Section 02830

ANCHOR HIGHLAND RETAINING WALL SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Concrete segmental retaining wall units.

B. Related Sections
   1. Section - Geosynthetic Wall Reinforcement
   2. Section - Backfill
   3. Section - Drainage Fill
   4. Section - Landscaping Turf
   5. Section - Drain Tile

1.02 REFERENCES

A. American Society of Testing and Materials
   1. ASTM C1372-99a; Standard Specification for Segmental Retaining Wall Units
   2. ASTM C 1262-98; Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units
   3. ASTM C698-91; Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb Rammer and 12-in. Drop, (Standard Proctor)
   4. ASTM D1557-91; Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and 18-in. Drop, (Modified Proctor)
   5. ASTM D448-86; Standard Classification for Sizes of Aggregate for Road and Bridge Construction
   6. ASTM C 140-99b; Standard Test Methods of Sampling and Testing Concrete Masonry Units
   7. ASTM D 2922-96; Standard Test Method for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
   8. ASTM D 1556-90; Standard Test Method for Density of Soil In Place by the Sand Cone Method
   9. ASTM D 2488-93; Standard Practice for Description and Identification of Soils, Visual-Manual Procedure (USCS; Unified Soil Classification System)

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Manufacturer's literature: Materials description
2. Shop drawings: Retaining wall system design, including wall heights, geosynthetic reinforcement layout and drainage provisions. The shop drawings shall be signed by a registered professional engineer licensed in the state of wall installation.
3. Samples
   a) Furnish (1) unit in the color and face pattern specified if requested by the Architect. If approved, unit may be used in the finished work.
   b) 12 inches square or larger piece of the geosynthetic reinforcement specified.
4. Test reports from an independent laboratory stating moisture absorption and compressive strength properties of the concrete wall units meet the project specifications when tested in accordance with ASTM C 140-96, Sections 6, 8 and 9.

1.04 DELIVERY, STORAGE AND HANDLING

A. To prevent damage, store above ground on wood pallets or blocking. Remove damaged or otherwise unsuitable material, when so determined, from the site.

1. Faces of the concrete wall units shall be substantially free of chips, cracks and stains.
2. Prevent excessive mud, wet cement, epoxy, and like material, which may affix themselves, from coming in contact with the materials.

1.05 EXTRA MATERIALS

A. Three replacement units identical to those installed on the Project.

1.06 DEFINITIONS

A. Geosynthetic reinforcement is a material specifically fabricated for use as a soil reinforcement.
B. Concrete retaining wall units are as detailed on the drawings and are specified under Section 02830: Anchor Highland Retaining Wall Units.
C. Drainage aggregate is a material used around and directly behind the concrete wall units.
D. Backfill is the soil, which is used as fill behind the drainage aggregate and within the reinforced soil mass if applicable.
E. Foundation soil is the soil mass supporting the leveling pad and reinforced zone of the retaining wall system.
F. Filter fabric is a material placed behind the wall units to prevent fines from passing thorough wall face.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete Retaining Wall Unit: “Anchor Highland Retaining Wall Units” as manufactured under license from Anchor Wall Systems.

1. Concrete wall units shall meet requirements of ASTM C1372-97 except the maximum water absorption shall be limited to 7.0 percent and unit height dimensions shall not vary more than +/- 1/16 inch from that specified.
2. The 6 inch concrete unit has a required minimum of 0.25 square foot face area. The 12 inch concrete unit has a required minimum of 0.50 square foot face. The 18 inch concrete unit has a required minimum of 0.75 square foot face.
3. Color as selected by Architect from manufacturer's standard selections.
4. Face pattern and texture: Natural Face Style and Split.
5. The concrete units shall include an integral concrete shear connection, flange/locator.

B. Geosynthetic reinforcement: Polyester fiber geogrid or polypropylene woven geotextile for use as soil reinforcement.
C. Base: Material shall consist of drainage aggregate, sand and gravel and/or concrete as shown on the construction drawings. A minimum of 6 inches of compacted base is required.
D. Filter fabric: A 4-ounce non-woven fabric for use in preventing fines passing through the wall face.
E. Drainage aggregate: Fill behind units shall consist of free-draining, crushed coarse aggregate that meets the gradation requirements of ASTM 448-86; Standard Classification for Sizes of Aggregate for Road and Bridge Construction, designation 57, 67, 6, 7 or 8.
F. Backfill: Materials are suitable non-organic soils at a moisture content which enables compaction to the specified densities. Unsuitable soils are organic soils and those soils with the USCS classification symbol of CH, OH, MH, OL, or PT. CL soils with a Plasticity Index (PI) greater than 25 are also considered unsuitable soils.
G. Drain tile: The drainage collection pipe shall be a perforated or slotted PVC or corrugated HDPE pipe. The pipe may be covered with a geotextile filter fabric to function as a filter.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which the retaining wall is to be erected and notify the Architect or Civil Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Promptly notify the wall design engineer of any site conditions, which may affect wall performance or may require a reevaluation of the wall design.

B. Foundation soil shall be examined by the project geotechnical engineer to ensure that the actual foundation soil strength, meets or exceeds that required on the construction drawings.

3.02 EXCAVATION

A. Excavate to the lines and grades shown on the construction drawings. Over-excavation not approved by the owner or duly appointed owner's representative shall not be paid for and replacement with compacted fill and/or wall system components will be required at the Contractor's expense. Do not disturb base beyond the lines shown. The Contractor shall be responsible for the stability of the excavation and it's influence on adjacent properties and structures.

3.03 FOUNDATION PREPARATION

A. Foundation soil shall be excavated as required for footing or base dimension shown on the construction drawings, or as directed by the engineer.
B. Soil not meeting the required strength shall be removed, sufficiently oversized from the front of the block and the back of the reinforcement and back-filled with suitable material.
C. Over-excavated areas shall be filled with suitable compacted backfill.

3.04 BASE COURSE PREPARATION

A. Base materials shall be placed as shown on the construction drawings with a minimum thickness of 6 inches.
B. Base materials shall be installed upon undisturbed soils, or foundation soils prepared in accordance with Section 3.03.
C. Material shall be compacted so as to provide a level, hard surface on which to place the first course of units.
D. Base materials shall be prepared to ensure complete contact of retaining wall unit. Gaps shall not be allowed.
E. Base materials shall be to the depths and widths shown on the plans. Reduce the depth of sand and gravel and replace with a 1" to 2" concrete topping. Concrete shall be lean, unreinforced and a maximum of two inches thick. Where a reinforced footing is required, place below the frost line.

3.05 ERECTION

A. First course of concrete wall units shall be placed on the prepared base material. Units shall be checked for level and alignment. The top of all units in base course shall be at the same elevation.
B. The 18" wide Highland Stone units are recommended for the base course.
C. Ensure that concrete wall units are in full contact with base.
D. Concrete wall units shall be placed side by side for full length of wall alignment. Alignment may be done, by using a string line or offset of wall line.

E. Place the filter fabric directly behind the wall units.
F. A minimum of 12 inches of drainage aggregate shall be placed behind the concrete wall units.
G. Drain tile shall be installed at the lowest elevation possible to maintain gravity flow of water to outside of the reinforced zone. The drainage collection pipe shall be day-lighted to an appropriate location away from the wall system at each low point or at 50-foot intervals along the wall.
H. Remove all excess fill from top of units and install next course. Ensure drainage aggregate and backfill are compacted before installation of next course.
I. Install each succeeding course. Backfill as each course is completed. Pull the units forward until the locating surface of the unit contacts the locating surface of the units in the preceding course. Pull the units forward as far as possible.
J. Install geosynthetic reinforcement in accordance with geosynthetic manufacturer's recommendations and the design drawings.

3.06 BACKFILL PLACEMENT

A. Reinforced backfill shall be placed, spread and compacted in a manner that will minimize slack in the reinforcement.
B. Fill in the reinforced zone shall be placed and compacted in lifts not to exceed 6 to 8 inches in loose thickness where hand operated compaction equipment is used and not exceeding 12 inches loose thickness where heavy, self-propelled compaction equipment is used.
C. All fill placed in the reinforced zone must be compacted to a minimum of 95 percent of the soil’s standard Proctor density (ASTM D 698-91) or as recommended by the project geotechnical engineer.
D. Only lightweight hand-operated equipment shall be allowed within 4 feet of the back of the retaining wall units, or one-half of the wall height, whichever is greater.

3.07 CAP UNIT INSTALLATION (If Applicable)

A. Apply construction adhesive to the top surface of the unit below and place the cap unit into desired position.
B. Cap units may need to be cut to obtain the proper fit.
C. Backfill and compact to finish grade.

3.08 ADJUSTING AND CLEANING

A. Damaged units should be replaced with new units during construction.
B. Contractor shall remove debris caused by this construction and leave adjacent paved areas broom clean.

3.09 QUALITY CONTROL

A. The wall installation contractor is responsible for quality control of installation of all materials. The contractor should enlist the assistance of a qualified independent third

party to verify the correct installation of all materials according to these specifications and the construction drawings.

B. The Owner, at his own expense, should retain a qualified professional to perform random quality assurance checks of the contractor's work.
C. Work found to be deficient according to these specifications or the construction drawings must be corrected at the contractor's expense.
D. The retaining wall will not be considered complete until excepted by the engineer or duly appointed owner's representative.

END OF SECTION

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