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PART 1: GENERAL

1.01 DESCRIPTION

- A. THE WORK TO BE PERFORMED INCLUDES SOURCING, PROVIDING AND INSTALLING CONCRETE RETAINING WALL BLOCKS TO THE LINES AND GRADES AS SPECIFIED ON THE PROJECT CONSTRUCTION DRAWINGS AND AS MAY BE FURTHER SPECIFIED HEREIN.
- B. WORK INCLUDES PREPARING FOUNDATION SOIL, FURNISHING AND INSTALLING LEVELING PAD, DRAINAGE AGGREGATE, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS.
- C. WORK INCLUDES FURNISHING AND INSTALLING ALL RELATED MATERIALS REQUIRED FOR CONSTRUCTION OF THE RETAINING WALL AS SHOWN ON THE CONSTRUCTION SHOP DRAWINGS.

1.02 REFERENCE STANDARDS

- A. AASHTO T11 STANDARD METHOD OF TEST FOR MATERIALS FINER THAN 75-µm SIEVE IN MINERAL AGGREGATES BY WASHING.
- B. AASHTO T27 STANDARD METHOD OF TEST FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES.
- C. AASHTO T90 STANDARD METHOD OF TEST FOR DETERMINING THE PLASTIC LIMIT AND PLASTIC INDEX OF SOILS.
- D. AASHTO T99 STANDARD METHOD OF TEST FOR MOISTURE-DENSITY RELATIONS OF SOILS USING A 5.5 LB. RAMMER AND A 12" DROP.
- E. AASHTO T104 STANDARD METHOD OF TEST FOR SOUNDNESS OF AGGREGATE.
- F. ASTM C330 STANDARD SPECIFICATION FOR LIGHTWEIGHT AGGREGATES.
- G. ASTM D698 STANDARD TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT (12,400 FT-LBF/FT³).
- H. VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PART 2: MATERIALS

2.01 DEFINITIONS

- A. RETAINING WALL UNIT - A PRECAST CONCRETE, SEGMENTAL FACING BLOCK PROVIDED BY AN AUTHORIZED MANUFACTURER.
- B. DRAINAGE AGGREGATE - CLEAN 1" CRUSHED ANGULAR ROCK LOCATED WITHIN AND IMMEDIATELY BEHIND THE RETAINING WALL UNITS TO FACILITATE DRAINAGE.
- C. FOUNDATION SOIL - SOIL ZONE IMMEDIATELY BENEATH THE RETAINING WALL FACING UNITS, THE WALL LEVELING PAD, AND THE REINFORCED SOIL ZONE.
- D. GEOGRID - A GEOSYNTHETIC MATERIAL MANUFACTURED OF HIGH TENSILE MATERIALS SPECIFICALLY FOR THE PURPOSE OF REINFORCING AND CREATING A STRUCTURAL SOIL MASS.
- E. GEOTEXTILE - PERMEABLE FABRIC USED IN SUBSURFACE DRAINAGE TO SEPARATE, FILTER, AND PROVIDE PERMANENT EROSION CONTROL.
- F. LEVELING PAD - AN UNREINFORCED CAST-IN-PLACE OR COMPACTED CRUSHED STONE PAD WHICH SERVES AS A FLAT SURFACE FOR PLACING THE INITIAL COURSE OF PRECAST UNITS.
- G. REINFORCED BACKFILL - SOIL ZONE EXTENDING FROM THE DRAINAGE AGGREGATE ZONE TO THE BACK OF THE EMBEDDED GEOGRID.
- H. RETAINED BACKFILL - SOIL IMMEDIATELY BEHIND THE RETAINING WALL FACING DRAINAGE AGGREGATE OR BEHIND THE RETAINING WALL REINFORCED BACKFILL.
- I. SUBSURFACE DRAINAGE SYSTEM - A SYSTEM FOR REMOVING WATER FROM BEHIND THE WALL AND CHANNELING IT TO A POINT OF POSITIVE DRAINAGE.

2.02 RECON RETAINING WALL UNITS

- A. RECON WALL UNITS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE DESIGN STRENGTH OF 4,000 PSI. STANDARD WEIGHT CONCRETE SHALL HAVE A 7% (+/- 2%) AIR ENTRAINMENT BY VOLUME. WEIGHT OF CONCRETE SHALL BE 145 PCF. VT ACT P50 TER, 5,000 PSI CONCRETE MIX DESIGN SHALL BE USED.
- B. BLOCKS SHALL BE CONSISTENT AND FREE OF STAINS, DEFECTS, CRACKS, OR CHIPS. UNITS THAT CONTAIN VISIBLE DEFECTS SUCH AS, BUT NOT LIMITED TO, VERTICAL OR HORIZONTAL SEAMS, CONSPICUOUS STAINS, FORM MARKS, OR COLOR STREAKS SHALL BE REPAIRED TO THE SATISFACTION OF THE PROJECT ENGINEER OR REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
- C. TEXTURE OF THE BLOCKS SHALL BE RECON NORTHSORE GRANITE IN NATURAL CONCRETE GRAY COLOR.
- D. PRODUCTION: POUR BLOCKS INSIDE HEATED PRODUCTION FACILITY. PLACE INSULATED CONCRETE BLANKETS OVER FORMS AFTER POURING. STRIP BLOCKS THE FOLLOWING DAY ONCE 1,500 PSI STRENGTH IS ACHIEVED. WET CURE TO FOLLOW SPEC 501.17(b)(5) AND BE MAINTAINED A MINIMUM 3-DAYS, OR UNTIL 80% OF THE 4,000 PSI DESIGN STRENGTH FOR RECON BLOCKS.
- E. BLOCKS ARE TO BE PALLETIZED PRIOR TO PLACING OUTSIDE. DUNNAGE IS NOT USED FOR STORAGE OR SHIPPING.

- F. ALL BLOCKS SHALL NOT BE SUBJECT TO AMBIENT TEMPERATURE CHANGE GREATER THAN 40°F IN A 24 HOUR PERIOD.
- G. BLOCKS SHALL NOT BE SUBJECT TO TEMPERATURE LESS THAN 36°F PRIOR TO MEETING THE 4,000 PSI DESIGN STRENGTH.
- H. BLOCKS SHALL NOT BE SHIP UNTIL THE 4,000 PSI DESIGN STRENGTH IS MET AND NOT BEFORE 72 HOURS FROM WHEN IT WAS CAST.

2.03 LEVELING PAD MATERIAL

- A. MATERIAL SHALL CONSIST OF UNREINFORCED CLASS D CONCRETE (2,500 PSI) OR COMPACTED CRUSHED STONE AS SHOWN ON THE CONSTRUCTION DRAWING.

2.04 DRAINAGE AGGREGATE (VTRANS #704.16 - MINIMUM PHI 40°)

- A. ROCK FOR DRAINAGE SHALL BE PRODUCED FROM NATURAL GRAVELS OR CRUSHED QUARRIED ROCK AND SHALL CONSIST OF CLEAN, HARD, SOUND, AND DURABLE MATERIAL.
- B. DRAINAGE AGGREGATE SHALL BE UNIFORMLY GRADED FROM COARSE TO FINE MEETING THE FOLLOWING GRADATION AS DETERMINED IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO T27:

SIEVE SIZE	% PASSING
1"	100
3/4"	90 - 100
3/8"	20 - 55
NO. 4	0 - 10
NO. 8	0 - 5

2.05 BACKFILL

- A. GRANULAR BACKFILL FOR STRUCTURES VTRANS #704.08 (MINIMUM PHI 34°) SHALL MEET THE FOLLOWING GRADATION AS DETERMINED IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO T27 AND AASHTO T11:

SIEVE SIZE	% PASSING
3"	100
NO. 4	45 - 75
NO. 100	0 - 12
NO. 200	0 - 6

- B. PLASTICITY INDEX (P.I.), AS DETERMINED IN ACCORDANCE WITH AASHTO T90, SHALL NOT EXCEED SIX.
- C. GRANULAR BACKFILL FOR STRUCTURES SHALL BE OBTAINED FROM APPROVED SOURCE. IT SHALL CONSIST OF SATISFACTORILY GRADED, FREE-DRAINING GRANULAR MATERIAL REASONABLY FREE FROM LOAM, SILT, CLAY, AND ORGANIC MATERIAL.
- D. BACKFILL SAMPLES AND TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

2.06 LIGHTWEIGHT BACKFILL

- A. LIGHTWEIGHT BACKFILL SHALL BE AN APPROVED ROTARY KILN MATERIAL MEETING THE REQUIREMENTS OF ASTM C330. NO BY-PRODUCT SLAGS, CINDERS, OR BY-PRODUCTS OF COAL COMBUSTION WILL BE PERMITTED. LIGHTWEIGHT BACKFILL SHALL BE NON-CORROSIVE AND SHALL HAVE A PROVEN RECORD OF DURABILITY AS DETERMINED IN ACCORDANCE WITH AASHTO T104.
- B. LIGHTWEIGHT BACKFILL (MINIMUM PHI 40°) SHALL MEET THE FOLLOWING GRADATION AS DETERMINED IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO T27 AND AASHTO T11:

SIEVE SIZE	% PASSING
1"	100
3/4"	90 - 100
3/8"	10 - 50
NO. 4	0 - 15

2.07 SUBSURFACE DRAINAGE SYSTEM

- A. SUBSURFACE DRAINAGE SYSTEM SHALL CONSIST OF PERFORATED POLYETHYLENE (PE) PIPE. IF THE PIPE IS NOT PLACED WITHIN CLEAN CRUSHED STONE IT SHALL BE WRAPPED IN A GEOTEXTILE FABRIC OR NON-PERFORATED WHERE REQUIRED.
- B. NON-PERFORATED PIPE SHALL BE USED TO CONNECT DRAINS FROM THE WALL TO DRAINAGE STRUCTURES OR HEADWALLS.
- C. FITTINGS SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.

2.08 GEOTEXTILE

- A. GEOTEXTILE SHALL BE A NON-WOVEN FABRIC MEETING THE REQUIREMENTS OF SECTION 649 FOR GEOTEXTILE FOR ROADBED SEPARATOR.

PART 3: EXECUTION

3.01 EXCAVATION

- A. CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. CONTRACTOR SHALL BE CAREFUL NOT TO DISTURB EMBANKMENT AND FOUNDATION MATERIALS BEYOND LINES SHOWN.

3.02 FOUNDATION SOIL PREPARATION

- A. FOUNDATION SOIL SHALL BE EXCAVATED AS REQUIRED FOR LEVELING PAD DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- B. UNSUITABLE SOILS SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.
- C. OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH APPROVED COMPACTED BACKFILL MATERIAL.

3.03 BASE LEVELING PAD

- A. LEVELING PAD MATERIALS SHALL BE PLACED UPON APPROVED FOUNDATION AS SHOWN ON THE CONSTRUCTION DRAWINGS TO A MINIMUM THICKNESS OF 12".
- B. AGGREGATE MATERIAL SHALL BE COMPACTED TO PROVIDE A DENSE, LEVEL SURFACE ON WHICH TO PLACE THE FIRST COURSE OF MODULAR UNITS. COMPACTION SHALL BE TO 95% OF STANDARD PROCTOR DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D698.
- C. CRUSHED STONE SHALL BE PLACED IN MAXIMUM 6" LIFTS AND SHALL BE WELL COMPACTED WITH A VIBRATORY PLATE COMPACTOR OR OTHER SUITABLE EQUIPMENT.

3.04 UNIT INSTALLATION

- A. THE FIRST COURSE OF CONCRETE MODULAR WALL UNITS SHALL BE CAREFULLY PLACED ON THE BASE LEVELING PAD. EACH UNIT SHALL BE CHECKED FOR LEVEL AND ALIGNMENT.
- B. UNITS ARE PLACED SIDE BY SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE DONE BY MEANS OF A STRING LINE OR OFFSET FROM A BASE LINE.
- C. SWEEP EXCESS MATERIAL FROM TOP OF UNITS AND INSTALL NEXT COURSE. ENSURE THAT EACH COURSE IS COMPLETELY UNIT FILLED, BACKFILLED AND COMPACTED PRIOR TO PROCEEDING TO NEXT COURSE.

3.05 DRAINAGE SYSTEM PLACEMENT

- A. A DRAINAGE SYSTEM SHALL BE PROVIDED AT THE BASE OF THE WALL SYSTEM BEHIND THE WALL UNITS.
- B. THE DRAINAGE SYSTEM SHALL CONSIST OF 4" PERFORATED POLYETHYLENE (PE) PIPE WRAPPED WITH GEOTEXTILE FABRIC.
- C. THE PIPE SHALL BE INSTALLED WITH POSITIVE DRAINAGE, 1% MINIMUM.

3.06 GEOGRID INSTALLATION

- A. GEOGRID SHALL BE LAID AT THE PROPER ELEVATIONS AND ORIENTATION AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENGINEER. EMBED GEOGRID OVER THE TONGUE AND GROOVE AND UP THE UNEXPOSED FRONT EDGE OF THE BLOCK.
- B. THE GEOGRID SHALL BE PULLED TAUT (50LBS/FT) TO ELIMINATE LOOSE FOLDS AND PRETENSION THE REINFORCEMENT. STAKE OR SECURE BACK EDGE OF GEOGRID PRIOR TO AND DURING BACKFILL AND COMPACTION.
- C. CORRECT ORIENTATION (ROLL DIRECTION) OF THE GEOGRID SHALL BE VERIFIED BY THE CONTRACTOR.

3.07 FILL PLACEMENT

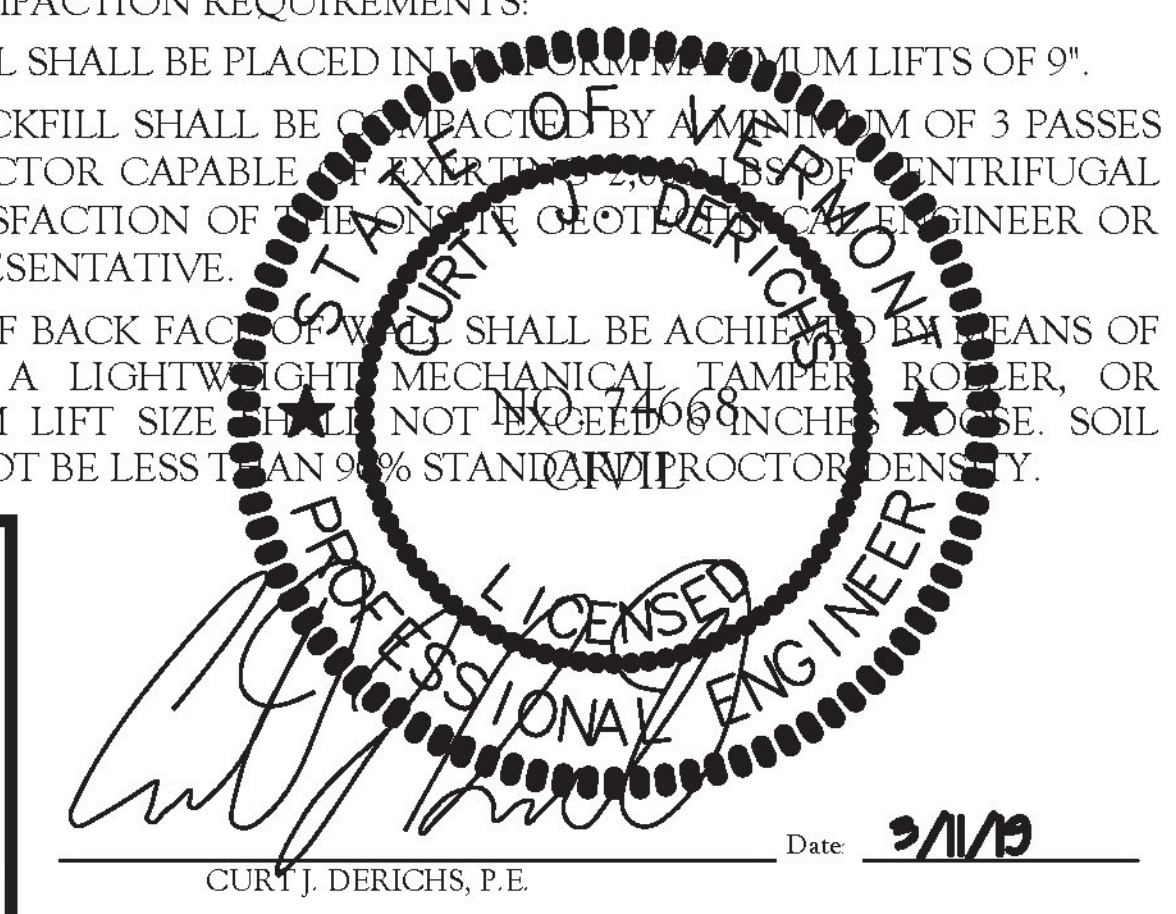
- A. FILL PLACE SHALL FOLLOW THIS SPECIFICATION OR THE GEOTECHNICAL REPORT, WHICHEVER IS MORE STRINGENT.
- B. BACKFILL PLACEMENT SHALL CLOSELY FOLLOW ERECTION OF EACH ROW OF BLOCKS. BACKFILL SHALL BE PLACED IN A WAY THAT DOES NOT CAUSE DAMAGE OR DISTURBANCE TO THE WALL.
- C. THE AREA IN FRONT AND AROUND THE LEVELING PAD SHALL BE BACKFILLED AS SOON AS PRACTICALLY POSSIBLE.
- D. BACKFILL MATERIAL SHALL BE PLACED WITH A MAXIMUM OF 12" LIFTS AND COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH AASHTO T99. THE IN PLACE MOISTURE CONTENT SHALL NOT EXCEED THE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH ASTM D698 AND BE NO LOWER THAN 2% BELOW OPTIMUM MOISTURE CONTENT.
- E. CRUSHED STONE BACKFILL COMPACTION REQUIREMENTS:
 - 1. CRUSHED STONE BACKFILL SHALL BE PLACED IN MAXIMUM LIFTS OF 9".
 - 2. THE CRUSHED STONE BACKFILL SHALL BE COMPACTED BY MEANS OF 3 PASSES OF A VIBRATORY COMPACTOR CAPABLE OF EXERTING 200 LBS OF CENTRIFUGAL FORCE AND TO THE SATISFACTION OF THE RESPONSIBLE GEOTECHNICAL ENGINEER OR THEIR DESIGNATED REPRESENTATIVE.
- F. COMPACTION WITHIN 3 FEET OF BACK FACE OF WALL SHALL BE ACHIEVED BY MEANS OF A MINIMUM 3 PASSES WITH A LIGHTWEIGHT MECHANICAL TAMPER, ROILER, OR VIBRATORY SYSTEM. MAXIMUM LIFT SIZE SHALL NOT EXCEED 6 INCHES. SOIL DENSITY IN THIS AREA SHALL NOT BE LESS THAN 98% STANDARD PROCTOR DENSITY.



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