

5DP-87-126

# TEMPORARY SEEDING NOTES APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE

COVER IS NEEDED. SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

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 23 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 16 THRU FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF

WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD. MULCHING: APPLY 12 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 GAL PER ACRE (5 GAL/1000 SQ. FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES, 8 FT OR HIGHER, USE 348 GAL PER ACRE (8 GAL/1000 SQ. FT) FOR

REFER TO THE 1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

### PERMANENT SEEDING NOTES

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

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING. -

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/1000 SQUARE FEET) 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 TIME OF SEEDING, APPLY 400 POUNDS PER ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ. FT.) 2) ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LINESTONE (92 LBS/1000 SQ. FT.) AND 1000 LBS. PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ. FT.) BEFORE

SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. SEEDING - FOR THE PERIODS MARCH 1 THRU APRIL 3D, 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 OF 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 WILL ANCHORED STRAW.

MULCHING - APPLY 13 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 B FEET OR HIGHER, USE 34B GALLONS PER ACRE (B GAL/1000 SQ. FT)

MAINTENANCE - INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND

## SEDIMENT CONTROL NOTES

- 1) A minimum of 24 hours notice must be given to the Howard County Office of Inspection and Permits prior to the start of any construction. (992-2437)
- 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 1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- 3) Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1, b) 14 days as to all other disturbed or graded areas on the project
- 4) All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol. 1, Chapter 12, of the HOWARD
- 5) All disturbed areas must be stabilized within the time period specified above in accordance with the 1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seedings (Sec. 51) sod (Sec. 54), temporary seeding (Sec. 50) and mulching (Sec. 52). 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: 100,225 \$ /4:3670 Acres 63,800 \$ /1.465 Acres Total Area of Site Area Disturbed Area to be roofed or paved state \$ 0.780 Acres Area to be vegetatively stabilized 158,865 \$/3.647Ac. 2550 Cu. Yds. 1880 Cu. Yds. Total Fill Offsite waste/borrow area location H/A
- Any sediment control practice which is disturbed by grading activity for placement of utilities must be epaired on the same day of disturbance.
- 9) Additional sediment controls must be provided, if deemed necessary by the Howard County DPW sediment control
- 10) On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sedition approvals may not be authorized until this initial

Owner/Developer:

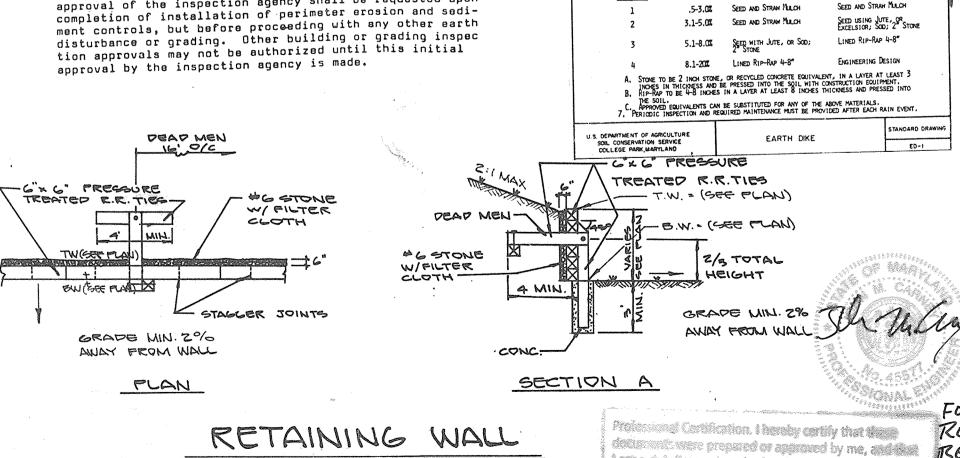
BUILDERS, INC.

301-995-0065

CONSOLIPATED HOME

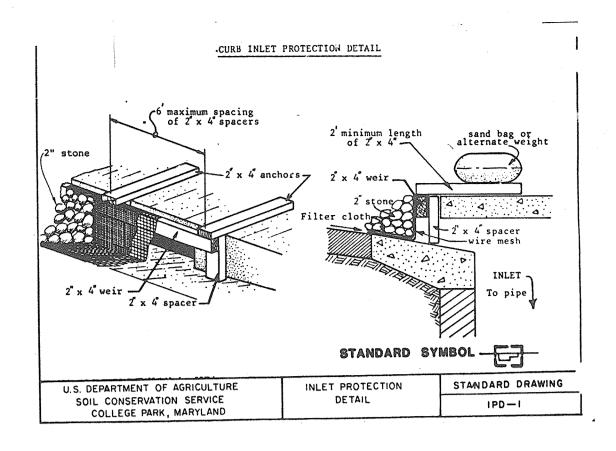
COLUMBIA, MD. 21045

GORMAN PLAZA BLOG. GUITE 116



NOT TO SCALE

NO.



## Construction Specifications

### Materials

- Wooden frame is to be constructed of 2" x 4" construction grade
- B. Wire mesh must be of sufficient strength to support filter fabric, and stone for curb inlets, with water fully impounded against it.
- C. Filter cloth must be of a type approved for this purpose; resistant to sunlight with sieve size, EOS, 40-85, to allow sufficient passage of water and removal of sediment.
- 4. Stone is to be 2" in size and clean, since fines would clog the MAXIMUM PRAINAGE AREA = 050 ALRE ( & AL.)
- B. Curb Inlet Protection

CROSS SECTION

POSITIVE CRAMAGE -GRADE SUFFICIENT TO DRAIN

CONSTRUCTION SPECIFICATIONS

ALL DIKES SHALL BE COMPACTED BY EARTH-MOVING EQUIPMENT.

ALL DIKES SHALL MAVE POSITIVE DRAINAGE TO AN OUTLET.

TOP HIDTH MAY BE HIDER AND SIDE SLOPES MAY BE FLATTER IF DESIRED TO FACILITATE
CROSSING BY CONSTRUCTION TRAFFIC.

CROSSING BY CONSTRUCTION TRAFFIC.

FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED SAFE OUTLET.

FARTH DIKES SHALL HAVE AN OUTLET THAT FUNCTIONS WITH A MINIMUM OF EROSION. PLYOFF
SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS A SEDIMENT TRAP OR SEDIMENT
BASIN HERE EITHER THE DIKE CHANNEL OR THE DRAINAGE AREA ABOVE THE DIKE ARE NOT

ADEQUATELY STABILIZED.

STABILIZATION SHALL BE: (A) IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR SEED AND STRAW MULCH OF STRAW MULCH IF NOT IN SEEDING SEASON, (B) FLOW CHANNEL AS PER THE CHART BELOW.

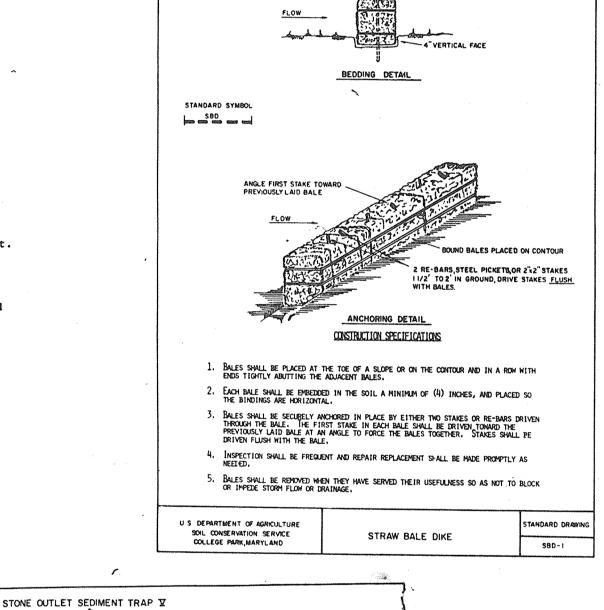
FLOW CHANNEL STABILIZATION

DIKE A

DIKE B

GRADE

- 1. Attach a continuous piece of wire mesh (30" min. width by throat length plus 4') to the 2" x 4" weir (measuring throat length plus 2') as shown on the standard drawing.
- 2. Place a piece of approved filter cloth (40-85 sieve) of the same dimensions as the wire mesh over the wire mesh and securely attach to the 2" x 4" weir.
- 3. Securely nail the 2" x 4" weir to 9" long vertical spacers to be located between the weir and inlet face (max. 6' apart).
- 4. Place the assembly against the inlet throat and nail (minimum 2' lengths of 2" x 4" to the top of the weir at spacer locations. These 2" x 4" anchors shall extend across the inlet top and be held in place by sandbags or alternate weight.
- 5. The assembly shall be placed so that the end spacers are a minimum l' beyond both ends of the throat opening.
- 6. Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place clean 2" stone over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or
- 7. This type of protection must be inspected frequently and the filter cloth and stone replaced when clogged with sediment.
- Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.



STABILIZED CONSTRUCTION ENTRANCE

PROFILE

PLAN VIEW

CONSTRUCTION SPECIFICATIONS

Width - Ten (10) foot minimum, but not less than the full width as

Filter will not be required on a single family residence lot.

14.03 A

dence lot where a 30 foot minimum length would apply).

a mountable berm with 5:1 slopes will be permitted.

Thickness - Not less than six (6) inches.

points where ingress or egress occurs.

be removed immediately

SOIL CONSERVATION

Stone Size - Use 2" stone, or reclaimed or recycled concrete equivalent.

Length - As required, but not less than 50 feet (except on a single resi-

Filter Cloth - Will be placed over the entire area prior to placing of stone

Surface Water - All surface water flowing or diverted toward construction

entrances shall be piped across the entrance. If piping is impractical,

Maintenance - The entrance shall be maintained in a condition which will

require periodic top dressing with additional stone as conditions demand

and repair and/or cleanout of any measures used to trap sediment. All

prevent tracking or flowing of sediment onto public rights-of-way. This may

Washing - Wheels shall be cleaned to remove sediment prior to entrance onto

stabilized with stone and which drains into an approved sediment trapping

Periodic inspection and needed maintenance shall be provided after each rain

public rights-of-way. When washing is required, it shall be done on an area

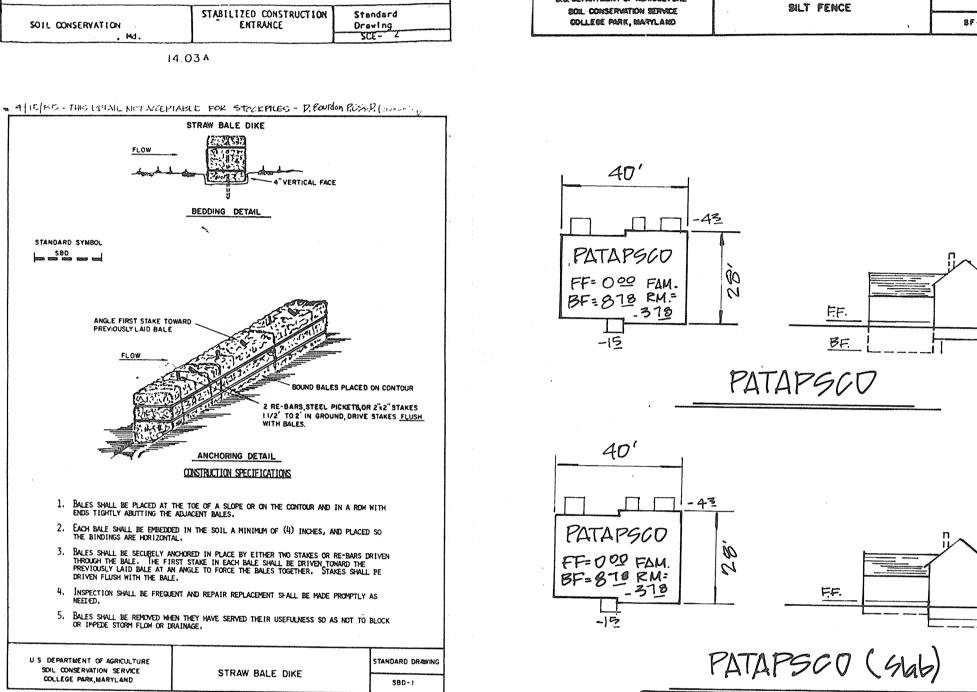
EXISTING

PAVEMEN'

PAVEMENT

STANDARD SYMBOL

Existing ground



SILT FENCE

doven wine pence (14 ½ ga. 1881., 18ax. 5" Meen Brackie) with peter cloth over

EMBED FRITER CLOTH

Noven wire fence to be fastened securely to fence posts with wire ties or staples.

2. FILTER CLOTH TO BE FASTENED SECURELY TO MOVEN MIRE FENCE MITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.

Maintenance shall be performed as beeded and material removed when bulges" develop in the silt fence.

U.B. DEPARTMENT OF ASSICULTURE

PERSPECTIVE VIEW

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

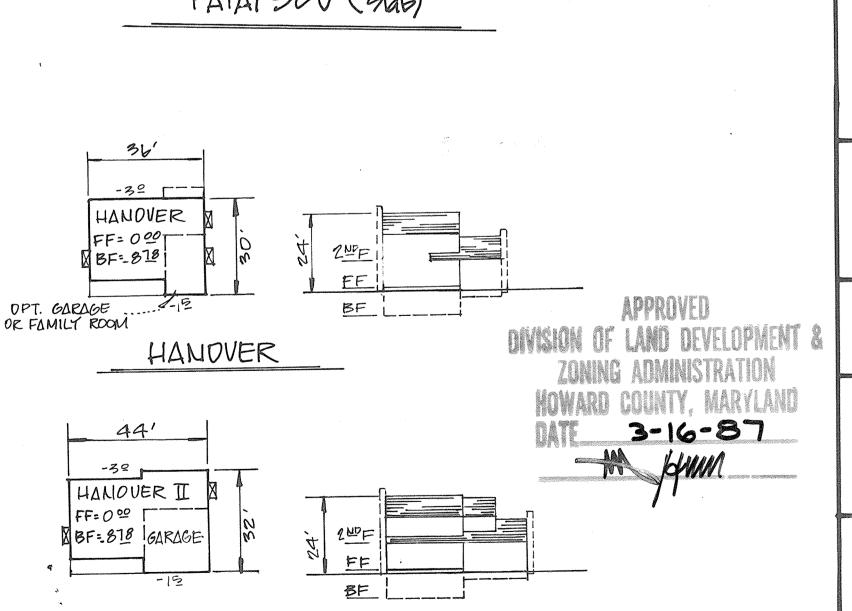
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POSTS: Steel either T or U TYPE or 2" HARDMOOD

FENCE: HOVEN WIRE, 14. GA.

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED

TANDARD DRAWN



CANBURY WOODS

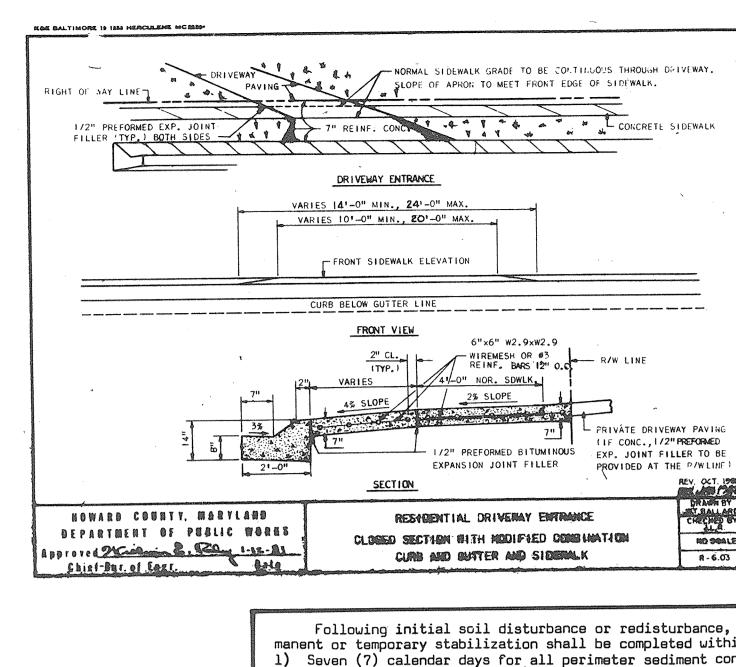
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HANDVER I

S.D.P. Nº 37-126



Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: 1) Seven (7) calendar days for all perimeter sediment control structures, dikes, swales, ditches, perimeter slopes and all slopes greater than 3:1, 2) Fourteen (14) days as to all other disturbed or graded areas on the project site.

NOTE: The contractor or developer shall contact the Construction Inspection/Survey Division 24 hours in advance of commencement of work at 792-7272.

## DEVELOPER'S LERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF NATURAL RESOURCES APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BOX INNING THE PROJECT."

# ENGINEER'S CERTIFICATE

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDI-TIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT."

REVIEWED FOR HOWARD S.C.D.

U.S. SOIL CONSERVATION SERVICE

AND MEETS TECHNICAL REQUIREMENTS

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIM CONSERVATION DISTRICT

APPROVED: FOR PUBLIC WATER AND PUBLIC SEWAGE SYSTEMS HOWARD COUNTY HEALTH DEPARTMENT

4-15-87 DATE NTY OFFICE OF PLANNING & ZONING 4-13-87

4-14-87 AND ZONING ADMINISTRATION APPROVED: FOR PUBLIC WATER AND PUBLIC SEWAGE,

STORM DRAINAGE SYSTEMS AND PUBLIC ROADS HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Sheet NOV., 86 DRAWN M.A.M CHECKED of BILL PROJECT NO. SCALE 15-32 AS SHOW

DATE

4-9-87

45577 06.03.20 DATE REVISIONS BEI#1 REVISE TOTAL SHEET NUMBER 12/29/18

\$ 400 is thely licensed professional engineer under (1) (and

of the State of Maryland.

GROUP, INC.

Maximum Drainage Area: 5 Acres

SOIL CONSERVATION SERVICE

COLLEGE PARK, MARYLAND

CROSS SECTION A-A

3. All cut and fill alopes shall be 2:1 or flatter.

has accumulated to is the design depth of the trap.

OPTION: A one foot layer of 2" stone may be placed on the upstream side of the riprap in

The fill material for the embankment shall be free of roots and other woody vegetation as

well as over-sized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed.

4. The stone used in the outlet shall be small riprap 4"-8" along with a 1' thickness of 2"

5. Sediment shall be removed and trap restored to its original dimensions when the sediment

7. Construction operations shall be carried out in such a manner than erosion and water

6. The structure shall be inspected after each rain and repairs made as needed

aggregate placed on the up-grade side on the small riprap OR embedded filter cloth in the

STONE OUTLET SEDIMENT TRAF

ST-X

CONSULTANTS OLNEY, MARYLAND 20832
GROUP INC. 301-924-4570

HOWARD COUNTY, MARYLAND

SEC. / AREA LOT / PARCE

1/1

209000

DETAILS & SPECIFICATIONS

LOTS 33-41 & LOTS 56-62

CANBURY WOODS

IST ELECTION DISTRICT

GEWER CODE

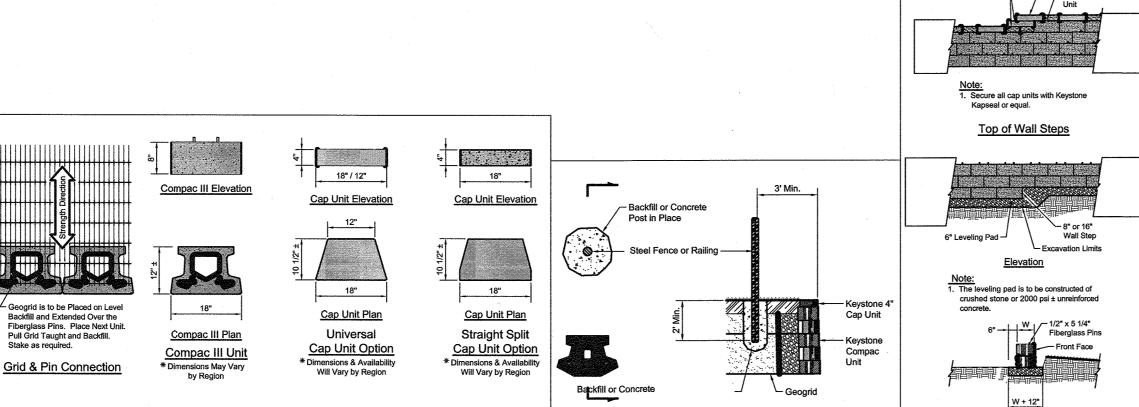
PLAT # OR L/F BLOCK# ZONE TAX/ZONE MAP ELE DIST CENSUST

3341656-6

SDP-87-126

### 6254 Fairbourne Court Keystone Compac III Segmental Retaining Wall Fence required above wall where grade difference from top of wall to bottom grade is 30" or greater. Work shall consist of designing, furnishing and construction of a KEYSTONE HARDSCAPE Compac III unit retaining wall system in accordance with these specifications The fence must be a minimum of and in reasonable close conformity with the lines, grades, design and dimensions shown on the plans. No alternate wall systems will be considered. 36-inches in height, and the Keystone Cap Unit openings in the fence or rail mus Work includes preparing foundation soil, furnishing and installing leveling pad, unit facing system, unit drainage fill and reinforced backfill to the lines and grades shown on 8" Min. Low Permeable Soil be small enough to prevent the passage of a four inch sphere. ences must be stable enough to Work incudes furnishing and installing geogrid soil reinforcement of the type, size, location and lengths designated on the construction drawings. vithstand 200 lbs of concentrated Reference Documents loading applied horizontally at any American Association of State Highway and Transportation Officials (AASHTO) ON LOT 37 ARE FROM AASHTO M 252 Corrugated Polyethylene Drainage Pipe Keystone Compac HOWARD COUNTY AASHTO M 288 Geotextile Specification for Highway Applications GEOGRAPHICAL INFORMATION American Society for Testing and Materials (ASTM - Unit Drainage Fill ASTM C140 Sampling and Testing Concrete Masonry Units (3/4" Crushed ASTM C1372 Specification for Dry-Cast Segmental Retaining Wall Units Rock or Stone) ASTM D442 Particle Size Analysis of Soils ASTM D698 Laboratory Compaction Characteristics of Soil – Standard Effort ASTM D1556 Standard Test Method for Density and Unit Weight of Soil In Place by the Sand Cone Method Reinforced Soil Geogrid Reinf. Approximate ASTM D1557 Laboratory Compaction Characteristics of Soil - Modified Effort Limits of ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System) ASTM D2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) 8.5' NO WOODY Excavation ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer pipe and Fittings ASTM D4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils Grid Depth REMOVE AND REPLACE. Retained Soil ASTM D4475 Horizontal Shear Strength of Pultruded Reinforced Plastic Rods EXISTING TIMBER RETAINING ASTM D4476 Flexural Properties of Fiber Reinforced Pultruded Plastic Rods WALL WITH SEGMENTAL BLOCK RETAINING WALL -ASTM D4595 Standard Test Method for Tensile Properties of Geotextiles by Wide-Width Strip Method 4" Perforated PVC ASTM D4873 Standard Guide for Identification, Storage and Handling of Geosynthetics ISTURBANCE LOD OF Drainage Tile ASTM D5262 Standard Test Method for Evaluating the Unconfined Tension Creep Behavior of Geosynthetics WALL REPLACEMENT ASTM D5818 Standard Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage ASTM D6637 Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Method Unreinforced Concrete ASTM D6638 Standard Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units When site conditions require, wrap drainage or Crushed Stone ASTM D6706 Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil TW = 112.00ASTM D6916 Standard Test Method for Determining the Shear Strength Between Segmental Concrete Units ( Foundation Soil tile in 3/4" aggregate and filter fabric with drainage composite or aggregate back drain National Concrete Masonry Association (NCMA) system, as directed by geotechnical engineer. NCMA SRWU-1 Test Method for Determining Connection Strength of SRW NCMA SRWU-2 Test Method for Determining Shear Strength of SRW USE EROSIÓN CONTROL Typical Reinforced Wall Section Compac III Unit - a dry-stacked concrete retaining wall unit machine made from Portland cement, water, aggregates, manufactured by a licensed manufacturer of THAT IS DISTURBED ---Structural Geogrid - a polymeric material formed by a regular network of connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock or earth and function primarily as reinforcement Unit Drainage Fill - drainage aggregate that is placed within and immediately behind the Keystone concrete units. Reinforced Backfill - compacted soil that is placed within the reinforced soil volume as outlined on the plans. (IN FEET) Retained Soil - the soil mass behind the reinforced backfill. 1 inch = 30 ft. Foundation Soil - the soil mass below the leveling pad and reinforced backfill. Leveling Pad - crushed stone, sand and gravel or unreinforced concrete material placed to provide a level surface for placement of the Keystone concrete units. Geosynthetic Reinforcement - polymeric material designed specifically for soil reinforcement. **Submittals and Certificatio** Contractor shall submit a Manufacturer's certification, prior to the start of work, that the retaining wall system components meet the requirements of this specification TW-117.33 and the structure design TW 116.67 STRATAGRI state of the project. STRATAGRID 200 - 7.00 ft TW 115.33 STRATAGRID 200 - 6.00 ft STRATAGRID 200 - 6.00 ft Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the Compac retaining wall system has been constructed successfully. Contact names and phone numbers shall be listed for each project TW 113.83 STRATAGRID 200 - 5.00 ft Contractor shall provide evidence that the design engineer has a minimum of five years documented experience in the design of reinforced soil structures. The design **%**TW 112.67 engineer shall provide proof of current professional liability insurance with an aggregate coverage limit of not less than \$2,000,000. Owner shall/may provide quality assurance inspection and testing during earthwork and wall construction operations. Contractor shall provide all quality control testing and inspection not provided by the owner. Owner's quality assurance program does not relieve the contractor of responsibility for quality control and wall performance. Contractor shall check all materials upon delivery to assure that the proper type, grade, color, and certification have been received. Contractor shall protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be Proposed Grade at bottom of Wa TDB 110.33 PART 2: PRODUCTS **Keystone Concrete Retaining Wall Units** Keystone Compac III retaining wall units shall conform to the following architectural requirements Face color - concrete gray, unless otherwise specified. The Owner may specify standard manufacturers' color. Face finish - hard split in angular tri-plane or straight face configuration. Other face finishes will not be allowed without written approval of Owner Bond configuration - running with bonds nominally located at midpoint in vertically adjacent units TG Elevations indicate grade elevation at top of the wall TDB indicated top of base Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of 20 feet (6 m) under diffused Keystone concrete units shall conform to the requirements of ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units. Keystone concrete units shall conform to the following structural and geometric requirements measured in accordance with ASTM C140 Sampling and Testing Concrete Masonry Units: Compressive strength: ≥ 3000 psi (21 MPa). **General Notes:** Absorption: ≤ 8 % for standard weight aggregates Dimensional tolerances: ± 1/8" (3 mm) from nominal unit dimensions not including rough split face. Retaining wall shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL or equivalent) certified soil technician. Unit Size: 8" (203 mm) (H) x 18" (457 mm) (W) x 12" (304 mm)(D) minimum. Keystone concrete units shall conform to the following constructability requirements: The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to Howard County Inspector prior to the start of Vertical setback: 1/8 inch (3 mm) ± per course (near vertical) or 1 1/8 inch (28 mm) + per course, per the design. construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP-399. Alignment and grid attachment mechanism - fiberglass pins, two per unit. The suitability of fill material shall be confirmed by the onsite soils technician. Each eight (8) inch lift shall be compacted to a minimum of 95% Standard Proctor Density and the testing report shall be made Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm). available to the Howard County Inspector upon compleation of construction. **Shear and Reinforcement Pin Connectors** For "CRITICAL" walls, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector upon Completion of construction. Shear and reinforcement pin connectors shall be 1/2-inch (12 mm) diameter thermoset isopthalic polyester resin pultruded fiberglass reinforcement rods to provide connection between vertically and horizontally adjacent units and geosynthetic reinforcement, with the following requirements: Flexural Strength in accordance with ASTM D4476: 128,000 psi (882 MPa) minimum. This wall was not designed for surcharge loads. Short Beam Shear in accordance with ASTM D4475: 6,400 psi (44 MPa) minimum Weep holes must daylight through the wall every 40 feet. Shear and reinforcement pin connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling. Base Leveling Pad Material Minimum bearing pressure is 2000 pounds per square foot. Material shall consist of a compacted crushed stone base, sand and gravel or unreinforced concrete, as shown on the construction drawings. Unit Drainage Fill Unit drainage fill shall consist of clean 1 inch (25 mm) minus crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM D-422: Sieve Size 1 inch (25 mm) 3/4-inch (19mm) 75 - 100 No. 4 (4.75 mm) 0 – 10 No. 50 (300 um) 0 - 5

APPROVED: DEPARTMENT OF PLANNING AND ZONING



Fence Plan

Detail

Fence SectionDetail

Geosynthetic reinforcement shall consist of geogrids manufactured for soil reinforcement applications and shall be manufactured from high tenacity polyester yarn or high density polyethylene. Polyester geogrid shall be made from high tenacity polyester filament yarn with a molecular weight exceeded 25,000 g/m and with a carboxyl end group value less than 30. Polyester geogrid shall be coated with an impregnated PVC coating that resists peeling, cracking and stripping.

Ta - Long Term Allowable Tensile Design Load. Ta of the geogrid material shall be determined as follows: Ta = Tult/(RFcr \* RFd \* RFid \* FS). Ta shall be evaluated based on a

Tult - Short Term Ultimate Tensile Strength. Tult shall be determined in accordance with ASTM D4595 or ASTM D6637. Tult is based on the minimum average roll values (MARV).

RFcr - Reduction Factor for Long Term Tension Creep. RFcr shall be determined from 10,000 hour creep testing performed in

accordance with ASTM D5262. RFcr = 1.45 minimum.

RFd - Reduction Factor for Durability. RFd shall be determined from polymer specific durability testing covering the range of expected soil environments. RFd = 1.10 minimum.

RFid – Reduction Factor for Installation Damage. RFid shall be determined from product specific construction damage testing performed in accordance with ASTM D5818. Test results shall be provided for each product to be used with project specific or more severe soil types. RFid = 1.05 minimum.

FS - Overall Design Factor of Safety. FS hall be 1.5 unless noted for the maximum allowable working stress calculation.

The maximum design tensile load of the geogrid shall not exceed the laboratory tested ultimate strength of the geogrid/facing unit connection divided by a factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with ASTM D6638 Connection Strength between Geosynthetic Reinforcement and Segmental Concrete Units or NCMA SRWU-1.

Ci – Coefficient of Soil Interaction. Ci values shall be determined per ASTM D6706 at a maximum 0.75 inch (19 mm) displacement.

Geogrid Soil Reinforcement (Cont.)

The geogrid manufacturer shall have a Manufacturing Quality Control program that includes QC testing by an independent laboratory. The QC testing shall include Tensile Strength testing, Melt Flow Index testing for HDPE geogrids and Molecular Weight testing for polyester geogrids.

If required, drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D3034 or corrugated HDPE pipe manufactured in accordance with AASHTO

When required, geotextile filter fabric shall be a needle-punched nonwoven fabric that meets the requirements of AASHTO M288.

# ASTM D5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method PART 3: EXECUTION

Contractor shall excavate to the lines and grades shown on the construction drawings. The Owner or Contractors QA/QC representative shall inspect the excavation and test the foundation soils and approve prior to placement of the leveling pad material or fill soils. Any over-excavation required to remove unsuitable soils shall be oversized from the front of the leveling pad and back of the geogrid reinforcement. Over-excavation and replacement of unsuitable soils and replacement with approved compacted fill will be compensated as agreed upon with the Owner.

Leveling pad material shall be placed to the lines and grades shown on the construction drawings to a minimum thickness of 6 inches (150 mm) and extend laterally a minimum of 6 inches in front and behind the Keystone wall unit.

Soil leveling pad materials shall be compacted to a minimum of 95% of Standard Proctor density per ASTM D697 or 92% Modified Proctor density per ASTM D1557.

## Leveling pad shall be prepared to insure full contact with the base surface of the concrete units.

First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in ful contact with the base and properly seated

Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.

Place and compact drainage fill within and behind wall units. Place and compact reinforced backfill soil behind drainage fill. Maximum stacked vertical height of wall units, prior to drainage fill and backfill placement and compaction, shall not exceed three courses.

## Structural Geogrid Installation

Geogrid shall be installed with the highest strength direction perpendicular to the wall alignment.

Install shear/connecting pins per manufacturer's recommendations

Geogrid reinforcement shall be placed at the strengths, lengths and elevations shown on the construction drawings, or as directed by the engineer. The geogrid shall be laid horizontally on compacted backfill and attached to the Keystone wall unit pins and within 1 inch of the face of the units. Place the next course of Keystone units over the geogrid. The geogrid shall be pulled taut and anchored prior to backfill placement on the geogrid. Geogrid reinforcements shall be continuous throughout their embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geogrid or gaps greater than 2 inches between adjacent pieces of geogrid are not permitted

# Contractor shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a Professional Engineer registered in the Reinforced Backfill Placemen

Reinforced backfill shall be placed, spread and compacted in such a manner that minimizes the development of slack in the geogrid and installation damage to the geogrid Reinforced backfill shall be placed and compacted in lifts not to exceed 6 inches (150 mm) where hand operated compaction equipment is used, or 8 - 10 inches (200 to 250 mm) where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density, as needed. Reinforced backfill shall be compacted to a minimum of 95% of Standard Proctor density per ASTM D697 or 92% Modified Proctor density per ASTM D1557. The moisture content of the reinforced backfill material during compaction shall be uniformly distributed throughout each layer and shall be dry of optimum by 0 to 3 percentage points of

Only hand operated compaction equipment shall be allowed within 3 feet (1 M) from the back of the Keystone concrete units. Tracked construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches (150 mm) is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing the fill and damaging or displacing the Keystone units

Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH. Sudden braking and turning shall be avoided. At the end of each day's operation, the Contractor shall slope the last lift of reinforced backfill away from the wall units to direct runoff away from the wall face. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

Prior to placement of the cap units, the upper surface of the top course of wall units shall be cleaned of soil and any other material. Cap units shall be adequately glued to the underlying wall units with an all-weather exterior construction adhesive.

## As-built Construction Tolerances

Vertical alignment: ± 1.5 inches (40 mm) over any 10 foot (3 m) distance. Wall batter: within 2 degrees of design batter. Overall wall batter shall be ≥ 0 degrees Horizontal alignment: ± 1.5 inches (40 mm) over any 10 foot (3 m) distance. Corners and curves: ± 1 foot (300 mm) to theoretical location Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm).

# **Field Quality Control**

Percent Passing

Plasticity Index (PI) < 15 and Liquid Limit < 40, per ASTM D4318

geogrid design due to increased installation damage during construction

Reinforced Backfill

1 1/2 inch (38 mm) 100

3/4-inch (19 mm) 75 - 100

No. 40 (425 um) 0 - 60

No. 200 (75 um) 0 - 35

Section

Leveling Pad Detail

Sieve Size Percent Passing

fill shall be used for each square foot (0.093 m2) of wall face unless otherwise specified.

Reinforced backfill shall be free of debris and meet the following gradation tested in accordance with ASTM D-422:

Drainage fill shall be placed within the cores of, between, and behind the units as indicated on the design drawings. Not less than 1.3 cubic foot (0.036 m3), of drainage

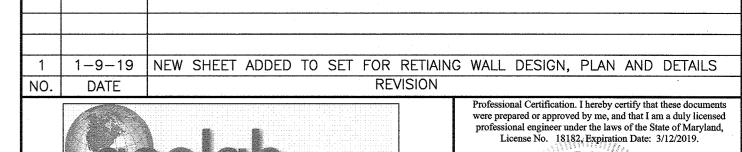
The maximum aggregate size shall be limited to 3/4 inch (19 mm) unless installation damage tests have been performed to evaluate potential strength reductions to the

Material can be site-excavated soils where the above requirements can be met. Soils not meeting the above criteria, including highly plastic clays and organic soils, shall

Contractor shall submit reinforced fill sample and laboratory test results to the Architect/Engineer for approval, prior to the use of any proposed reinforced backfill material.

Quality Assurance - The owner shall/may engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the Contractor from securing the necessary construction quality control testing. Quality assurance should include foundation soil inspection and testing and verification of the geotechnical design parameters and verification that the contractor's quality control testing is adequate as a minimum. Quality assurance shall also include observation of the construction for general compliance with the design drawings and project specifications. Quality assurance is usually best performed by the site geotechnical engineer. Quality Control - The Contractor shall engage independent inspection and testing services to perform the minimum quality control testing described in the retaining wall design

plans and specifications. Only qualified and experienced technicians and engineers shall perform quality control testing and inspection services Quality control testing shall include soil and backfill testing to verify soil types and strengths, compaction and moisture conditions and verification that the retaining wall is being constructed in accordance with the design plans and specifications.



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OWNER LOT 37: SAMUEL AND RACHEL EDOHO-EKET 6254 FAIRBOURNE COURT HANOVER, MD 21076

RETAINING WALL BUILDER:

qeolab@verizon.net

**CANBURY WOODS** 

LOT 33-41 & 56-62, SECTION 1 - AREA 1 TAX MAP: 38 GRID: 09 PARCEL: 904

ZONED: R-12 FIRST ELECTION DISTRICT HOWARD COUNTY, MARYLAND REPLACEMENT SHEET

BADGER COMPANIES 16951 YORK ROAD REVISED SITE DEVELOPMENT PLAN SUITE B MONKTON, MD 21111 **RETAINING WALL DETAILS LOT 37** 410-949-1888 DATE: BEI PROJECT NO. 2940 JAN., 2019 DRAFT: DESIGN: . SCALE: AS SHOWN SHEET 4 of 4