

## SECTION 31 20 00

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the provisions of the other parts.
- B. Related Sections:
  - 1. Section 32 11 24 Aggregate Base Course

##### 1.2 SCOPE

- A. The work under this section of the specifications shall consist of furnishing all labor, materials, equipment, transportation, and services required to complete all earthwork as indicated on the drawings and specified herein. Adjustment of grades may be permitted, subject to prior approval by the Landscape Architect, providing the overall grading concept is maintained.

##### 1.2 QUALITY ASSURANCE

- A. Excavation team shall be established and experienced with a minimum of 5 years experience constructing athletic fields.

##### 1.3 ENVIRONMENTAL REQUIREMENTS

- A. The contractor is expected to visit the site to determine all conditions to be encountered, protect improvements on adjoining properties, as well as those on the owner's property, and to restore any improvements damaged by his work to their original condition, as acceptable to the owner or other parties or authorities having jurisdiction.
- B. The contractor shall perform all work so as to permit the site to be free draining at all times and to prevent ponding. Contractor shall provide positive drainage for the entire site during the course of construction to eliminate standing water in excavated areas.

##### 1.4 SAFETY CODES AND STANDARDS

- A. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

##### 1.5 LINES AND GRADES

- A. The plans indicate lines, grades and elevations of the finish work. In general, areas to be paved shall be excavated and/or filled, and graded to the bottom elevations of such pavements. Grass areas shall be finish graded prior to seeding. Sod/seed areas shall be rough graded to 2" below finish grade prior to placement of topsoil.

##### 1.8 PROTECTION OF EXISTING TREES & VEGETATION

- A. Protect existing trees, and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stock piling construction materials or excavated materials within drip line, excess foot or vehicle traffic, or parking of vehicles within drip line. Provide temporary fences, barricades or guards as required to protect trees and vegetation to be left standing. Provide protection for roots over 1.5 inches in diameter that are cut during construction operations. Coat the cut

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faces with emulsified asphalt or other acceptable coating that is specially formulated for horticultural use on cut or damaged plant tissues. Temporarily cover all exposed roots with wet burlap to prevent roots from drying out, provide earth cover as soon as possible. Repair or replace trees and vegetation damaged by construction operations in a manner acceptable to the Landscape Architect. Tree damage repair shall be performed by a qualified tree surgeon.

#### PART 2 - PRODUCTS

##### 2.1 BACKFILL AND FILL MATERIALS

- A. Backfill shall be excavated soil material, free of rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable matter, and other deleterious matter. Existing materials may be used for backfill, provided no silt is mixed with material. Backfill consists of placement of acceptable soil material in layers, in excavations, to required subgrade elevation, for each area classification listed below.
- B. Fill Material: Fill material shall be clean, hard, durable, uncoated particles of sand or sand gravel mixture, provided that there shall be a substantial excess of sand-screenings.

##### 2.2 TOPSOIL

- A. Existing onsite topsoil shall be screened and free of rock or gravel larger than 1" in any dimension, debris, waste, frozen materials, vegetable matter and other deleterious matter. Screened topsoil shall be used for landscape restoration areas (non-playing field) areas only.
- B. Topsoil to have 5% organic peat content.

#### PART 3 - EXECUTION

##### 3.1 EXCAVATION

- A. Excavation consists of removal of material encountered to obtain required subgrade elevations.
  - 1. Excavation for Ditches: Cut ditches to cross-sections and grades as shown. Deposit excavated materials a sufficient distance from the edge of ditches to prevent cave-ins or material from sliding into ditch. Keep ditches free of leaves, sticks, and other debris until final acceptance of work.
  - 2. Removal of Unsatisfactory Soil Materials: Excavate unsatisfactory soil materials encountered that extend below required elevations, to additional depth directed by the Landscape Architect.
  - 3. Material Storage: Place excavated materials classified as unsatisfactory fill materials where directed by Owner's geotechnical consultant.
  - 4. Stability: Slope sides of excavations over five feet (5') deep to angle of repose of material excavated; otherwise shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfill by scaling, benching, shelving, or bracing. Take precautions to prevent slides or cave-ins when excavations are made in locations adjacent to backfill excavations, and when sides of excavations are subjected to vibrations from vehicular traffic or the operation of machinery or any other source. Stabilize earth subgrades under areas of paving and after excavating, but prior to filling, by discing four inches (4") deep and by compacting same as specified for fills. Remove soft or unstable soil below finish grade elevations and backfill such voids with compacted fill material.

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#### 3.2 BACKFILL AND FILL MATERIALS

##### A. Surface Preparation

1. Remove vegetation, debris, unsatisfactory soil materials, obstruction and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with existing surface. When the existing ground surface has a density less than that specified under "Compaction" (3.2 A 2) for the particular area classification, break up ground surface, pulverize, and compact to the required depth and percentage of maximum density.
2. Compaction: Perform compaction of soil materials for fills and backfills using suitable soil compaction equipment for materials to be compacted and work area locations. Control soil compaction during construction for compliance with percentages of maximum density specified for each classification. All compaction tests shall be in accordance with ASTM D1557 or AASHTO T180 C Modified Proctor Method.
3. Placement And Compaction: Place backfill materials in layers not more than eight inches (8") in loose depth. Before compaction, moisten or aerate each layer, as necessary, to provide the optimum moisture content. Compact each layer to required percentage of maximum density for each area classification. Do not place backfill or fill material on surfaces that are muddy, or frozen, or contain frost or ice. Thoroughly compact all fill and backfill by rolling each layer, following spreading, as closely as possible. Roll the areas in equal amounts in two directions. Provide compaction equipment or type best suited to achieve the desired results with the type of soil. In general, use sheeps foot and/or tamping type rollers on soils of a cohesive type; pneumatic wheeled or vibrating rollers on granular fill material, all as approved by the Landscape Architect. Operate compacting equipment on each layer until the entire area has been thoroughly and uniformly compacted to the required density.
4. Maximum Density Requirements: Provide not less than the following percentages of maximum density of the same soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place. Any soils found unsuitable for specified compaction requirements shall be removed as directed by Owner.
5. Lawn or Unpaved Areas: Compact top six inches (6") of subgrade and each layer of backfill or fill material at eighty-five percent (85%) maximum density.
6. Grading: Preparation of subgrade: Rough grade all areas within the limits of site grading under this section, including adjacent transition areas. The rough grade shall be compacted as required. Shape the surface of future lawn areas to the line grade and cross-section with the surface not more than 0.10 feet above or below a subgrade elevation. Take extreme care in the grading of swale areas to insure free movement of surface runoff. Ponding shall be non-existent or at a minimum.

#### 3.3 FINISH GRADING

##### A. Sub-Soil Preparation

1. Fine grade sub-soil systematically to eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc., in excess of two inches (2") in size. Remove sub-soil which has been contaminated with petroleum products.
2. Bring sub-soil to required levels, profiles and contours suitable for receiving the required finish surfaces. Make changes in grade gradual; blend slopes into level areas. Maximum slope 4:1 unless otherwise indicated.
3. Cultivate sub-grade to a depth of six inches (6") where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.
4. Compact sub-soil at the following percentages to a depth of 12 inches:
  - a. 85% Modified Proctor where topsoil is to be placed.

##### B. Placing Topsoil

1. Place to the following depths, up to finished grade elevations:

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- a. Four inches (4") for sodded areas
- b. Use topsoil in relatively dry state. Place during dry weather.
- c. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles, and contours of finish grades shown on the plans.
- d. Remove all stones, roots, grass, weeds, debris, and other foreign material while spreading.
- e. Manually spread topsoil around trees, plants and buildings to prevent damage which may be caused by grading equipment.
- f. Compact placed topsoil to 85% Modified Proctor.

**END OF SECTION 31 20 00**