

FOR SOIL EROSION AND SEDIMENT

CONTROL BY THE HOWARD SOIL

CONSERVATION DISTRICT.

21.0 STANDARDS AND SPECIFICATIONS <u>FOR</u> TOPSOIL

iii. For sites having disturbed areas over 5 acres: i. On soil meeting topsoil specifications, obtain test results dictating fertilizer and lime amendments required

to bring the soil into compliance with the following: a. pH for topsoil shall be between 6.0 and 7.5. If

the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise

6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.

b. Organic content of topsoil shall be not less than 1.5 percent by weight.

c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.

d. No sod or seed shall be placed on soil soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elassed (14 days min.) to permit dissipation of

elapsed (14 days min.) to permit dissipation of

NOTE: Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by

ii. Place topsoil (if required) and apply soil ammendments specified in 20.0 Vegetative Stabilization—Section I—Vegetative Stabilization Methods and Materials.

i. When topsoiling, maintain needed erosion and sediment control practices such as diversions, Grade

Stabilization Structures, Earth Dikes, Slope Silt Fence and

been previously established, shall be maintained, albeit 4"

iii. Topsoil shall be uniformly distributed in a 4" — 8" layer and lightly compacted to a minimum thickness of 4".

Spreading shall be performed in such a manner that sodding

iv. Topsoil shall not be place while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be

or seeding can proceed with a minimum of additional soil

preparation and tillage. Any irregularities in the surface

resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions

detrimental to proper grading and seedbed preparation.

ii. Grades on the areas to be topsoiled, which have

phyto-toxic materials.

V. Topsoil Application

<u>Definition</u>

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE

PROFILE

PLAN VIEW

Construction Specification

2. Width — 10' minimum, should be flared at the existing road to provide a

3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior

to placing stone. ** The plan approval authority may not require single family residences to use geotextile.

Stone — crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of

5. Surface Water — all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone

over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey, a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.

6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized con—

PAGE MARYLAND DEPARTMENT OF ENVIRONMEN F - 17 - 3 WATER MANAGEMENT ADMINISTRATION

1. Length — minimum of 50' (* 30' for a single residence lot).

** GEOTEXTILE CLASS -

'C' OR BETTER

- EXISTING GROUND

SCE SCE

BERM (6" MIN.)

- EARTH FILL

AGGREGATE OVER LENGTH AND WIDTH OF STRUCTURE

---- PIPE AS NECESSARY

PAVEMEN

EXISTING

PAVEMENT

Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation

<u>Purpose</u>

To provide a suitable soil medium for vegetable growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

Conditions Where Practice Applies I. This practice is limited to areas having 2:1 or flatter

a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative arowth.

b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.

c. The original soil to be vegetated contains material toxic to plant growth. d. The soil is so acidic that treatment with

II. For the purpose of these Standards and Specifications areas having slopes steeper than 2:1 require special consideration and design for adequate stabilization. Areas having slopes steeper than 2:1 shall have the appropriate stabilization shown on the plans.

Construction and Material Specifications

I. Topsoil salvaged from the existing site may be used provided that it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-SCS in cooperation with Maryland

II. Topsoil Specifications - Soil to be used as topsoil must meet the following:

i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or a soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger that 1 and 1/2"

ii. Topsoil must be free of plants or plant parts such as Bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.

iii. Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4–8 tons/acre (200–400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

II. For sites having disturbed areas under 5 acres: i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization Section I — Vegetative Stabilization Methods and Materials.

TEMPORARY SEEDING NOTES SEEDBED PREPARATION: Loosen upper three inches of soil by raking, discing or other acceptable means before seeding, if not previously

SOIL AMENDMENTS: Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft).

SEEDING: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2 1/2 bushel per acre of annual rye (3.2 lbs./1000 sq.ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs./1000 sq.ft.). For the period November 1 thru February 28, protect site by applying 2 tons per acre of well anchored straw mulch and seed as soon as possible

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs./1000 sq.ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT

PERMANENT SEEDING NOTES

APPLY TO GRADED OR CLEARED AREAS NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE

SEEDBED PREPARATION: Loosen upper three inches of soil by raking, discing or other acceptable means before seeding, if not previously

SOIL AMENDMENTS: In lieu of soil test recommendations, use one of the following schedules: 1) Preferred-Apply 2 tons per acre dolomitic limestone (92 lbs/ 100 sq.ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs./ 1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At the time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq.ft.)

2) Acceptable-Apply 2 tons per acre dolomatic limestone (92 lbs/ 1000 sq.ft.) and apply 1000 lbs. per acre 10-10-10- fertilizer (23 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper

SEEDING: For the periods March 1 thru April 30, and August 1 thru October 15, seed with 60 lbs. per acre (1.4 lbs/1000 sq.ft.) of Kentucky 31 Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Kentucky 31 Tall Fescue per acre and 2 lbs. per acre (.05 lbs./1000 sq.ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by: Option (1) 2 tons per acre well anchored straw mulch and seed as soon as possible in the spring. Option (2) Use sod. Option (3) Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

MAINTENANCE: Inspect all seeded areas and make needed repairs replacements and reseedings.

SEDIMENT AND EROSION CONTROL NOTES

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspections, Licenses and Permits, Sediment Control Division prior to the start of any construction (313–1855).

2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1994 MARYLAND STANDARDS AND SPECS.

FOR SOIL EROSION AND SEDIMENT CONTROL and revisions thereto 3. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control stuctures, dikes, perimeter slopes and all slopes greater than 3:1 b) 14 days as to all other disturbed or graded areas on the

4. All sediment traps/basins shown must be fenced and warning signs posted around their perimeters in accordance with Vol.1, Chapter 7, of the HOWARD COUNTY DESIGN MANUAL, Storm

 All disturbed areas must be stabilized within the time period specified above, in accordance with the 1994 MARYLAND STAND— ARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seedings, sod, temporary seeding and mulching (Sec G).
Temporary stabilization with mulch alone can only be done when

recommended seeding dates do not allow for proper germination and establishment of grasses. 6. All sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector.

7. SITE ANALYSIS: Total Area of Site:

Area Disturbed:

Area to be roofed or paved:

Area to be vegetatively stabilized:

Total Cut:

Total Fill:

Offsite Waste/Borrow Area Location:

**

4.49 Acres
3.26 Acres
2.06 Acres
2.06 Acres
4.49 Acres
3.26 Acres
4.49 A

Offsite Waste/Borrow Area Location 8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same

day of disturbance. Additional sediment control must be provided, if deemed neces-sary by the Howard County DPW Sediment Control Inspector. 10. On all sites with disturbed areas in excess of 2 acres, approva of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading.

11. Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized within

Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is

12. The total amount of silt fence = 3098 L.F.

13. The total amount of super silt fence = 927 L.F. 14. The total amount of earth dike =

* It is the responsibility of the contractor to identify the spoil/borrow site and notify and gain approval from the sediment control inspector of the site and it's grading permit number at the time of construction.

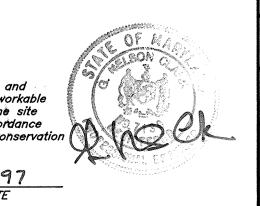
CONSTRUCTION SEQUENCE: NO. OF DAYS Install sediment and erosion control devices and stabilize Excavate for foundations, rough grade and temporarily stabilize Construct structures, sidewalks and driveways. Final grade and stabilize in accordance with Stds. and Specs. 7. Upon approval of the sediment control inspector, remove sediment and erosion control devices and stabilize.

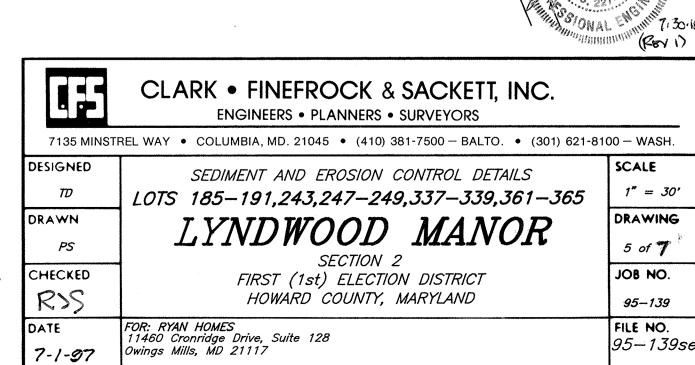
DEVELOPER'S/BUILDER'S CERTIFICATE

I/We certify that all development and construction will be done according to this plan of development and plan for sediment and erosion control and that all responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of the Environment Approved Training Program for the Control of Sediment and Erosion before beginning the project. I also authorize periodic on—site inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary".

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ENGINEER'S CERTIFICATE hereby certify that this plan for Sediment and Erosion Control represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation





MODIFY LOT 339 / ADD SHEETS 60 AND 7 OF T

REVISIONS

7.30.18

DATE

SDP 98-02

SEGMENTAL RETAINING WALL SPECIFICATIONS

PART 1 - GENERAL

1.1 WORK INCLUDES

WORK INCLUDES FURNISHING AND INSTALLING SEGMENTAL RETAINING WALL UNITS, GEOGRID REINFORCEMENT, WALL FILL, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS PRODUCED BY CLARK, FINEFROCK, & SACKETT, INC., AND AS SPECIFIED HEREIN. THE CONTRACT ALSO INCLUDES THE FURNISHING AND INSTALLING OF ALL APPURTENANT MATERIALS, EQUIPMENT, AND LABOR REQUIRED FOR CONSTRUCTION OF THE GEOGRID REINFORCED, SEGMENTAL RETAINING WALL, AT THE TIME OF THIS RETAINING WALL DESIGN, A GEOTECHNICAL EXPLORATION HAD NOT BEEN PERFORMED TO OUR KNOWLEDGE, IF IOIL CONDITIONS ARE DIFFERENT THAN THE PARAMETERS USED TO DESIGN THIS WALL THEN GTA MUST BE GIVEN THE OPPORTUNITY TO EVALUATE OUR DESIGN AND RE-DESIGN THE WALL IF NECESSARY

- 1.2 REFERENCE STANDARDS
- A. ASTM C90-75 (1981 REV) HOLLOW LOAD BEARING MASONRY UNITS.
- B. ASTM C140-75 (1981 REV) SAMPLING AND TESTING CONCRETE MASONRY UNITS. ASTM C145-75 (1981 REV) - SOLID LOAD BEARING CONCRETE MASONRY UNITS.
- GEOSYNTHETIC RESEARCH INSTITUTE (GRI), GRI-GG4 DETERMINATION OF LONG TERM DESIGN STRENGTH OF GEOGRIDS,
- ASTM D 638 TEST METHOD FOR TENSILE PROPERTIES OF PLASTIC. ASTM D 1248 - SPECIFICATION OF POLYETHYLENE PLASTICS MOLDING AND EXTRUSION MATERIALS. ASTM D 4218 - TEST METHOD FOR CARBON BLACK CONTENT IN POLYETHYLENE COMPOUNDS BY THE MUFFLE FURNACE
- H. ASTM D 3034 SPECIFICATION FOR POLYVINYL CHLORIDE (PVC) PIPE. 1. ASTM C 1372 - SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.
- 1.3 DELIVERY, STORAGE AND HANDLING
- A. CONTRACTOR SHALL CHECK THE MATERIALS UPON DELIVERY TO ASSURE THAT PROPER MATERIAL HAS BEEN RECEIVED.
- B. CONTRACTOR SHALL PREVENT EXCESSIVE MUD, WET CEMENT, EPOXY, AND LIKE MATERIALS WHICH MAY AFFIX THEMSELVES, FROM COMING IN CONTACT WITH THE MATERIALS. CONTRACTOR SHALL PROTECT THE MATERIALS FROM DAMAGE. DAMAGED MATERIAL SHALL NOT BE INCORPORATED INTO THE
- REINFORCED RETAINING WALL D. GEOGRIDS SHOULD BE STORED ABOVE -20°F
- 1.4 SUBMITTALS/CERTIFICATION

THE CONTRACTOR SHALL SUBMIT A MANUFACTURER'S CERTIFICATION, PRIOR TO THE START OF THE WORK, THAT THE RETAINING WALL SYSTEM COMPONENTS MEET THE REQUIREMENTS OF ASTM C 1372 AND OTHER REQUIREMENTS SPECIFIED HEREIN. THIS CERTIFICATION SHALL BE PROVIDED TO THE GEOTECHNICAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO WALL CONSTRUCTION.

PART 2 - PRODUCTS

2.1 DEFINITIONS

- A. GEOGRID IS A HIGH DENSITY POLYETHYLENE, POLYESTER, OR POLYPROPYLENE GRID, SPECIFICALLY FABRICATED FOR USE AS
- B. CONCRETE RETAINING WALL UNITS ARE AS DETAILED ON THE DRAWINGS AND AS SPECIFIED HEREIN.
- C. BACKFILL IS THE SOIL WHICH IS USED AS FILL FOR THE REINFORCED SOIL MASS.
 D. FOUNDATION SOIL IS THE IN-SITU SOIL OR CONTROLLED COMPACTED FILL PLACED BELOW THE BOTTOM OF THE RETAINING WALL AND GEOGRID ZONE

2.2 MATERIALS

THE CONTRACTOR SHALL SUBMIT MANUFACTURER'S CATALOG AND SAMPLES OF THE PROPOSED MATERIALS FOR APPROVAL BY THE PROJECT GEOTECHNICAL ENGINEER A MINIMUM OF SEVEN DAYS BEFORE THE START OF CONSTRUCTION. MATERIALS SHOULD BE TRANSPORTED TO THE SITE ONLY AFTER APPROVAL OF THE PROPOSED MATERIALS BY THE PROJECT GEOTECHNICAL ENGINEER.

- MASONRY UNITS SHALL BE KEYSTONE COMPAC III UNITS. SUBSTITUTION OF OTHER CONCRETE UNITS MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER. CONCRETE WALL UNITS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI, IN ACCORDANCE WITH
- ASTM C-90. THE CONCRETE SHALL HAVE ADEQUATE FREEZE/THAW PROTECTION WITH A MAXIMUM MOISTURE ABSORPTION OF 6 PERCENT. MODULAR CONCRETE MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 1372 - STANDARD SPECIFICATIONS
- FOR SEGMENTAL RETAINING WALL UNITS. THE UNITS SHALL PASS 100 FREEZE/THAW CYCLES IN WATER WITH LESS THAN 1% WEIGHT LOSS IN ACCORDANCE WITH
- EXTERIOR DIMENSIONS MAY VARY. UNITS ARE REQUIRED TO HAVE A MINIMUM OF 1.0 SQUARE FOOT OF FACE AREA
- UNITS SHALL HAVE ANGLED SIDES AND BE CAPABLE OF ATTAINING CONCAVE AND CONVEX ALIGNMENT CURVES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. UNITS SHALL BE INTERLOCKED WITH NON-CORROSIVE REINFORCED FIBERGLASS PINS.
- UNITS SHALL BE INTERLOCKED AS TO PROVIDE A MAXIMUM OF 1.25-INCH OF SETBACK PER BLOCK.

B. LEVELING PAD

MATERIAL FOR LEVELING PAD/FOOTING SHALL CONSIST OF COMPACTED FREE-DRAINING COARSE AGGREGATES MEETING THE REQUIREMENTS OF ASTM #57 STONE. A COMPACTED LEVELING PAD A MINIMUM OF 6 INCHES THICK AND 24 INCHES WIDE

C. FIBERGLASS CONNECTING PINS

THERMOSET ISOPTHALIC POLYESTER RESIN PULTRUDED FIBERGLASS REINFORCEMENT RODS, A MINIMUM ONE-HALF INCH

PINS SHALL HAVE A MINIMUM FLEXURAL STRENGTH OF 128,000 PSI AND SHORT BEAM SHEAR OF 6,400PSI. FOR SUBSTITUTE CONCRETE UNITS, USE OF OTHER COMPATIBLE CONNECTOR SYSTEMS MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER.

GEOSYNTHETIC REINFORCEMENT SHALL CONSIST OF HIGH PERFORMANCE WOVEN POLYESTER GEOGRIDS MANUFACTURED BY TENCATE INTERNATIONAL AND HIGH DENSITY POLYETHYLENE (HDPE) GEOGRIDS MANUFACTURED BY TESAR INTERNATIONAL FOR SOIL REINFORCEMENT APPLICATIONS WHERE SPECIFIED ON THE PLANS. THE TYPE STRENGTH AND PLACEMENT LOCATION OF THE REINFORCING GEOSYNTHETIC SHALL BE AS SHOWN ON THE PLANS, DETAILED TEST DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION AND SHALL INCLUDE TENSILE STRENGTH (ASTM D 4595 OR ASTM D 6637), CREEP (ASTM D 5262), SITE DAMAGE AND DURABILITY (GRI GG-4), PULLOUT (ASTM D 6706). AND CONNECTION (ASTM D6638) TEST DATA.

INCLUDED WITH THE TEST DATA SHALL BE A REPORT THAT WILL SHOW THAT THE MIRAFI 3XT SHALL HAVE AN ULTIMATE

- TENSILE STRENGTH OF 3,500 POUNDS PER LINEAR FOOT (MARV), A LONG-TERM DESIGN STRENGTH OF 1,918 POUNDS PER LINEAR FOOT, IN ACCORDANCE WITH ASTM D 6637 AND A JUNCTION STRENGTH OF 975 POUNDS PER LINEAR FOOT (MARV) IN ACCORDANCE WITH GRI-GC2.
- TYPE OF FENCING SELECTED BY THE OWNER/DEVELOPER MAY INTERFERE WITH GEOGRID REINFORCEMENT. INSTALL SLEEVE--IT 1224R FENCE POST FOUNDATION SYSTEM, SONOTUBES CONCURRENTLY, OR OTHER FOUNDATION SYSTEM CONCURRENTLY WITH GEOGRID AND FILL PLACEMENT TO AVOID CONFLICTS OR DAMAGE TO GEOGRID. OWNER SHALL ELECT FENCING PRIOR TO START OF WALL CONSTRUCTION SO WALL AND FENCE CONTRACTORS CAN COORDINATE

REINFORCED ZONE

INSTALLATION.

CONTROLLED FILL SOIL SHALL MEET THE REQUIREMENTS OF AASHTO GROUP CLASSIFICATION OF A-2-4 OR MORE GRANULAR. IF ADEQUATE QUANTITIES ARE NOT AVAILABLE ON-SITE, IMPORTED BACKFILL SHALL MEET THE ABOVE REQUIREMENTS AND SHALL BE APPROVED BY GTA.

F. RETAINED FILL AND STRUCTURAL FILL

CONTROLLED FILL SOILS TO BE PLACED OUTSIDE THE REINFORCED BACKFILL AREA AND WHERE SPECIFIED SHALL CONSIST OF ON-SITE OR BORROW SOILS MEETING THE REQUIREMENTS OF USCS ML, SM, OR MORE GRANULAR. ALL FILL MATERIALS PROPOSED TO BE PLACED BEHIND THE REINFORCED BACKFILL SHALL BE PLACED AS CONTROLLED FILL COMPACTED TO 92 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE MODIFIED PROCTOR, ASTM D-1557.

G. UNIT FILL / DRAINAGE LAYER

H. LOW-PERMEABILITY SOIL

THE UNIT FILL AND DRAINAGE LAYER SHALL CONSIST OF ASTM #57 STONE AND BE PLACED WITHIN THE BLOCK CELLS AS UNIT FILL AND BEHIND THE BLOCK WITH A MINIMUM THICKNESS OF 12 INCHES.

LOW-PERMEABILITY SOILS TO BE PLACED AT THE TOP OF THE WALLS WHERE SPECIFIED SHALL CONSIST OF SANDY, SILTY OR CLAYEY SOILS MEETING THE REQUIREMENTS OF ML, CL, OR SC WITH A MINIMUM OF 30% PASSING THE #200 SIEVE.

DRAINAGE PIPE

THE DRAINAGE PIPES SHALL BE PERFORATED HDPE OR SOLID PVC PIPE AS INDICATED. FILTER FABRIC

FILTER FABRIC SHALL BE NON-WOVEN, POLYPROPYLENE GEOTEXTILE, 140N MANUFACTURED BY NICOLON MIRAFI GROUP OR APPROVED EQUIVALENT.

K. SLEEVE-IT OR SONOTUBE

SLEEVE-IT OR SONOTUBES SHALL BE INSTALLED DURING WALL CONSTRUCTION AT FENCE POST HOLDER LOCATIONS BASED

PART 3 - EXECUTION

A. EARTHWORK

- 1. THE CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. LINDER NO. CIRCUMSTANCES SHALL THE EXCAVATION LINES AND GRADES BE EXCEEDED, EXCEPT WITH OWNER'S APPROVAL, THE CONTRACTOR SHALL PROTECT THE EXCAVATION FROM SLOUGHING BY EXCAVATING TO THE APPROPRIATE GRADE FOR THE VEN SOIL TYPE AND COVERING THE EXCAVATED FACE WITH THE STONE DRAINAGE LAYER.
- THE BOTTOM OF WALL EXCAVATION SHALL BE SLOPED AT A MINIMUM GRADE OF 2% TOWARDS THE WALL FACE. THE CONTRACTOR IS RESPONSIBLE FOR STABILITY OF ALL EXCAVATION AND FILL SLOPES REQUIRED TO CONSTRUCT THE WALL. PERFORM ALL EXCAVATION IN ACCORDANCE WITH THE APPLICABLE OSHA AND COUNTY STANDARDS. PRIOR TO RETAINING WALL CONSTRUCTION AND THE PLACEMENT OF FILL, ALL TOPSOIL SHALL BE STRIPPED AND REMOVED FROM THE WALL AREA.

B. FOUNDATION SUBGRADE PREPARATION

FOUNDATION SOIL SHALL BE EXCAVATED AS REQUIRED FOR INSTALLATION OF LEVELING PAD, GEOGRID, STRUCTURAL FILL, AND OTHER ELEMENTS AND AS SHOWN ON THE CONSTRUCTION DRAWINGS. THE EXPOSED SUBGRADE SHALL BE THOROUGHLY PROOFROLLED. THE SURFICIAL SOFT/LOOSE SOILS, AND TOPSOIL SHALL BE REMOVED TO A STABLE SUBGRADE AS DIRECTED BY GTA.

ALL FILL REQUIRED TO ACHIEVE THE WALL BOTTOM ELEVATION SHALL CONSIST OF STRUCTURAL FILL THAT MEETS THE REQUIREMENTS OF PART 2, ITEM F. THE FILL SHALL BE PREPARED, PLACED, COMPACTED, AND TESTED IN ACCORDANCE

WITH PART 3, ITEM F. PLACEMENT OF STRUCTURAL FILL SHALL NOT PROCEED UNTIL THE SUBGRADE HAS BEEN APPROVED

MINIMUM VALUES THAT ARE SHOWN FOR THE PERTINENT WALL SEGMENTS ON THE WALL PROFILE SHEETS AND AS SPECIFIED

4. FOUNDATION SOIL SHALL BE EXAMINED BY GTA TO ASSURE THAT THE ACTUAL FOUNDATION SOIL STRENGTH MEETS OR EXCEEDS THE DESIGN PARAMETERS IN PART 5 ON THIS SHEET AND ON THE WALL PROFILE SHEETS. SOILS NOT MEETING REQUIRED STRENGTH SHALL BE REMOVED AND REPLACED WITH CONTROLLED, COMPACTED MATERIAL. ALLOWABLE BEARING PRESSURE FOR NATURAL AND CONTROLLED, COMPACTED STRUCTURAL FILL SHALL MEET OR EXCEED THE

- THE LEVELING PAD SHALL BE PLACED AS SHOWN ON THE CONSTRUCTION DRAWINGS WITH A MINIMUM THICKNESS OF 6
- LEVELING PAD MATERIALS SHALL BE INSTALLED ON UNDISTURBED IN-SITU SOILS OR CONTROLLED, COMPACTED BACKFILL. LEVELING PAD SHALL BE PREPARED TO INSURE COMPLETE CONTACT OF RETAINING WALL UNIT WITH BASE, GAPS SHALL NOT BE ALLOWED. 4. THE LEVELING PAD SHALL BE CONSTRUCTED WITH THE MATERIALS DESCRIBED IN PART 2.

D LINIT INSTALLATION

- FIRST COURSE OF CONCRETE WALL UNITS SHALL BE PLACED ON THE LEVELING PAD. THE UNITS SHALL BE CHECKED FOR LEVEL AND ALIGNMENT. THE FIRST COURSE IS THE MOST IMPORTANT TO PROVIDE ACCURATE AND ACCEPTABLE RESULTS. INSURE THAT UNITS ARE IN FULL CONTACT WITH BASE.
- 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 BASE LINE INSTALL FIBERGLASS CONNECTING PIN. LAY UP EACH COURSE INSURING THAT THE CONNECTING PINS ARE INSERTED THROUGH FRONT SLOT OF THE UNIT, AND INTO
- IE RECEIVING SLOT IN THE COURSE BENEATH, REPEAT PROCEDURE TO THE EXTENT OF WALL HEIGHT. 6. AT THE END OF EACH COURSE WHERE THE WALL CHANGES ELEVATION, UNITS SHALL BE TURNED INTO THE BACKFILL. UNITS SHALL BE LAID AS TO CREATE THE MINIMUM RADIUS POSSIBLE. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, A MINIMUM OF ONE UNIT SHALL BE INSTALLED INTO THE GRADE. ONLY THE FRONT FACE OF THE UNITS SHALL BE VISIBLE FROM THE
- 7. CONVEX AND CONCAVE CURVES SHALL BE MADE USING COMPAC UNITS OR BY TRIMMING THE UNITS AS REQUIRED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- 8. CAP UNITS SHALL BE INSTALLED AND BONDED WITH CONSTRUCTION ADHESIVE OR EPOXY CEMENT AS REQUIRED BY 9. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE BACK OF THE RETAINING WALL DURING CONSTRUCTION.

- 1. THE GEOGRID SOIL REINFORCEMENT SHALL BE LAID HORIZONTALLY ON COMPACTED BACKFILL AND CONNECTED TO THE CONCRETE WALL UNITS. HOOK GRID OVER THE FIBERGLASS CONNECTING PIN, PULL TAUT, AND ANCHOR BEFORE BACKFILL IS PLACED ON THE GEOGRID. SLACK IN THE GEOGRID AT THE WALL UNIT CONNECTIONS SHALL BE REMOVED IN A MANNER, AND TO SUCH A DEGREE, AS APPROVED BY THE ENGINEER. GEOGRID SHALL BE LAID AT THE PROPER ELEVATION AND ORIENTATION AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS
- DIRECTED BY THE ENGINEER. CORRECT ORIENTATION (ROLL DIRECTION) OF THE GEOGRID SHALL BE VERIFIED BY THE CONTRACTOR.
- GEOGRID SHALL BE SECURED IN-PLACE WITH STAPLES, PINS, SAND BAGS, OR BACKFILL AS REQUIRED BY FILL PROPERTIES, FILL PLACEMENT PROCEDURES, OR WEATHER CONDITIONS, OR AS DIRECTED BY THE ENGINEER. OVERLAPS.
- a. UNIAXIAL GEOGRID DOES NOT NEED TO BE OVERLAPPED IN THE ACROSS THE ROLL DIRECTION, EXCEPT TO CONTAIN THE FILL AT THE SLOPE FACE WHEN WRAP-AROUND FACING IS USED. UNIAXIAL GRID SHOULD BE OVERLAPPED 48" IN THE ROLLED
- b. A LAYER OF SOIL A MINIMUM OF 4 INCHES IN THICKNESS SHALL BE SPREAD BETWEEN UNIAXIAL GEOGRID LAYERS IN THE AREA TO BE OVERLAPPED, OR AS DIRECTED.

F. PLACEMENT OF FILL AND BACKFILL

- FILL MATERIALS SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS. AT THE TIME OF COMPACTION, FILL MATERIALS SHALL BE WITHIN -2% TO +4% OF THE OPTIMUM MOISTURE CONTENT, AND SHALL BE COMPACTED TO A MINIMUM OF 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM
- SPECIFICATION D-1557. THE MODIFIED PROCTOR METHOD 3. BACKFILL SHALL BE PLACED, SPREAD, AND COMPACTED IN SUCH A MANNER THAT MINIMIZES THE DEVELOPMENT OF WRINKLES IN AND/OR MOVEMENT OF THE GEOGRID. PLACE BACKFILL FROM FRONT OF GEOGRID AND SPREAD TO BACK OF
- 4. THE LIFT OF BACKFILL IMMEDIATELY BELOW A LAYER OF GEOGRID SHALL BE SCARIFIED TO A DEPTH OF 2 INCHES IMMEDIATELY AFTER COMPLETION OF LIFT COMPACTION. THE GEOGRID SHALL BE PLACED AND THE SUBSEQUENT LIFT OF SOIL PLACED AND COMPACTED THE SAME DAY AS THE UNDERLYING LIFT IS SCARIFIED.
- ONLY HAND-OPERATED COMPACTION EQUIPMENT SHALL BE ALLOWED WITHIN 4 FEET OF THE WALL FACE BACKFILL SHALL BE PLACED FROM THE WALL OUTWARD TO INSURE THAT THE GEOGRID REMAINS TAUT. TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED WITHIN THE REINFORCED ZONE BEHIND THE WALLL RUBBER-TIRED EQUIPMENT MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS. LESS THAN 10 MPH. SUDDEN
- 9. ALL FILL AND BACKFILL OPERATIONS SHALL BE OBSERVED ON A FULL-TIME BASIS BY A QUALIFIED SOIL TECHNICIAN TO DETERMINE IF MINIMUM COMPACTION REQUIREMENTS ARE BEING MET AND THAT MATERIALS MEETING OR EXCEEDING THE SPECIFICATION REQUIREMENTS ARE USED. IN-PLACE DENSITY TESTS SHALL BE PERFORMED WITH A MINIMUM OF 1 TEST PER 2,000 SQUARE FEET OF FILL AREA FOR
- EACH LIFT OF FILL PLACED. THE ELEVATION AND LOCATION OF THE TESTS SHALL BE CLEARLY IDENTIFIED AT THE TIME OF 11. THE BACKFILL MATRIX MUST BE CONSTRUCTED SO THAT FINE GRAIN SOILS DO NOT TRAP WATER.

- 1. DRAINAGE FILL SHALL BE PLACED BEHIND THE WALL TO THE LIMITS SHOWN. THE DRAINAGE FILL SHALL BE A MINIMUM OF 12 INCHES THICK AND SHALL MEET THE REQUIREMENTS OF ASTM #57 STONE. THE DRAINAGE FILL SHALL BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR EQUAL) AS SHOWN ON THE DRAWINGS.
- POSITIVE DRAINAGE SHALL BE MAINTAINED DURING AND AFTER CONSTRUCTION. SOILS WITHIN THE REINFORCED ZONE THAT BECOME WET DURING CONSTRUCTION SHALL BE DRIED OR REMOVED. INSTALL THE PERFORATED DRAINAGE PIPES AND LATERAL DRAINAGE PIPES INCREMENTALLY ALONG WITH THE INSTALLATION OF CONCRETE UNITS AND PLACEMENT OF FILL.

SLEEVE-IT OR SONOTUBES SHALL BE INSTALLED BEHIND THE BLOCK CELLS AT FENCE POST HOLDER LOCATIONS BASED ON THE SELECTED FENCE, AND BE FILLED WITH CONCRETE OR GROUT A MINIMUM DEPTH OF 28".

PART 4 - CONSTRUCTION OBSERVATION AND TESTING

C. THE SUITABILITY OF FILL MATERIAL SHALL BE CONFIRMED BY THE ON-SITE SOILS TECHNICIAN.

THE RETAINING WALL SHOULD BE CONSTRUCTED LINDER THE OBSERVATION OF GTA THE REQUIRED BEARING PRESSURE BENEATH THE FOOTING OF THE WALL SHALL BE VERIFIED IN THE FIELD BY A CERTIFIED SOILS TECHNICIAN. TESTING DOCUMENTATION MUST BE PROVIDED TO THE GEOTECHNICAL ENGINEER PRIOR TO THE START OF WALL CONSTRUCTION. THE REQUIRED TEST PROCEDURE SHALL BE THE DYNAMIC CONE PENETROMETER (DCP) TEST ASTM STP-399.

PART 5 - DESIGN PARAMETERS

WALL_GEOMETRY	WA
MAXIMUM EXPOSED WALL HEIGHT (FT.):	6.0
ANGLE OF FACE (DEG.):	8*
BLOCK EMBEDMENT (FT.):	MIN
MAXIMUM BACKFILL SLOPE ANGLE (DEG.):	O"
MAXIMUM TOE SLOPE ANGLE:	VAR
REINFORCED FILL ZONE	
DENSITY OF BACKFILL (PCF):	130
PHI (DEC.).	30

RETAINED ZONE DENSITY (PCF): PHI (DEG.): COHESION (PSF):

COHESION (PSF):

GEOGRID TYPE

6" Leveling

Excavation -

concrete.

Excavation -

Limits

1. The leveling pad is to be constructed of crushed stone or 2000 psi ± unreinforced

SECTION

_ 1/2" x 5 1/4" Fiberglass Pins

Pad

COVERAGE OF GEOGRIDS:

- FOUNDATION SOIL DENSITY (PCF): COHESION (PSF): NO. 57 STONE ALLOWABLE BEARING PRESSURE 2,000 PSF
- COMPAC III TRI-PLANE UNITS KEYSTONE BLOCKS: KEYSTONE CAP BLOCKS: 4" HIGH CAP UNITS AGGREGATE, AASHTO NO. 57
- WALL/SOIL INTERACTION COEFFICIENT: DIRECT SHEAR COEFFICIENT: CONSTRUCTION DAMAGE BASED ON-CRUSHED STONE GEOGRID LENGTH (FT.): 6 TO 8 FEET MIRAFI 140 N, OR APPROVED EQUIVALENT GEOTEXTILE:

MIRAFI 3X1

PART 6 - DESIGN CRITERIA

DESIGN PARAMETERS			
MIN. F.S. FOR SLIDING:	1 . 5	GEOGRID INSTALLATION DAMAGE REDUCTION FACTOR	1.15
MIN. F.S. FOR OVERTURNING:	2.0	GEOGRID DURABILITY REDUCTION FACTOR	1.1
MIN. F.S. FOR UNCERTAINTIES:	1.5	GEOGRID OVERALL SAFETY FACTOR	1.5
MIN. F.S. FOR GLOBAL STABILITY:	1.3	BEARING PRESSURE SAFETY FACTOR	2.0

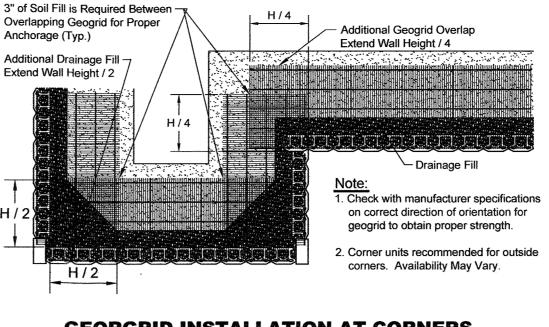
THIS WALL IS LOCATED ENTIRELY ON PRIVATE PROPERTY AND IS TO BE PRIVATELY MAINTAINED BY THE PROPERTY OWNER. THE STRUCTURAL DESIGN OF THE FENCE IS TO BE PERFORMED BY OTHERS PER LOCAL CODE. STOCKPILES SHALL NOT BE PLACED ON TOP OF ANY RETAINING WALL WITHIN THE REINFORCED OR RETAINED ZONES AT ANY TIME. STOCKPILES SHALL NOT BE PLACED AT THE BASE OF ANY RETAINING WALL WITHIN 20 FEET OF THE WALL FACE AT ANY TIME. STOCKPILE MATERIALS INCLUDE BUT ARE NOT LIMITED TO SOIL, SNOW, AND LANDSCAPING MATERIAL

PART 7 - CONSTRUCTION SEQUENCE

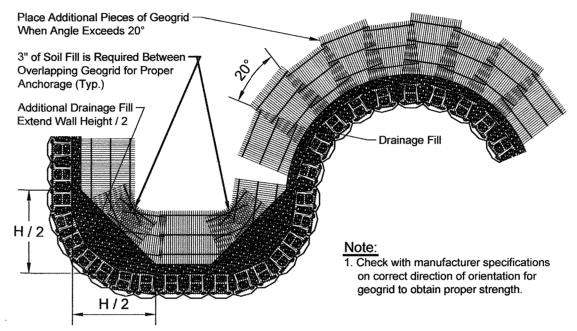
- OBTAIN BUILDING PERMITS AND INSTALL SEDIMENT AND EROSION CONTROL DEVICES. GRADE AREAS BELOW AND BEHIND THE WALLS.
- CONSTRUCT LEVELING PAD. CONSTRUCT WALL INCLUDING BLOCK, GEOGRID, AND REINFORCED FILL. RETAINED FILL SOILS SHALL BE CONSTRUCTED CONCURRENT TO REINFORCED FILL. INSTALL SLEEVE-IT OR SONOTUBES BEHIND THE BLOCK CELLS AS DETAILED. SLEEVE-IT OR SONOTUBE SHALL BE INSTALLED
- WITH A MINIMUM DEPTH OF 28 INCHES AND BACKFILLED WITH GROUT OR CONCRETE. F. IINSTALL CAP UNITS.

(2) - 4" Cap Units or

(1) - 8" Cap Unit -



GEORGRID INSTALLATION AT CORNERS



—SET POSITION OF SLEEVE IMMEDIATELY BEHIND TOPMOST COMPAC UNIT.

COMPACT TO 92% MDD PER ASTM D1557.

SLEEVE HALF-

— SLEEVE—IT™ 1224R CUT THE GEOGRID AROUND THE

AS NECESSARY

*FENCING SYSTEMS APPROVED FOR USE WITH THE SLEEVE—IT™ 1224R ARE LIMITED TO THE FOLLOWING HEIGHTS: CHAIN LINK — UP TO 8—FT, PRIVACY — UP TO

DETAIL OF FENCE POST INSTALLATION

USING SLEEVE-IT™ 1224R

NOT TO SCALE

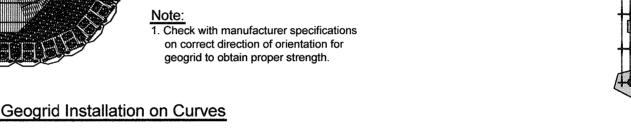
6-FT (WOODEN, PVC, METAL). POST SIZE 4"X4" MAX.

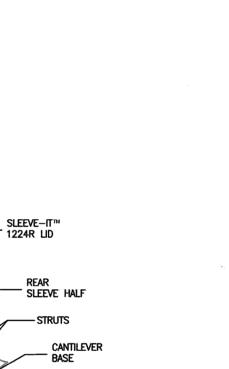
(12" × 24") DEEP SLEEVE-IT™ SYSTEM

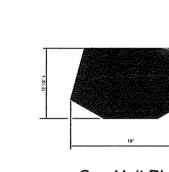
CONCRETE, SET FENCE, POST.

FILL SLEEVE WITH

BACKFILL







Compac III Elevation

Compac III Plan

Compac III Unit

* Dimensions May Vary

by Region

Cap Unit Elevation

SCALE: |" = 2000'

Geogrid is to be Placed on Level

Backfill and Extended Over the

Fiberglass Pins. Place Next Unit.

Pull Grid Taught and Backfill.

Grid & Pin Connection

Cap Unit Elevation

Cap Unit Plan

Universal

Cap Unit Option

Will Vary by Region

* Dimensions & Availabilit

Stake as required.

Cap Unit Plan 3-Plane Split Cap Unit Option * Dimensions & Availability Will Vary by Region



GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3445-A BOX HILL CORPORATE CENTER DRIVE ABINGDON, MARYLAND 21009 410-515-9446

FAX: 410-515-4895 WWW.GTAENG.COM © 2018 GEO-TECHNOLOGY ASSOCIATES, INC.

	© 2018 GEO-TECHNOLOGI ASSOCIATES, INC.			
DESIGNED	R	ETAINING WALL NOTES AND	DETAILS	SCALE
KPR	_:			AS NOTED
		SITE DEVELOPMENT PO		
DRAWN	LOTS	185-191,243,247-2	49, 337-339	DRAWING
KDJ		361-365		6 OF 7
	11	NDWOODA	MANAR	
CHECKED		NDNOCDI	PHIVOIN	JOB NO.
TMW		SECTION 2 FIRST (1ST) ELECTION DISTRIC HOWARD COUNTY, MARYLANI		100778
DATE	FOR: RYAN	HOMES		FILE NO.
JUNE 2018	11460 CRO	NRIDGE DRIVE, SUITE 128 ILLS, MD 21117		95-139X

TRI-PLAN UNIT



Wall Step

Excavation Limits

FENCE POST*-

∠4" Cap Unit

-8" Keystone

\Unit

6" Leveling Pad

ELEVATION

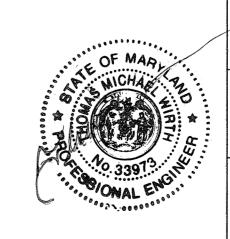
1. Secure all cap units with Keystone

Top of Wall Steps

Kapseal or equal.

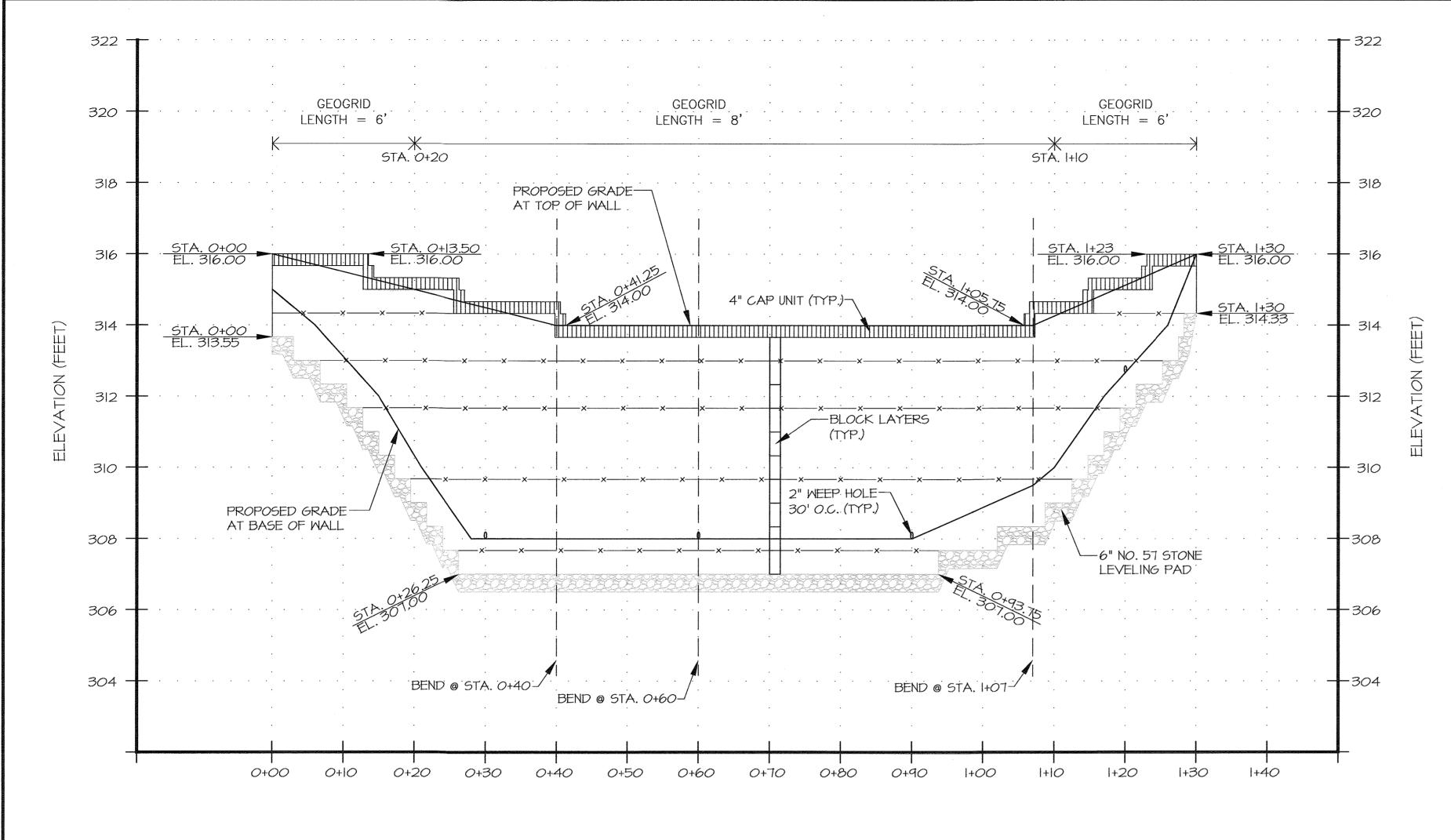


Revised Wall Plans per County Comments 07/30/2018 06/21/2018 Add Retaining Wall to Lot 339 DATE



SDP 98-02A

APPROVED: DEPARTMENT OF PLANNING AND ZONING Chil Cambon 8.29.18 CHIEF, DEVELOPMENT ENGINEERING DIVISION 10-24-18



RETAINING WALL PROFILE

SCALE: HORZ. 1" = 10'VERT. 1" = 2'

APPROVED: DEPARTMENT OF PLANNING AND ZONING

8.29.18 DATE

10-24-18 DATE

10-24-18

CHIEF, DEVELOPMENT ENGINEERING DIVISION A

----×----×------ MIRAFI 3XT GEOGRID

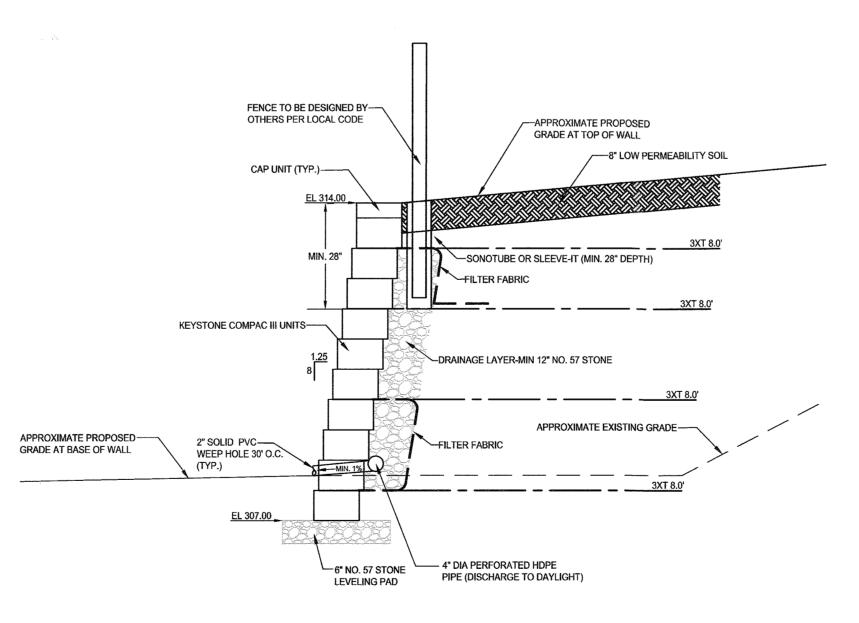
07/30/2018

06/21/2018

Revised Wall Plans per County Comments

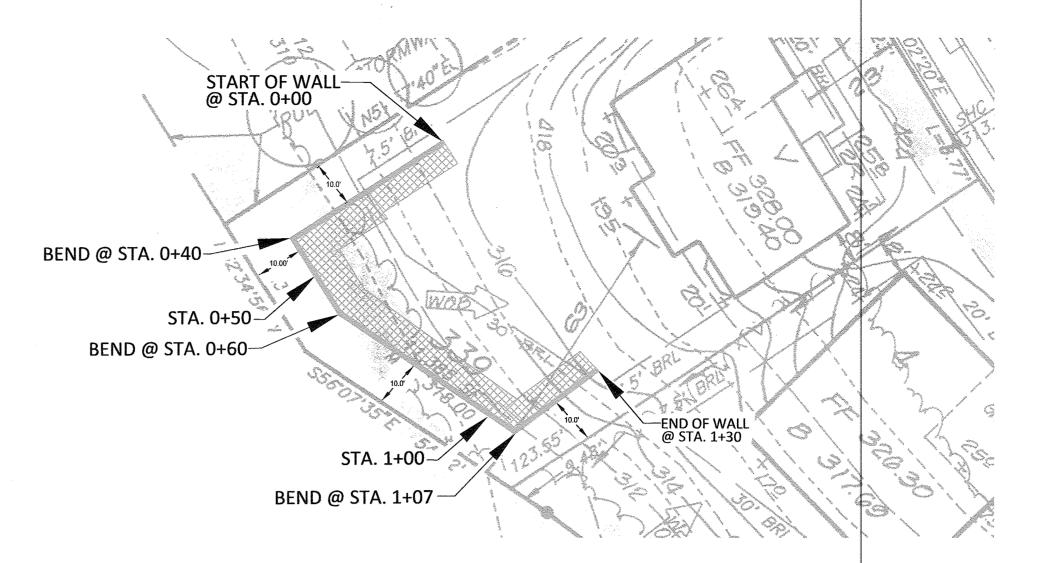
Add Retaining Wall to Lot 339

REVISIONS



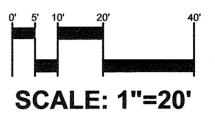
NOTE: WALL HEIGHT SHALL BE A MAXIMUM OF 6 FEET.

RETAINING WALL CROSS SECTION VIEW @ STA. 0+70 SCALE: 1:2



RETAINING WALL LOCATION PLAN

SCALE: 1" = 20'



PROPOSED WALL ALIGNMENT



APPROXIMATE GRID LOCATION



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			OGY ASSOCIATES, INC.	
DESIGNED	RETAINI	SCALE		
KPR _		AS NOTED		
		SITE DEVELOPMENT P	1	
DRAWN	LOTS 1	185-191,243,247-2	149, 337- 339	DRAWING
KDJ		361 - 365		7 OF 7
	/ Y /	VDWOODA	INNOR	
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		SDD 00	000	

SDP 98-02B