

**SECTION 31 20 11
EARTH MOVING (SHORT FORM)**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Earthwork including excavation, fill, backfill, and lawn restoration.

1.2 DEFINITIONS

A. Unsuitable Materials:

1. Fills: Topsoil, frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (3 inches); organic materials, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable.
2. Existing Subgrade (except footings): Same materials as above paragraph, not capable of direct support of slabs, pavement, and similar items, with the possible exception of improvement by compaction, proof rolling, or similar methods of improvement.

B. Earthwork: Earthwork operations required within the new construction area. Also includes earthwork required for auxiliary structures and buildings and sewer and other trench work throughout the job site.

C. Degree of Compaction: Degree of compaction is expressed as a percentage of maximum density obtained by the test procedure presented in AASHTO T99 Method A.

D. The term fill means fill or backfill.

E. Topsoil: Fertile, friable, natural topsoil of loamy character and characteristic of locality, capable of growing healthy horticultural crops of grasses.

1.3 CLASSIFICATION OF EXCAVATION

A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on the surface; utilities, and other items including underground structures indicated to be demolished and removed; together with any type of materials regardless of character of material and obstructions encountered.

SPEC WRITER NOTES: Retain Unclassified
excavation above or classified excavation
below.

- B. Classified Excavation: Removal and disposal of all material not defined as rock.
- C. Rock Excavation (None expected on this job):
 - 1. Solid ledge rock (igneous, metamorphic, and sedimentary rock).
 - 2. Bedded or conglomerate deposits, cemented to present characteristics of solid rock which cannot be excavated without blasting; or the use of modern power excavator (shovel, backhoe, or similar power excavators) minimum 0.75 m³ (1 cubic yard) capacity, properly used, having adequate power and in good running condition.
 - 3. Boulders or other detached stones each having a volume of 0.4 cubic meter (1/2 cubic yard) or more.

1.4 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Nursery and Landscape Association (ANLA):
 - 1. 2004 - American Standard for Nursery Stock.
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. T99-01 (R2004) - Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop.
 - 2. T180-01 (2004) - Moisture-Density Relations of Soils Using a 4.54-kg [10 lb] Rammer and a 457 mm (18 inch) Drop.
- D. ASTM International (ASTM):
 - 1. D698-07 - Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - 2. D1557-07 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
- E. Standard Specifications of (Insert name of local state) State Department of Transportation, latest revision.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fills: Materials approved from on site and off site sources.
 - 1. Dry Density: 1760 kg/m³ (110 pcf) minimum.
 - 2. Plasticity Index: 6 maximum.
 - 3. Liquid Limit: 30 maximum.

- B. Granular Fill:
 - 1. Under Concrete Slab: Crushed stone or gravel graded from 25 mm (1 inch) to 4.75 mm (No. 4).
- C. Fertilizer: 5 percent nitrogen, 10 percent phosphorus, and 5 percent potash.
- D. Sod: Comparable species with existing turf. Use State Certified or State Approved sod when available. Deliver sod to site immediately after cutting and in a moist condition. Thickness of cut must be 19 mm to 32 mm (3/4 inch to 1 1/4 inches) excluding top growth. There shall be no broken pads and torn or uneven ends.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- A. Clearing:
 - 1. Clear within the limits of earthwork operations as described or designated by the COR.
 - 2. Remove trees, shrubs, fences, foundations, incidental structures, paving, debris, trash and any other obstructions.
 - 3. Remove materials from the Cemetery Property.
- B. Grubbing:
 - 1. Remove stumps and roots 75 mm (3 inches) and larger diameter.
 - 2. Leave undisturbed sound stumps, roots up to 75 mm (3 inches) diameter, and nonperishable solid objects minimum 900 mm (3 feet) below subgrade or finished embankment.
 - 3. Do not leave material within the burial profile up to 2400 mm (8 feet) below finished grade.
- C. Trees and Shrubs:
 - 1. Remove trees and shrubs, not shown for removal, within 4500 mm (15 feet) of new construction and 2250 mm (7'-6") of utility lines when approved in advance by the COR.
 - 2. Remove materials from the Cemetery Property.
 - 3. Transplant trees and shrubs with a ball of earth and burlap according to the latest issue of the, "American Standard for Nursery Stock", of the American Association of Nurserymen, Inc.
 - 4. Transplant trees and shrubs to a permanent or temporary position within two hours after digging.
 - 5. Maintain trees and shrubs held in temporary locations by watering as necessary and feeding liquid fertilizer semi-annually with a minimum

analysis of 5 percent nitrogen, 10 percent phosphorus and 5 percent potash.

6. Maintain plants moved to permanent positions as specified for plants in temporary locations until substantial completion.
 7. Protect from damage, existing trees and shrubs. Trim, clean, and paint existing trees and shrubs including the roots, according to standard industry horticultural practice for the geographic area and plant species.
 8. Do not store building materials closer to trees and shrubs to remain than the farthest extension of limbs.
- D. Stripping Topsoil: Unless otherwise indicated on the drawings, extend limits of earthwork operations anywhere the existing grade is filled or cut or where construction operations have compacted or otherwise disturbed the existing grade or turf. Strip topsoil as defined herein, or as indicated in the geotechnical report, within the limits of earthwork operations as specified above, unless specifically indicated or specified elsewhere in the specifications or shown on the drawings. Stockpile topsoil and protect as directed by the COR. Eliminate foreign material larger than 0.014 cubic meter (1/2 cubic foot) in volume, from soil when stockpiled. Retain topsoil on station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Do not excavate wet topsoil.
1. Test soil for chemicals, pesticides and fertilizers when topsoil is removed from formerly utilized as farmland, to verify suitability for use in new lawn areas.
- E. Concrete Slabs and Paving:
1. Score deeply or saw cut existing concrete slabs and paving to be removed in a neat, straight cut, sections where excavation or trenching occurs.
 2. Extend pavement section, minimum of 300 mm (12 inches) on both sides of widest part of trench excavation. Provide parallel final score lines unless otherwise indicated on Drawings.
 3. Remove material from the Cemetery Property.
- F. Disposal:
1. Remove materials from site and disposed of at legally approved site.
 2. Comply with applicable Federal, State and local regulations. Do not burn materials on site.

3.2 EXCAVATION

- A. Shoring, Sheet piling and Bracing: Shore, brace, or slope to an angle of repose banks of excavations to protect workmen, banks, adjacent paving, structures, and utilities, in compliance with OSHA requirements.
1. Extend shoring and bracing to bottom of the excavation. Shore excavations carried below the elevations of adjacent existing foundations.
 2. Provide concrete fill support when bearing of foundation is disturbed by excavation, improper shoring or removal of shoring, placing of backfill, and similar operations, under disturbed foundations, as directed by COR. Do not remove shoring until permanent work in excavation has been inspected and approved by COR.
- B. Excavation Drainage:
1. Operate pumping equipment to keep excavations free from water and subgrades dry, firm, and undisturbed until permanent work is received by COR.
 2. Obtain approval from COR before placement of permanent work on subgrades.
 3. Remove disturbed material to firm undisturbed material after water is brought under control, when subgrade for foundations is disturbed by water. Replace disturbed subgrade in trenches by mechanically tamped sand or gravel.
- C. Trench Earthwork:
1. Utility Trenches (Except Sanitary and Storm Sewer):
 - a. Excavate to width required for sheet piling and bracing and proper performance of Work.
 - b. Grade bottom of trenches with bell-holes, scooped-out to provide uniform bearing.
 - c. Support piping on undisturbed earth unless a mechanical support is indicated on Drawings.
 - d. The length of open trench in advance of pipe laying shall not be greater than is authorized by the COR.
- D. Site Earthwork:
1. Perform excavation as indicated on Drawings and as follows:
 - a. Remove and replace unsuitable subgrade materials, as determined by the COR.
 - b. When unsuitable material is encountered and removed, the contract price and time will be adjusted according to Articles,

DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL REQUIREMENTS as applicable. Adjustments to be based on cubic meters (cubic yard) in cut section only.

2. Finished subgrade elevation as follows:

- a. Planting and Lawn Areas: 100 mm (4 inches) below finished grade, unless otherwise specified or indicated on the Drawings.

3.3 FILLING AND BACKFILLING

- A. General: Fill or backfill when all debris, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. Use excavated materials or borrow for fill and backfill, as applicable. Do not use unsuitable excavated materials. Do not backfill until pipes in contact with backfill have been installed, and work inspected and approved by COR.
- B. Placing: Place material in horizontal layers not exceeding 200 mm (8 inches) loose depth and then compacted. Do not place material muddy, frozen, or with frost surfaces.
- C. Compaction: Use approved equipment (hand or mechanical) to suit type of material compacted. Moisten or aerate material necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact each layer until there is no evidence of further compaction.

3.4 GRADING

- A. General: Uniformly grade areas within limits specified, including adjacent transition areas. Smooth finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between points and existing finished grades. Provide smooth transition between abrupt changes in slope.
- B. In unfinished areas, fill low spots and level off with coarse sand or fine gravel.
- C. Place crushed stone or gravel fill under concrete slabs on grade, tamped, and leveled, 150 mm (6 inches) thick, unless otherwise indicated on Drawings.

3.5 LAWN AREAS

- A. General: Harrow and till new or existing lawn areas to remain, 100 mm (4 inches) deep. Establish existing or design grades by dragging or similar operations. Do not do earthwork on wet soil. Obtain plant bed approval from COR before seeding or sodding operation begins.

- B. Finished Grading: Begin after rough grading has settled. Scarify subgrade surface areas 100 mm (4 inches) deep. Apply topsoil smooth, even surface, and true grades minimum 100 mm (4 inches). Shape top and bottom of banks to form reverse curves in section; make junctions with undisturbed areas to conform to existing topography.
- C. Fertilizing: Mix fertilizer into the soil 100 mm (4 inches) deep at a rate of 12 kg/100 m² (25 pounds per 1000 square feet).
- D. Sodding: Water topsoil lightly before laying sod. Tightly butt sod strips at the ends and stagger in a running bond fashion. Place sod strips running across slope from bottom to top. Secure sodded slopes by pegging or other approved methods. Roll sodded area not to exceed 225 kg/m (150 pounds per foot) of the roller width.
- E. Watering: Upon completion in any one section, water thoroughly new sod pad and soil to a sufficient depth. COR will be responsible for sod after installation and acceptance.

3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of off Cemetery property.

3.7 CLEANING

- A. Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Clean site, free of debris, and suitable for subsequent construction operations. Remove debris, rubbish, and excess material from the Cemetery Property.

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