

SECTION 31 30 00 - EXCAVATING, BACKFILLING, AND COMPACTING FOR STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes the excavation, backfilling and compacting required for the structures shown in the Contract Drawings.

1.2 RELATED SECTIONS

- B. Structural Testing/Inspection Agency Services.

1.3 REFERENCES

- A. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.
- B. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
- C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- D. ASTM D1586 - Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.
- E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- F. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- G. Geotechnical Report #71.4056 by Willmer Engineering Inc, Dated October 30th, 2015.

1.4 DEFINITIONS

- A. Granular sub-base: Granular fill directly beneath slabs-on-grade.
- B. Backfill: Fill immediately behind foundation elements or retaining walls.
- C. Structural fill: Fill under the structure other than the granular sub-base.

1.5 SUBMITTALS

- A. Upon request, submit soil test reports performed by the Structural Testing/Inspection Agency.
- B. Submit sufficient data for verification of the vibratory roller.

1.6 QUALITY ASSURANCE

- A. Structural Testing/Inspection Agency shall perform the following quality related items:
 - 1. Verify structural fill complies with specifications.
 - 2. Determine particle size, liquid limit, plastic limit, plasticity index and maximum density of each type of soil.
 - 3. Observe proof rolling.
 - 4. Perform a sufficient number of field density tests to verify compaction of structural fill. As a minimum, perform one test per lift for every 2500 square feet of fill placed.
 - 5. Verify foundation bearing capacity.
 - 6. Verify quantities of material removed and quantities of material placed where Unit Prices are involved.

1.7 SURVEY

- A. Prior to construction, have structure location staked and certified by a licensed surveyor. If discrepancies between actual lines and elevations exist, notify Architect/Structural Engineer before proceeding with layout of structure.

1.8 SUBSURFACE CONDITIONS

- A. Copies of a subsurface investigation of the site will be made available upon request. The data is not intended as a representation or warranty of the continuity of such conditions. Owner will not be responsible for interpretation or conclusions drawn therefrom by the Contractor. The data is made available for the convenience of the Contractor and is not guaranteed to represent all conditions that may be encountered.
- B. Contractor may examine the site and make his own subsurface explorations at no additional cost to the Owner. Notify Owner prior to making any subsurface explorations.

1.9 EXISTING UTILITIES

- A. Locate existing underground utilities by careful hand excavation. If utilities are to remain in place, provide protection from damage during construction operations.
- B. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Do not interrupt existing utility service facilities occupied and used by Owner or others, unless written permission is given by the Architect and then only after temporary utility services have been provided.
- C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Architect immediately for directions.
- D. Repair damaged utilities to satisfaction of utility owner.

1.10 NOTICE

- A. Notify the Architect/Structural Engineer 72 hours prior to the beginning of any excavation work.

PART 2 - PRODUCTS

2.1 GRANULAR SUB-BASE

- A. Granular sub-base shall be sound and free-draining, such as sand, gravel or crushed stone with less than 10% passing the 200 sieve. Maximum diameter shall be 1-1/2 inches.

2.2 BACKFILL

- A. Backfill shall meet the requirements of the granular sub-base.

2.3 STRUCTURAL FILL

- A. Structural fill shall meet the requirements of backfill specified above.
- B. Structural fill shall be free of organics, debris and deleterious materials

PART 3 - EXECUTION

3.1 STRIPPING

- A. Strip vegetation, topsoil, roots, and other unsuitable material to a depth determined by the Structural Testing/Inspection Agency but not less than one foot, nor less than 10 feet outside the perimeter of the structure.
- B. Stockpile sufficient amounts of topsoil as required to cover areas to be landscaped with a minimum of six inches of material.

3.2 EXCAVATION

- A. Excavation shall be considered unclassified.
- B. Perform excavation to the depths and limits on the Drawings and as specified herein.
- C. Do not excavate to full depth when there is probability of frost forming or ground freezing in excavation before concrete is placed.
- D. Ground water may be encountered during the foundation excavation. Provide a system for controlling the ground water to a level at least three feet below the lowest point of the excavation.
- E. Keep excavations dry by sloping ground away from holes and trenches.

3.3 PROOFROLLING

- A. After stripping or excavation and before any fill placement, fill areas shall be proof rolled with a minimum of two coverages of a loaded dump truck or scraper in each of two perpendicular directions.
- B. Areas found to be soft or pumping shall have the soft soil removed and replaced with structural fill and compacted as outlined herein.

3.4 PLACEMENT OF STRUCTURAL FILL

- A. Do not place structural fill on subgrade that contains frost, mud or is frozen.
- B. Structural fill shall be placed and compacted in 8 -inch thick loose layers.
- C. Compact structural fill to 95 percent of the maximum dry density as measured by Standard Proctor, ASTM D698, with water content within +3/-3 percent of the optimum moisture content.

3.5 PLACEMENT OF GRANULAR SUBBASE

- A. Do not place granular sub-base on subgrade that contains frost, mud or is frozen.
- B. Compact granular sub-base to 95 percent of the maximum dry density as measured by Standard Proctor, ASTM D698, with the water content within +3/-3 percent of the optimum moisture content.

3.6 PLACEMENT OF BACKFILL

- A. Backfill behind wall shall be placed in layers of six inches.
- B. Compact backfill behind walls to 95 percent of the maximum dry density as measured by Standard Proctor, ASTM D698, with water content within +2/-2 percent of the optimum moisture content.

3.7 CLEAN UP

- A. Remove excess excavated materials from job site and upon completion leave site in clean condition.

END OF SECTION