.

120231.01 DESCRIPTION.

A. Scope.

1. The work of this specification consists of providing and placing Freely Draining Planting Soil fill.
2. All work will also include the preservation from injury or defacement of all vegetation and objects designated to remain as shown on the Drawings or as directed by the Engineer.

B. Samples and Submittals.

1. Planting soil: Provide three 1 cubic foot samples of proposed planting soil to a certified laboratory for agricultural suitability analysis, each from a separate area of the soil source, for testing, analysis, and approval. Contractor will deliver samples to testing laboratories, and have the testing report sent directly to the Engineer and pay all costs. Testing sample materials and areas at the source from which they were taken will be clearly labeled with number 1, 2, and 3. Testing samples and reports will have the appropriate corresponding numbers printed on them. Reports will include the following tests and recommendations.
 - a. Mechanical gradation (sieve analysis) will be performed and compared to the USDA Soil Classification System. A hydrometer will be used to determine the percentage each of clay and silt.
 - b. Percent of organics will be determined by the loss on ignition of oven-dried samples. Test samples will be oven-dried to a constant weight at a temperature of 230°F, $\pm 9^\circ$.
2. Chemical analysis will be undertaken for Nitrate Nitrogen, Ammonium Nitrogen,

Phosphorus, Potassium, Calcium, Magnesium, extractable Aluminum, Soluble Salts, and acidity (pH) and buffer (pH).

3. Tests, as specified, for gradation, organics, soil chemistry and pH will be performed by a public extension service or a private testing laboratory approved by the Engineer.
4. Soil analysis tests will show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish particular lawns and planting objectives noted.
5. All tests will be performed in accordance with the current standards of the Association of Official Analytical Chemists.

C. Layout and Grades.

The words "finished grade" as used herein will mean final grade elevations indicated on the contract documents. Project site areas will be given a uniform slope between points for which finished grades are indicated or between such points and existing established grades except at the top and toe of slopes where vertically curving, smooth and continuous slopes will be established.

120231.02 MATERIALS.

A. General.

Fill materials will conform to the following material descriptions. AASHTO T11, T27, and AASHTO M145 will determine gradation requirements.

B. Planting Soil.

1. Planting soil will be "fine sandy loam" or "sandy loam" determined by mechanical analysis (ASTM D-422) and based on the "USDA Classification System". Planting soil will not contain rocks or clods of 3/4 inch diameter or greater. Planting soil will have the following mechanical analysis:

<u>Textural Class</u>	<u>Percentage of Total Weight</u>	<u>Average Percentage</u>
Sand (0.05 - 2.0 mm dia. range)	45 - 75	60
Silt (0.002-0.05 mm dia. range)	15 - 35	25
Clay (less than 0.002 mm dia. range)	5 - 20	15

2. The maximum retained on a Number 10 sieve will be 15% by weight, 20% by volume of the total sample.
3. Planting soil will not contain less than 3% nor more than 5% organic matter as determined by the loss on ignition of oven-dried samples.
4. The acidity range of the planting soil will be pH 6.0 to 7.5 .

5. Planting soil will be free of debris and other extraneous matter. It will be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC2) of a 1:2 soil-water suspension will be equal to or less than 1.0 milliohms/cm. (Test minus sieve Number 10 material). Soils will not have levels of Aluminum greater than 200 parts per million.
6. Do not deliver planting soil to the site until the Engineer approves the laboratory test results. The Engineer will reject any material delivered to the site, which, after on-site, post-delivery testing, does not meet these specifications.

A. Soil Additives.

1. Sulphur for adjustment of planting soil pH will be commercial or flour Sulphur, unadulterated, and will be delivered in containers with the name of the manufacturer, material, analysis and net weight appearing on each container.
2. Ground limestone for adjustment of planting soil pH will contain not less than 85% of total carbonates. 40% will pass through 100-mesh sieve and ninety five percent will pass through a 20-mesh sieve. Contractor will be aware of planting soil pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.
3. Organic soil additives will be natural humus or well rotted cow manure, free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C., latest edition, the acidity range will be approximately 5.5 pH to 7.6 pH and the organic matter will be not less than 85%. The minimum water absorbing ability will be 200% by weight on an oven-dry basis.
4. Fine Sand.
 - a. Physical Properties (dry weight basis): at least 95% will pass a No. 20 sieve and no more than 20% will pass a No. 200 sieve.
 - b. Chemical Properties.
 - 1) Salinity: The saturation extract conductivity will not exceed 3.0 milliohms/cm @ 25 degrees C.
 - 2) Boron: The concentration in the saturation extract will not exceed 1.0 PPM.
 - 3) Sodium: The sodium absorption ratio (SAR) as calculated from analysis of the saturation extract will not exceed 6.0.
5. Gypsum: Agricultural grade product containing 80% minimum calcium sulfate.
6. Iron Sulfate (Ferric or Ferrous): Supplied by a commercial fertilizer supplier, containing 20% to 30% iron and 35% to 40% Sulfur.
7. Sulfate of Potash: Agricultural grade containing 50% to 53% of water-soluble potash.
8. Single Superphosphate: Commercial product containing 20% to 25% available phosphoric acid.
9. Ammonium Sulfate: Commercial product containing approximately 21% ammonia.

10. Ammonium Nitrate: Commercial product containing approximately 34% ammonia.
11. Calcium Nitrate: Agricultural grade containing 15-1/2% nitrogen.
12. Urea Formaldehyde: Granular commercial product containing 38% nitrogen.
13. I.B.D.U. (Iso-Butyldiene Diurea): Commercial product containing 31% nitrogen.
14. Iron Sequestrene: Geigy Iron Sequestrene 330 Fe.
15. Bone meal will be fine ground, steam-cooked, packinghouse bone with a minimum analysis of twenty three percent (23%) phosphoric acid and one percent (1.0%) of nitrogen.

120231.03 CONSTRUCTION.

A. Grades and Elevations.

1. The Drawings indicate alignments, grade elevations and invert elevations. Establish the lines and grades in conformity with the Drawings. The Owner's Representative, however, will require such adjustments in the field as are found necessary in order to avoid interference with any special conditions encountered.
2. Project areas will be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades. All lawns and planting areas will slope at a minimum of 2%. Round the tops and toes of all slopes as directed by Owner's Representative. Notify Landscape Architect of any conditions encountered that will not allow adequate surface slope and request direction before proceeding.
3. Coordinate with the Owner's representative so that suitable grade stakes are located and maintained until finish grade is accepted. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

B. Filling, Backfilling and Compaction.

1. All areas to be filled as shown on Drawings, will be free of construction debris, refuse, compressible or decayable materials and standing water. Do not place fill when fill materials or material below it are frozen. No fill materials containing ice or frozen lumps will be used.
2. Compacted subgrade will be the graded surface prior to any fills. Rough grade will be the top surface of subgrade ready to receive planting soil or paving.
3. At the completion of excavation and before placing any fills, compact subgrades that are determined to be unconsolidated, to the same compaction levels required for placed fills as required hereinafter.
4. Place geotextile soil separation fabric per contract documents.

5. Do not place fill that is too wet or too dry to be compacted to the required density. De-water or add water as required to comply with specifications.
6. Compaction of each lift will be as specified herein and as determined by ASTM Test, Designation D1556. Fill will be placed in successive horizontal lifts no thicker than 8 inches and compacted to the required density as specified herein. Maximum dry density will be determined in accordance with ASTM D1557, Method D. The following percentages of maximum dry densities will be achieved for fill materials or prepared subgrades.
 - a. All fills to within 18 inches of finished subgrade 90%
 - b. Top 18 inches to finished grade 80-85%
7. In the case of lawn and planting areas, compaction requirements for subgrades and fills will be considered minimums and maximums within the density percentages called for, and any over-compaction of subgrades or fills which does not allow for the free percolation of surface water will be corrected by loosening subgrades or fills through tilling or other means and re-compacting to specified compaction limits.

C. Rough Grading.

1. Rough grading will include the shaping, trimming, rolling, and refinishing of all surfaces of the subbase and the preparation of grades as shown on the contract documents. Traffic of men and equipment across soil subgrade areas will be prohibited following excavation to the required lines and grades.
2. If, during the progress of the project, any pipe, drain or other construction is damaged due to operations under this Contract, the Contractor will repair all damage at no additional cost to the Contracting Authority and restore damaged areas to their original conditions.
3. Do all other cutting, filling and grading to the lines and grades indicated on the contract documents. Grade evenly to within the dimensions required for grades shown on contract documents and as specified herein. Fill will be left in a compacted state at the end of the workday and sloped to drain.
4. The Contractor will bring all areas to grades as shown on the contract documents and in the details.
5. Wherever streets, lawns, or sidewalks or other items contained within or outside the construction limits have been excavated in fulfilling the work required under this Contract, the Contractor will furnish and install all materials necessary to bring finish surfaces level with the existing adjacent surfaces. All work will be installed to match the existing conditions.
6. Placed fill materials, which become disturbed, will be re-graded and re-compacted. Fill materials that become contaminated will be removed and replaced.

D. Finish Grading.

1. **General.**
 - a. Grade all planting areas smooth after weeding, planting soil spreading, soil

preparation, and soil conditioning have been completed and soil has been thoroughly compacted.

- b. Provide all grades for natural runoff of water without low spots or pockets. Accurately set flow line grades at 2% minimum gradient unless otherwise noted in the contract documents.
- c. Rake finish grades to remove all stones and other debris that is 3/4 inch or larger.
- d. Finish grades will be smooth, even and on a uniform plane with no abrupt changes of surface. Slope uniformly between given spot elevations. Minimum slope on lawn areas will be 2%, and maximum slope in lawn areas will be 33%.
- e. Grades not otherwise indicated, will be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs or catch basins except at tops and toes of slopes.
- f. Tops and toes of all slopes will be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.

2. Grades.

- a. Tolerance: All planting areas, including lawn areas, will be true to grade within 1 inch when tested in any direction with a 10 foot straightedge.
- b. Finished Grades of Planting soil for Planting Beds: 3 inches below top of adjacent pavement, headers, curbs, or walls unless otherwise indicated on the Drawings.
- c. Finished Grades of Lawn Areas: 1 inch below top of adjacent pavement, curbs or headers.

E. Cleanup.

At the end of all filling and grading operations and before acceptance of the work, the Contractor will remove all debris, rubbish, etc., from the site. The premises will be left clean and presentable to the Engineer's satisfaction.

120231.04 METHOD OF MEASUREMENT.

Measurement will be at the contract unit price per cubic yard for Planting Soil, supplied and installed.

120231.05 Basis of Payment.

Payment for Planting Soil will be made according to the contract unit price and will constitute full compensation for complete compliance with requirements of this item, including all labor, equipment, materials, tools, incidental work, and construction methods.