SECTION 13 1107 – WATER FEATURE BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Building perimeter and site structure backfilling to subgrade elevations.
2. Site filling and backfilling.
3. Fill under slabs-on-grade (Pool Shells).
4. Fill for over-excavation.
5. Consolidation and compaction as scheduled.

B. Related Sections:

1. SECTION 13 1101 – WATER FEATURE EARTHWORK
2. SECTION 13 1102 – WATER FEATURE GEOSYNTHETICS FOR EARTHWORK
3. SECTION 13 1103 – WATER FEATURE GRADING AND EXCAVATION
4. SECTION 13 1104 – WATER FEATURE DEWATERING
5. SECTION 13 1105 – WATER FEATURE FOUNDATION DRAINAGE
6. SECTION 13 1106 – WATER FEATURE TRENCHING
7. SECTION 13 1108 – WATER FEATURE EROSION AND SEDIMENTATION CONTROL
8. SECTION 13 1204 – WATER FEATURE CAST IN PLACE CONCRETE
9. SECTION 13 1205 – WATER FEATURE SHOTCRETE
10. SECTION 13 1303 – WATER FEATURE MEMBRANE LINER
11. SECTION 13 1401 – WATER FEATURE PIPE AND FITTINGS

C. References:

1. Site specific Geotechnical Report – Bore Hole Locations and Findings of Subsurface Materials
2. ASTM C136 – STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
3. ASTM D1556 – STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY THE SAND-CONE METHOD
4. ASTM D1557 – STANDARD TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT
5. ASTM D 2167 – STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY RUBBER BALLON METHOD
6. ASTM D2487 – STANDARD PRACTICE FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
7. ASTM D3282 – STANDARD PRACTICE FOR CLASSIFICATION OF SOILS AND SOIL-AGGREGATE MIXTURES FOR HIGHWAY CONSTRUCTION PURPOSES
8. ASTM D4318 – STANDARD TEST METHODS FOR LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
9. ASTM D6938 – STANDARD TEST METHOD FOR DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH)
10. Standard Specifications for local jurisdictions

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Schedule of values and applicable prices as per Project Specifications and referenced sections.

B. Fill (All Types): By the cubic yard (meter). Includes excavating existing subsoil, supplying materials, stockpiling, scarifying substrate surfaces, placing where required, and compacting.

C. Structural Fill (All Types): By the cubic yard (meter). Includes supplying fill materials, stockpiling, scarifying substrate surfaces, placing where required, and compacting.

D. Concrete Fill: By the cubic yard (meter). Includes supplying materials, forming, mixing and placing where required, and curing.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Fill Type (Subsoil Type S1 and S2, Topsoil Type S3, S4 and S5): As specified in SECTION 13 1101 – WATER FEATURE EARTHWORK.

B. Structural Fill: As specified in SECTION 13 1101 – WATER FEATURE EARTHWORK.

C. Concrete: Lean concrete conforming to SECTION 03 3000 – STRUCTURAL CONCRETE Type C with a compressive strength of 2,500 psi (11.9 kPa).

2.2 ACCESSORIES

A. Geotextile Fabric: As specified in SECTION 13 1102 – WATER FEATURE GEOSYNTHETICS FOR EARTHWORK.

B. Membrane Liner: As specified in SECTION 13 1303 – WATER FEATURE MEMBRANE LINER.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify subdrainage, damp proofing, or waterproofing installation has been inspected and approved by the Owner or Owner's Representative.

B. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

C. Verify structural ability of unsupported walls to support imposed loads by the fill.

D. Verify the installation of all site piping and utilities prior to backfilling.

3.2 PREPARATION

A. Compact existing subgrade to density requirements before placement of subsequent backfill materials.

B. Cut out soft areas of existing subgrade not capable of compaction in place. Backfill with Coarse Aggregate Type A fill and compact to density equal to or greater than requirements for subsequent fill materials.

C. Scarify to a depth of 12-inches (300mm) existing and proof roll subgrade surface to identify soft spots, fill and compact to density equal to or greater than requirements for subsequent fill materials.

D. Compaction to be completed with mechanical or heavy hand tampers.

3.3 BACKFILLING

A. Backfilling areas to contours and/or elevations indicated with unclassified fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Granular Fill (Coarse Aggregate Type A): Place and compact materials in equal continuous layers not exceeding 8-inches (200mm) compacted depth.

D. Unclassified Fill Type: Place and compact unclassified material in equal continuous layers not exceeding 8-inches (200mm) compacted depth.

E. Employ a placement method that does not disturb or damage other Work.

F. Maintain optimum moisture content of each layer of fill materials to attain required compaction density. Add water by uniform sprinkling.

G. Do not use heavy equipment to backfill against unsupported foundation walls and retaining walls.

H. Backfill simultaneously with hand equipment on each side of unsupported foundation walls until supports are in place.

I. Slope grade away from building at a minimum of 2-inches (50mm) in 10-feet (3m), unless otherwise noted.

J. Make gradual grade changes. Blend slope into level areas.

K. Remove surplus backfill material from the site.

L. Leave fill material stockpile areas free of excess fill material.

M. Protect Geosynthetic fabric and membrane liners during backfilling. If fabric or liner is damaged, do not continue backfilling until damage is repaired and approved by the Owner.

3.4 TOLERANCES

A. Top Surface of Backfilling Subgrade: plus, or minus 1/2-inch (12mm) of required elevations.

B. Top Surface of General Backfilling: plus, or minus 1-inch (25mm) from required elevations.

3.5 FIELD QUALITY CONTROL

A. Comply with Project Specifications and referenced sections.

B. Compaction testing shall be performed in accordance with ASTM D1556, ASTM D1557, ASTM D2167, and ASTM D6938.

C. If testing indicates that the Work does not meet specified requirements, remove the Work, replace, compact, and retest.

D. Frequency of Tests: one (1) test per each 7,500-square feet (670 sq. m) per vertical lift.

E. Proof roll compacted fill surfaces under slabs-on-grade, pavers, paving, and structures.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished work as per the Project Specifications and referenced sections.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.7 SCHEDULE

A. Interior Slabs-on-Grade:

1. Fill Type A; 12-inches (300mm) thick, compacted to 95-percent.
2. Cover with Fill Type A; 2-inches (50mm) thick, compacted to 95-percent.

B. Exterior Side of Foundation Walls, Retaining Walls, Over Granular Filter Material, and Foundation Perimeter Drainage:

1. Fill Type A, as shown in the Contract Documents, each lift compacted to 95-percent.

C. Fill Under Landscape Areas:

1. Fill Type S3, S4, or S5 to 12-inches (300mm) below finish grade, compacted to 95-percent.

D. Fill Under Grass Areas:

1. Fill Type S2, S3, or S4 to 12-inches (300mm) below finish grade, compacted to 95-percent.

E. Fill For Berming:

1. Fill Type S2 to 12-inches (300mm) below finish grade, compacted to 95 percent.

F. Fill Under Interlocking Paving:

1. Fill Type A to underside of sand leveling bed, compacted to 95-percent.

G. Fill Asphalt or Concrete Paving:

1. Compact Subsoil base to 95-percent of its maximum dry density.
2. Fill Type A to 12-inches (300mm) below finish grade, compacted to 95-percent.
3. Stabilize subgrade, if required, to minimum LBR of 40.

H. Fill to Correct Over-Excavation:

1. As specified in SECTION 31 0515 and 31 0516.

I. Fill Under Landscape Areas:

1. Fill Type S1 to 12-inches (300mm) below finish grade, compacted to 95-percent.

END OF SECTION