Keystone Synteen Retaining Walls

1.1 General

Keystone Retaining Wall Systems are designed as a gravity retaining wall utilizing a high density polyethylene/polyesther geogrid to reinforce the soil zone behind the wall. The geogrid is positively connected to the modular concrete block creating a reinforced soil mass capable of resisting lateral earth pressures and surcharged loads. All references to the Engineer refer to Worldwide Engineering.

1.2 Backfill Materials

The soil material associated with the retaining wall in the reinforced zone , the retained zone, or the foundation bedding shall have the following properties:

A) Foundation Soils: ϕ=28 degrees, cohesion= 150 psf , unit weight= 120 lbs./cu.ft

B) Retained Soils: ϕ=28 degrees, cohesion= 150 psf , unit weight= 120 lbs./cu.ft

C) Reinforced Soils: ϕ=28 degrees, cohesion= 150 psf , unit weight= 120 lbs./cu.ft

The soil characteristics above were assumed based on information supplied to the Engineer. If this information does not represent the actual soil to be used, the Engineer shall be notified immediately, the new soil parameters shall be submitted to the Engineer, and the wall will be required to be redesigned. Payment for all designs is the responsibility of the Owner and/or General Contractor.

1.3 Foundation Loads

The maximum applied foundation load for this wall is 3 KIPS/sq.ft.

1.4 Concrete Masonary Wall Units

Concrete Wall Units shall be Keystone units manufactured in accordance with ASTM-C90 and ASTM C140 and shall have a mininum 28 day compressive strength of 3000 psi. Units shall be interlocked with non-corrosive fiberglass pins.

1.5 Geogrid Reinforcement

The geogrid reinforcing material shall be a high tenacity polyethylene manufactured by Synteen and shall meet the specification requirements published by Synteen for:

Sympaforce 35/30-25

1.6 Wall Batter

Batter for the entire wall shall be maintained at 7.1 degrees. (1" setback per course)

2.0 Foundation Requirements

The foundation bearing capacity that was assumed for design shall be verified in the the field, and copies of the test data filed with the Engineer. The footing shall be cleared of loose soil. A minimum of 12" of washed stone shall be placed at the back of each block as indicated on the details.

2.1 Leveling Pad

Material shall consist of compacted sand, gravel, crushed rock, or unreinforced concrete. The pad shall be 6" thick when concrete and 8" thick otherwise. Sand or gravel material shall be compacted to 95% Standard Proctor. Aggregate material shall receive a minimum of one pass of the compaction equipment. The top of the leveling pad shall be maintained at a depth of 1.5 feet when the exposed height of the wall exceeds 7 feet.

2.2 Unit Fill

The void within each unit shall be filled with a washed stone having 100% of the aggregate passing the 1.5" sieve. A minimum of 3/8" washed stone size is required.(No more than 5% passing the #200 sieve.) Place this material behind the block as well. All excess material shall be swept clean from the top of the block prior to installing the next course. Each course of block shall be completely filled before proceeding to the next course.

2.3 First Block Course

The first course of block shall be placed on top of and in full contact with the leveling pad. The units shall maintain a distance of a minimum 6" from the front and back of the leveling pad. Proper alignment may be achieved with the aid of a string line. Place stone below the first block and the leveling pad and level the block in both directions. After placing pins in each of the appropriate holes proceed to the next course of block. Each unit shall contact the units on both sides as well as above and below. Some adjustments may be required for walls with curves and a batter.

2.4 Caps

Apply a construction adhesive to the cap units to prevent their removal.

3.0 Geogrid Installation

The geogrid reinforcement shall be laid horizontally on compacted backfill and connected to the concrete wall units by hooking geogrid over the fiberglass pins. Geogrid shall be pulled taut removing all slack from the material and anchored before adding fill. Geogrid shall be installed at the elevations and lengths required as shown on the plans. (Refer to details for the appropriate orientation) Soil surface shall be smooth and level and have been compacted to 95% Standard Proctor before installing the grid.

3.1 Fill Placement

Backfill material shall be placed on a maximum 8" compacted to 95% Standard Proctor. Only hand operated equipment shall be allowed within 3 feet of the Keystone units. Backfill shall be placed from the wall rearward to insure tautness of the geogrid. Construction equipment shall not be operated directly on the geogrid.

3.2 Unsuitable Materials

Soils containing roots, brush, sod or other organic material shall not be allowed. Frozen soils, snow, ice, heavy clays, or wet soils shall not be allowed. Material passing the #40 sieve shall not have a liquid limit of greater than 30 and a plastic limit of greater than 15, unless written consent is obtained from the Engineer prior to placement.

3.3 Soil Properties

Minimum internal angle of friction shall equal or be greater than 28 degrees with 150 psf cohesion. Verification shall be filed with the Engineer that the soil will meet this criteria.

4.0 Soil Testing

Compaction testing shall be performed for every lift elevation requiring geogrid or every 3rd lift as a minimum Tests shall be performed for every 100 linear feet of wall face. Compaction tests as well as a verified friction angle shall be filed with the Engineers' office.

5.0 Hydrostatic Pressure Potential

The Engineer shall be notified if any of the following should become evident:

-water or wetness from or in a cut bank

-local springs, local storm drains, sewers, water lines under or behind the wall

6.0 Acceptable Block

Keystone standard or compact units shall be used and kept free of defects that would interfere with the placing or positioning of the unit or impair its strength. Minor cracks incidental to the usual method of manufacturing or minor chipping resulting from shipment and delivery are not grounds for rejection.

7.0 Acceptable Geogrid

Geogrid shall be rejected if 20% or more of a structural rib has been cut or ripped. The Contractor shall inspect all geogrid delivered to the site and reject materials that meets this criteria. If the geogrid is damaged on the construction site, it shall be replaced at the Contractors expense.

8.0 Drainage Composite- (Applies to cut wall applications only)

Drainage Composite shall be installed to cover 30% of the cut behind the geogrid layers. Tensar DC1200 (6 ft. wide sections) provides 30% coverage when installed on 15 ft. centers and 2/3 the wall height.

9.0 Special Provisions

A) General contractor shall coordinate upper geogrid layers installation with paving installation.

B) No Bodkin Connections shall be made within 6 feet of each other or the modular unit.

C) Maintain the direction of drainage away from the wall face at all times during construction of the wall and finish grading as shown on plans.

D) Placement of geogrid shall be as per plans reference to length and elevations.

E) The Engineer shall be notified by the installing contractor should the embedment depth of the block be less than 6" for walls less than 7', and less than 1.5' for walls greater than 7' in height.

F) The reinforced soil is assumed to be a sandy type material. (Pure silts and clays) are not acceptable.

10.0 Qualification of Design

A) Stability of any temporary slopes required by the installation of a segmental retaining wall shall be addressed by a qualified Geotechnical Engineer. Responsibility of these temporary slopes rests with the Owner and/or Architect of this project and the slopes shall meet all OSHA standards of maximum slope steepness = 1.5H:1V.

B) Handrail/guardrail requirements shall be determined by the Architect or General Contractor.

01-SB-012
APPROVED
TOWN OF CARY
DRC: 5-22-02
PLANNING: BS 6-13-02
ENGINEERING: TS 6-12-02

All walls to be hardsplit block in the Keystone (or approved equal) color "Brown"

WORLDWIDE ENGINEERING - GEO DIVISION

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3/25/02

NO	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
1	Revision #1		3/25/02				

DESIGNER: MICHAEL KISER PE

CONSTRUCTION NOTES

THE GROVE @ CARY PARK RETAINING WALLS CARY, N.C.

DRAWN MLK DATE 3/8/02 INSP. DATE
DWN JGK DATE 3/8/02 INSP. DATE
CHKED DATE MTRL DATE
SCALE SEGMENTAL RETAINING WALL REV.