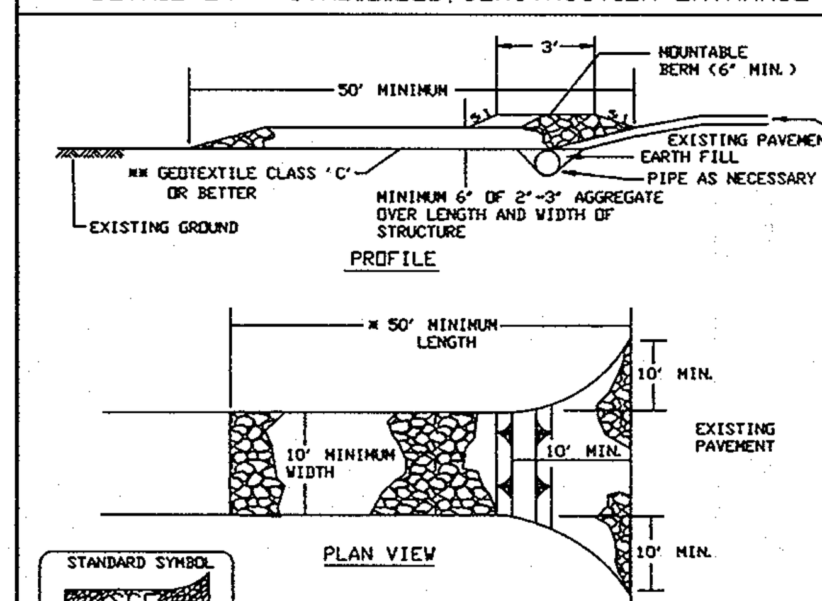
DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specification

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

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

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.

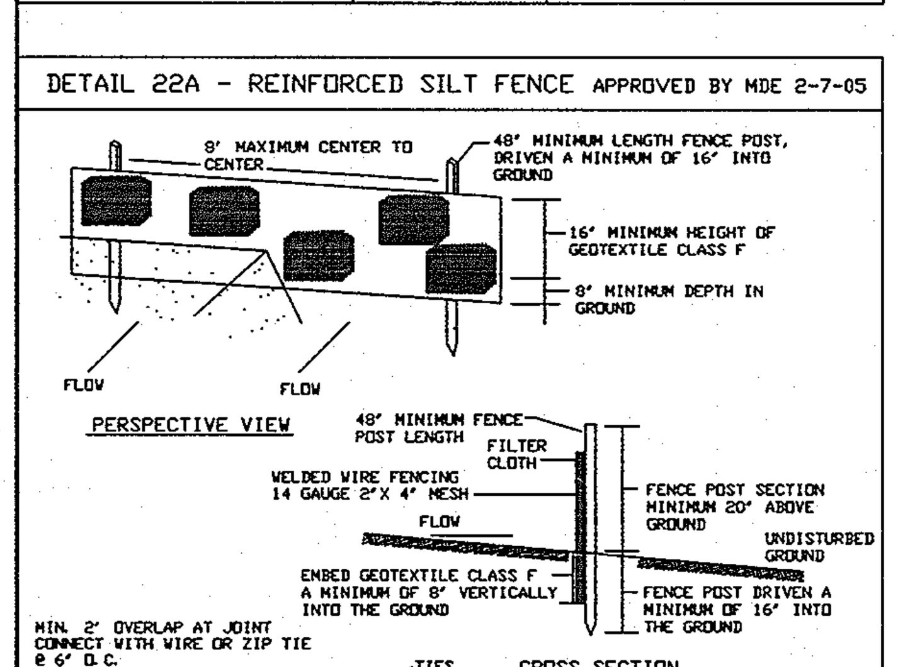
4. Stone - crushed aggregate (2" to 3") or reclained or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.

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 construction entrance.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 22A - REINFORCED SILT FENCE APPROVED BY MDE 2-7-05



Construction Specifications

1. Metal fence post shall be a minimum of 48" long driven 16" minimum into the ground. Post shall be standard T or U section weighting not less than 1.00 pound per linear foot.

2. Geotextile shall be fastened securely to each fence post with wire ties or zip ties at top and mid section and shall meet the following requirements for geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal ft²/ minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and wired tied or zip tied to prevent sediment bypass.

4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 15 - 3B	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SILT FENCE

Silt Fence Design Criteria

Slope Steepness	(Maximum) Slope Length	(Maximum) Silt Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2% slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and silt fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 15 - 3C	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

HOWARD SOIL CONSERVATION DISTRICT

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, disking or other acceptable means before seeding, if not previously loosened.

Soil Amendments: In lieu of soil test recommendations, use one of the following schedules:

1. Preferred -- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil. At time of seeding, apply 400 lbs/acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq. ft.)

2. Acceptable -- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 1000 lbs/acre 10-10-10 fertilizer (23 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil.

Seeding -- For the periods March 1 – April 30, and August 1 -- October 15, seed with 60 lbs/acre (1.4 lbs/1000 sq. ft.) of Kentucky 31 Tall Fescue. For the period May 1 -- July 31, seed with 60 lbs Kentucky 31 Tall Fescue per acre and 2 lbs/acre (.05 lbs/100() sq. ft.) of weeping lovegrass. During the period of October 16 – February 28, protect site by:
Option 1 -- Two tons per acre of well anchored straw mulch and seed as soon as possible in the spring.
Option 2 --Use sod. Option 3 -- Seer: with 60 lbs/acre Kentucky 30 Tall Fescue and mulch with 2 tons/acre well anchored straw.

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 slope 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq. ft.) for anchoring.

Maintenance -- Inspect all seeding areas and make needed repairs, replacements and reseedings.

TEMPORARY SEEDING NOTES.

Apply to graded or cleared areas likely to be re-disturbed where a short-term vegetative cover is needed.

Seedbed preparation: -- Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

Soil Amendments: -- Apply 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.).

Seeding: -- For periods March 1 – April 30 and from August 15 -- October 15, seed with 2-1/2 bushel per acre of annual rye (3.2 lbs/1000 sq. ft.). For the period May 1 -- August 14, seed with 3 lbs/acre of weeping lovegrass (.07 lbs/1000 sq. ft.). Fo~ the period November 16 -- February 28, protect site by applying 2 tons/acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.

Mulching: -- Apply 1-1/2 to 2 tons/acre (70 to 90 lbs/1000 sq. ft.) of unrotted weed-free, 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 slope 8 ft. or higher, use 348 gal. per acre (8 gal/1000 sq. ft.) for anchoring.

Refer to the *1994 MAR4AND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL* for additional rates and methods not covered.

STANDARD SEDIMENT 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 most current MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL and revisions thereto.

3. Following initial soil disturbance or re-disturbance, 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 site.

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 COUNTY DESIGN MANUAL, Storm Drainage.

5. All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seeding (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:

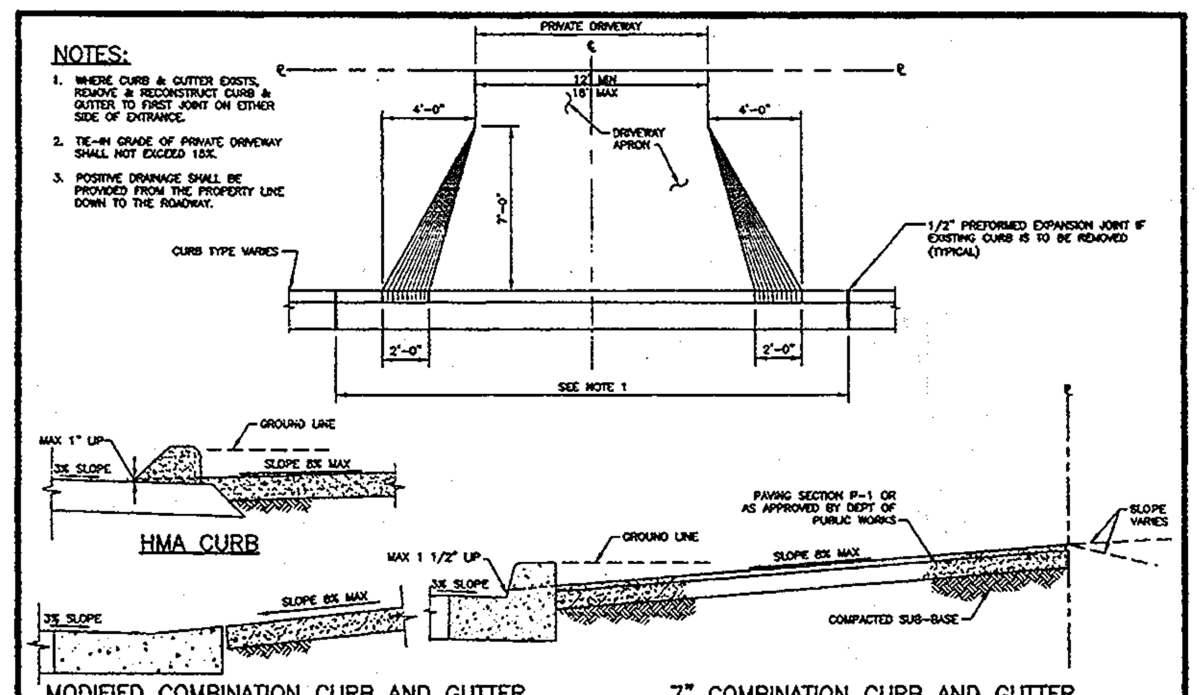
Total Area of Site	0.468	Acres
Area Disturbed	0.326	Acres
Area to be roofed or paved	0.1231	Acres
Area to be vegetatively stabilized	0.2029	Acres
Total Cut	259	Cu. Yds.
Total Fill	259	Cu. Yds.
Offsite waste/borrow area location:	0	

8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.

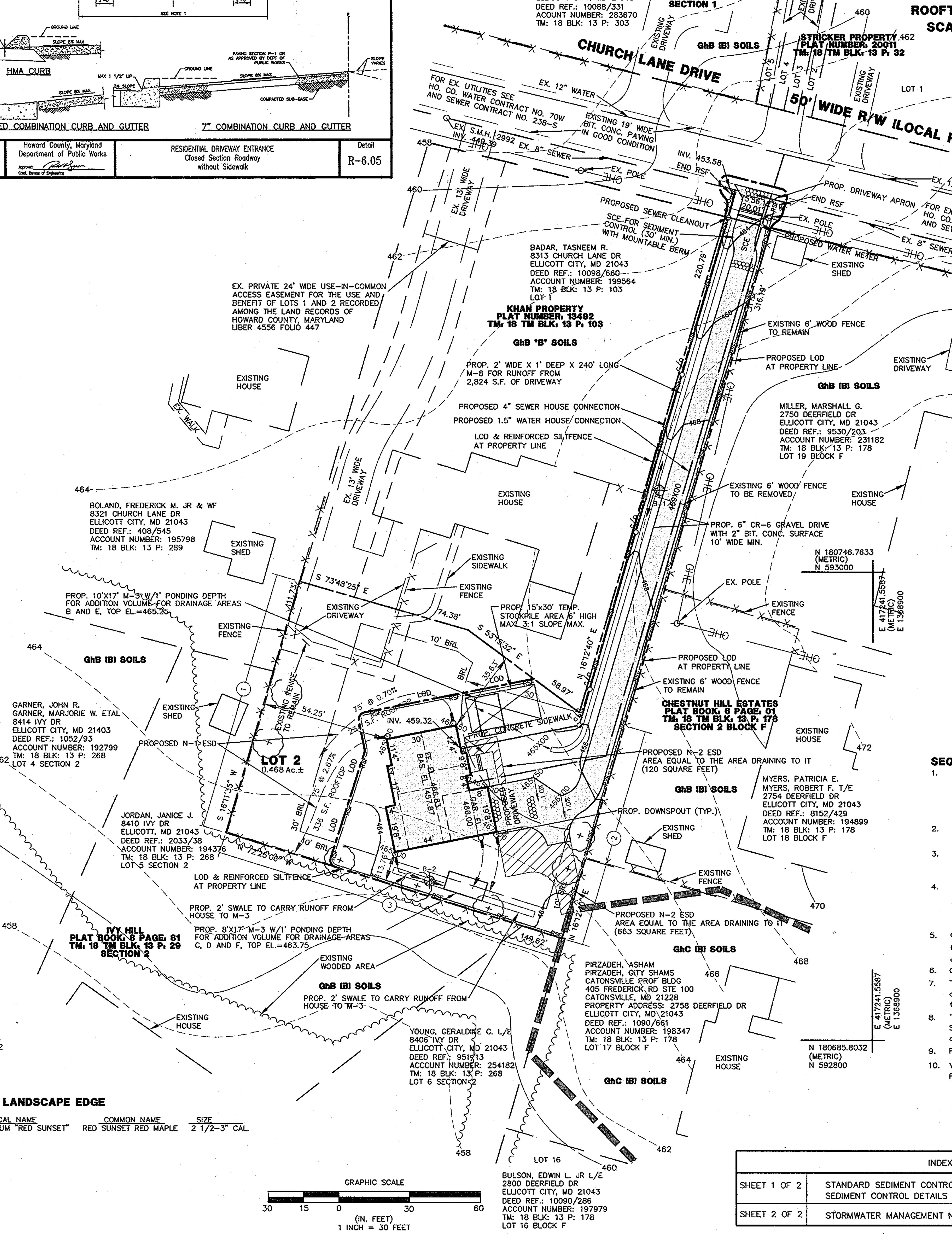
9. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.

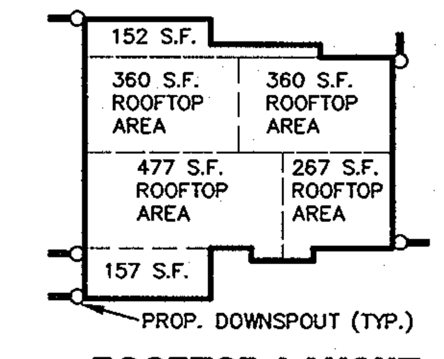
10. On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.

11. Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized by the end of each work day, whichever is shorter.



Howard County, Maryland Department of Public Works	RESIDENTIAL DRIVEWAY ENTRANCE Closed Section Roadway without Sidewalk	Detail R-6.05

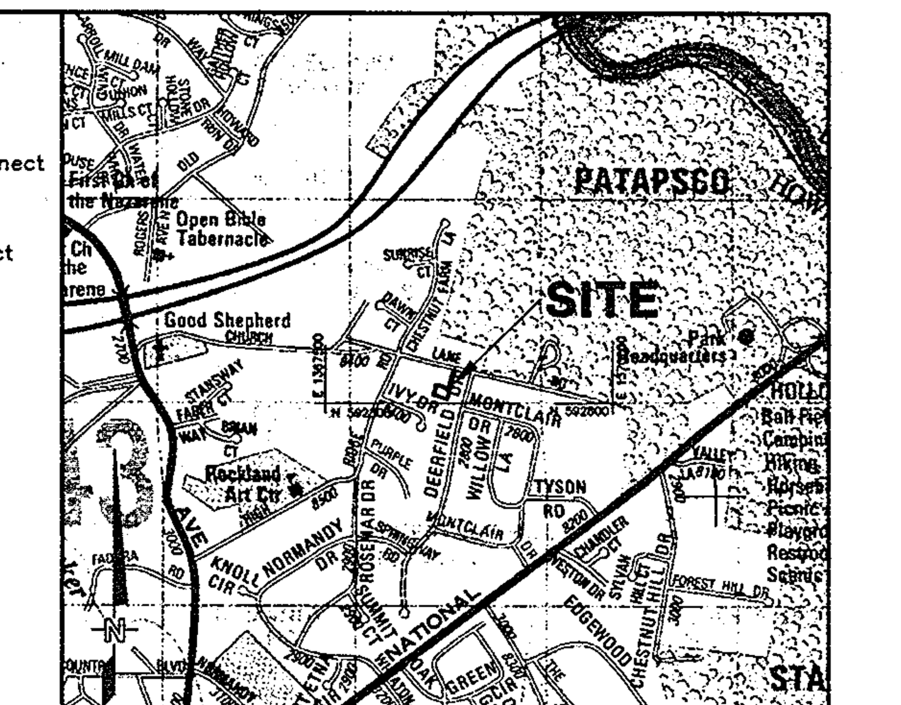




ROOFTOP LAYOUT SCALE: 1"=30'

LEGEND

— —20— —	Existing Grade
—[20]—	Proposed Grade
LOD — —	Limit of Disturbance
—RSF—	Reinforced Silt Fence
— —	Existing Lot Line
(shaded box)	Proposed Impervious
SCE	Stabilized Construction Entrance
⊠	Temporary Stockpile Area
(hatched box)	Area of Non-rooftop Disconnect
75' @ 2.40%	Proposed Rooftop Disconnect
—X—X—	Existing Fence
(scalloped line)	Existing Treeline
(outline)	Existing Structure
B-2	Boring Location

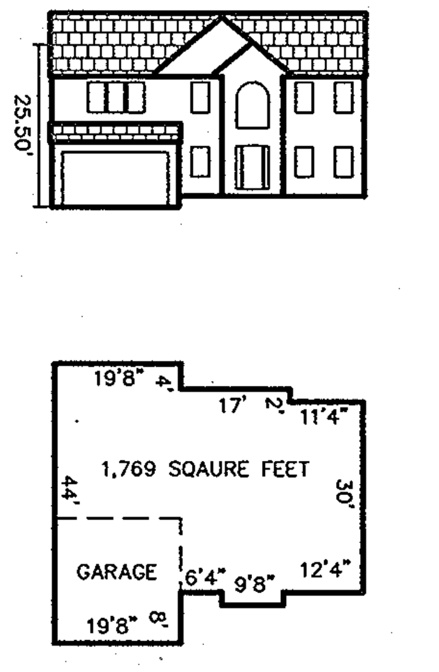


VICINITY MAP

SCALE: 1" = 2,000'
ADC MAP: 12, GRID: E4
Copyright ADC The Map People
Permitted Use Number 20811204

SITE ANALYSIS DATA/GENERAL NOTES:

1. SUBJECT PROPERTY ZONED R-20 PER THE 2/2/04 COMPREHENSIVE ZONING PLAN AND THE "COMP. LITE" ZONING AMENDMENTS EFFECTIVE 7/28/06.
2. COORDINATES BASED ON NAD '83, MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. H.C.M. 17EA AND NO. H.C.M. 17 EB
   STA. NO. H.C.M. 17EA N 181150.5724 (METERS) E 413772.7247 (METERS)
   STA. NO. H.C.M. 17 EB N 180994.8448 (METERS) E (413227.8979 (METERS)
3. BOUNDARY SURVEY COMPLETED BY FISHER, COLLINS AND CARTER, INC. ON OR ABOUT APRIL, 1998 PER RECORD PLAT (PB M.D.R. NO. 13492)
4. DRIVEWAY SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLING TO ENSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
   A) WIDTH – 12 FEET (16 FEET SERVING MORE THAN ONE RESIDENCE);
   B) SURFACE – SIX (6") INCHES OF COMPACTED CRUSHER RUN BASE WITH TAR AND CHIP COATING. (1-1/2" MINIMUM);
   C) GEOMETRY – MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM 45' RADIUS
   D) STRUCTURES (CULVERTS/BRIDGES) – CAPABLE OF SUPPORTING 25 GROSS TONS (H25-LOADING);
   E) DRAINAGE ELEMENTS – CAPABLE OF SAFELY PASSING 100 YEAR FLOOD WITH NO MORE THAN 1 FOOT DEPTH OVER SURFACE;
   F) STRUCTURE CLEARANCES – MINIMUM 12 FEET;
   G) MAINTENANCE – SUFFICIENT TO ENSURE ALL WEATHER USE.
5. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
6. ANY DAMAGE TO THE COUNTY RIGHT-OF-WAY SHALL BE CORRECTED AT THE DEVELOPERS EXPENSE.
7. CONTRACTOR SHALL CHECK SEWER HOUSE CONNECTION ELEVATION AT PROPERTY LINE PRIOR TO CONSTRUCTION.
8. FOR DRIVEWAY ENTRANCE DETAILS REFER TO HO. CO. DESIGN MANUAL VOL. IV DETAILS R.6.05.
9. SITE ANALYSIS DATA:
   A. TOTAL PROJECT AREA: 20,423 S.F. OR 0.468 AC.
   B. TOTAL AREA OF IMPERVIOUS SURFACE PROPOSED: 5,361 S.F. OR 0.1231 AC.
10. THIS PROJECT IS EXEMPT FROM FOREST CONSERVATION OBLIGATIONS IN ACCORDANCE WITH SECTION 16.1202(b)(1)(i) OF THE HOWARD COUNTY CODE AND FOREST CONSERVATION MANUAL BASED ON THIS BEING A SITE DEVELOPMENT FOR DEVELOPMENT ON LAND LESS THAN 40,000 SQUARE FEET.
11. THE WATER HOUSE CONNECTIONS SHALL BE FOR INSIDE METER SETTING.
12. THE MINIMUM SETBACK FOR STRUCTURES SHALL BE AS FOLLOWS:
   SINGLE FAMILY ATTACHED, SEMI-DETACHED, AND TWO-FAMILY DWELLINGS
   FRONT SETBACK: 50' FROM THE PUBLIC STREET RIGHT OF WAY
   REAR SETBACK: 30'
   SIDE SETBACK: 10' FROM PROPERTY LINE
13. THE WHC MUST BE INSTALLED WITH A MINIMUM 1.5-FOOT HORIZONTAL CLEARANCE AND 1-FOOT VERTICAL CLEARANCE, ABOVE THE SHC.
14. IN ACCORDANCE WITH SECTION 133.D.2.a OF THE ZONING REGULATIONS, TWO OFF-STREET PARKING SPACES PER UNIT ARE REQUIRED AND SHALL BE PROVIDED. GARAGE MAY NOT BE CONVERTED TO LIVING SPACE OR FOR STORAGE.
15. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.
16. FINANCIAL SURETY FOR THE REQUIRED 7 SHADE TREES IN THE AMOUNT OF $2,100.00 IS PART OF THE BUILDERS GRADING PERMIT APPLICATION.
17. AT THE TIME OF INSTALLATION, ALL SHRUBS AND OTHER PLANTINGS HEREWITH LISTED AND APPROVED FOR THIS SITE, SHALL BE OF THE PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATION OF REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THIS APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATES.
18. IN ACCORDANCE WITH SECTION 128 OF THE HOWARD COUNTY ZONING REGULATIONS, BAY WINDOWS, CHIMNEYS OR EXTERIOR STAIRS NOT MORE THAN 16' FEET IN WIDTH MAY PROJECT NO MORE THAN 4 FEET INTO ANY SETBACKS. PORCHES OR DECKS MAY PROJECT NO MORE THAN 10 FEET INTO THE FRONT OR REAR YARD SETBACK (APPLIES TO RESIDENTIAL SDP's).



THE "EASTON"

SCALE: 1"=30'

SEQUENCE OF CONSTRUCTION

1.	Pre- construction meeting: Notify the Department of Inspections and Permits at least 48 hours before commencing work. Work may not commence until the permitee or the responsible personnel have met on site with the sediment and erosion control inspector to review the approved plans.	2 DAYS
2.	Install S.C.E. and Reinforced Silt Fence as shown. Notify county to Obtain Phase 1 Sediment Control Inspection.	2 DAYS
3.	Rough grade and excavate for basement. Begin construction of the foundation. Framing of the house may not commence until entire site is temporarily stabilized.	2 WEEKS
4.	Building construction may not proceed past the ground floor until all remaining disturbed areas have been permanently or temporarily stabilized. During construction beyond the ground floor, all disturbed areas must be stabilized at the end of each business day.	2 MONTHS
5.	Once the disturbed areas have been stabilized, the engineer must certify to the inspector that the grades and drainage patterns shown on the approved erosion and sediment control plan have been obtained.	3 DAYS
6.	Construct driveway and finish construction of the house.	3 MONTHS
7.	The utility work shall be performed in a manner that only allows disturbance which can be completed and stabilized that working day.	1 DAY
8.	Temporarily stabilize areas with seed and mulch. Construct S.W.M. ESDs. (Note: The ESDs will be required to be inspected and certified by a P.E.)	4 DAYS
9.	Final grade and permanently stabilize all disturbed areas.	2 DAYS
10.	With the Howard County, Inspectors Approval. Remove the remaining sediment control measures.	1 DAY

HOWARD COUNTY REFERENCE NUMBERS

ENVIRONMENTAL CONSERVATION PLAN: ECP-12-024

IMPERVIOUS BREAKDOWN

1. EXISTING IMPERVIOUS AREA: 0.00 S.F. = 0.00 AC.
2. PROPOSED IMPERVIOUS: HOUSE: 1,768 S.F. = 0.0405 AC.
   DRIVEWAY: 3,487 S.F. = 0.0801 AC.
   CONC. WALK: 106 S.F. 0.0024 AC.
   TOTAL: 5,361 S.F. = 0.1231AC.

LIMIT OF DISTURBANCE NOTE

THE TOTAL DISTURBED AREA FOR THE CONSTRUCTION SHOWN ON THIS PLAN IS 14,222 S.F. OR 0.326 AC.

SOIL DESCRIPTION

GhB (B) GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES

REINFORCED SILTFENCE NOTE

WHEN PLACING THE REINFORCED SILTFENCE ON A SLOPE THAT RUNS DOWNHILL, INSTALL IN A "J" CONFIGURATION TURNING THE FENCING INTO THE LIMIT OF DISTURBANCE. THIS SHOULD BE DONE AT APPROXIMATELY 35-50 FOOT INTERVALS.

LANDSCAPE NOTE

AT THE TIME OF PLANT INSTALLATION, ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPE PLAN, SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENT IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTION OR RELOCATION OF THE REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THE APPROVED LANDSCAPE PLAN MAY RESULT IN THE DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIAL ARE PLANTED AND/OR REVISIONS ARE MADE TO THE APPLICABLE PLANS.

"THE OWNERS, TENANTS AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALL. ALL PLANT MATERIALS SHALL BE MAINTAINED TO ENSURE CONTINUED COMPLIANCE WITH THE APPLICABLE REGULATION. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.

SCHEDULE A: PERIMETER LANDSCAPE EDGE

CATEGORY	ADJ TO ROADWAY	ADJ TO PERIMETER PROPERTIES			
LANDSCAPE TYPE	N/A	A (PERIMETER 1)	A (PERIMETER 2)	A (PERIMETER 3)	TOTAL
LINEAR FEET OF PERIMETER	N/A	111.73'	95.00'	149.62'	
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET)	N/A				
NUMBER OF PLANTS REQUIRED SHADE TREES EVERGREEN TREES SHRUBS	0 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	2 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	2 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	3 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	7 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS
NUMBER OF PLANTS PROVIDED SHADE TREES EVERGREEN TREES SHRUBS	SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	2 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	2 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	3 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS	7 SHADE TREES 0 EVERGREEN TREES 0 SHRUBS

SCHEDULE A: PERIMETER LANDSCAPE EDGE

QUANTITY	SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
7	(tree symbol)	ACER RUBRUM "RED SUNSET"	RED SUNSET RED MAPLE	2 1/2-3" CAL.

INDEX OF SHEETS	
SHEET 1 OF 2	STANDARD SEDIMENT CONTROL PLAN, VICINITY MAP, GENERAL NOTES, AND SEDIMENT CONTROL DETAILS
SHEET 2 OF 2	STORMWATER MANAGEMENT NOTES & DETAILS AND PROPOSED DRAINAGE AREA MAP

ADDRESS CHART

LOT/PARCEL #	STREET ADDRESS
LOT 2/PARCEL 103	8305 CHURCH LANE DRIVE, ELLICOTT CITY, MD. 21043

PERMIT INFORMATION

SUBDIVISION NAME			SECTION/AREA		LOT/PARCEL#
KHAN PROPERTY					LOT 2/PARCEL 103
PLAT# OR L/F	GRID #	ZONING	TAX MAP NO.	ELECT. DISTRICT	CENSUS TRACT
13492	13	R-20	18	02-08	6026.00

APPROVED : HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Division of Land Development — Date 11/16/12

Chief, Development Engineering Division HSP — Date 11/16/12

Director — Date 11/16/12

This development plan is approved for soil erosion and sediment control by the HOWARD COUNTY SOIL CONSERVATION DISTRICT.

Howard SCD — Date 11/1/12

M.A.F. & ASSOCIATES, LLC

526 HOODS MILL ROAD
WOODBINE, MD 21797
PHONE: 410-552-5541
FAX: 410-552-5546
EMAIL: MFORGEN@AOL.COM

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONEL 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"

DEVELOPER: TREVILLIAN PROPERTIES, LLC. — Date 10/24/12
WILLIAM C. TREVILLIAN

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 conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District"

MICHAEL J. WERNER — Date 10/24/12
MD PE #23380

STATE OF MARYLAND MICHAEL JOSEPH WERNER No. 23380 PROFESSIONAL ENGINEER

OWNER/DEVELOPER:

TREVILLIAN PROPERTIES, LLC
7865 QUARTERFIELD ROAD
SEVERN, MD. 21144
410-761-2430

SITE DEVELOPMENT PLAN

PROJECT NUMBER:

KHAN PROPERTY LOT 2
PLAT BOOK M.D.R. No 13492
SINGLE FAMILY DWELLING

TAX MAP 18 BLOCK 13 PARCEL 103 TAX ACCOUNT #:2-392410 ZONING: R-20

DATE: MARCH 20, 2012

SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND

SHEET SDP-1 of SDP-2

SDP-12-065

M-3. Landscape Infiltration

Landscape infiltration utilizes on-site vegetative planting areas to capture, store, and treat stormwater runoff. Rainwater is stored initially, filters through the planting soil and gravel media below, and then infiltrates into native soils. These practices can be integrated within the overall site design by utilizing a variety of landscape features for storage and treatment of stormwater runoff. Storage may be provided in constructed planters made of stone, brick, concrete, or in natural areas excavated and backfilled with stone and topsoil.

Applications:

Landscape infiltration can be best implemented in residential and commercial land uses. Residential areas with compact housing such as clustered homes and townhouses can utilize small green spaces for landscape infiltration. Because space in these instances prevents structural pretreatment, the drainage area to these practices should be limited to less than 10,000 ft². Larger drainage areas may be allowed where soil testing is performed and pretreatment forebays can be implemented. Successful application is dependent upon soil type and groundwater elevation.

Performance:

The P_E values determined by Equation 5.1 may be applied to the ESD sizing criteria when landscape infiltration systems are designed according to the guidance provided below. Re, requirements are also met when the P_E from Equation 5.1 meets or exceeds the soil specific recharge factor listed in Section 2.2.

Constraints:

The following constraints are critical when considering the use of landscape infiltration to capture and treat stormwater runoff:

- **Space:** Landscape infiltration should not be used in areas where operation may create a risk for basement flooding, interfere with subsurface sewage disposal systems, or other underground structures. The initial site planning process shall consider landscaping opportunities where these practices may be implemented.
- **Topography:** Steep terrain affects the successful performance of landscape infiltration. These practices should be constructed without a slope. If slopes entering these practices are too steep, then level-spreading devices such as check dams, terraces, or berms may be needed to maintain sheetflow.
- **Soils:** Permeable soils are critical to the successful application of landscape infiltration. The HSG should be A or B. For HSG C or D, designers should consider using practices with underdrains like micro-bioretention.

- **Drainage Area:** Drainage areas less than 10,000 ft² are most appropriate for landscape infiltration. Larger drainage areas may require pretreatment and soils testing to verify the infiltration rates.
- **Hotspot Runoff:** Landscape infiltration should not be used to treat hotspots that generate higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff and may contaminate groundwater.
- **Infrastructure:** Landscape designers should consider overhead electrical and telecommunication lines when selecting plant materials.

Design Guidance:

The following conditions should be considered when designing landscape infiltration:

- **Conveyance:** Stormwater runoff is collected in landscaped areas where water will sheetflow across the facility, percolate through the planting media, and infiltrate into underlying soils. A flow splitter should be used to divert runoff in excess of the ESD$_v$ away from the facility at non-erosive velocities to a stable, downstream conveyance system. If bypassing the practice is not feasible, an internal overflow device such as an elevated yard inlet may be used.
- **Treatment:** Landscape infiltration shall meet the following design criteria:
  - *The drainage area to any individual practice shall be 10,000 ft² or less.*
  - *The surface area (A$_f$) of landscape infiltration practices shall be at least 2% of the contributing drainage area. A P_E value based on Equation 5.1 shall be applied to the contributing drainage area.*

$$P_E = 20^* \times \frac{A_f}{DA} \quad \text{(Equation 5.1)}$$

  - *Landscape infiltration facilities located in HSG B (i.e., loams, silt loams) shall not exceed 5 feet in depth. Facilities located in HSG A (i.e., sand, loamy sand, sandy loam) shall not exceed 12 feet in depth.*
  - *Landscape infiltration facilities shall be designed to fully dewater the entire ESD$_v$ within 48 hours.* Temporary storage of the ESD$_v$ may be provided above the facility.
  - *A 12 to 18-inch layer of planting soil shall be provided as a filtering media at the top of the facility.*
  - *A minimum 12-inch layer of gravel is required below the planting soil.*
  - *A 12-inch layer of clean sand shall be provided at the bottom to allow for a bridging medium between the existing soils and stone within the bed.*
  - *The storage volume for the ESD$_v$ shall be determined for the entire system and includes the temporary ponding area, the soil, and the sand and gravel layers in the bottom of the facility. Storage calculations shall account for the porosity (n=0.40) of the gravel and soil media.*
  - Pretreatment measures shall be implemented along the main stormwater runoff collection system where feasible. These include installing gutter screens, a

removable filter screen on rooftop downspout pipes, a sand layer or pea gravel diaphragm at the inflow, or a two to three-inch surface mulch layer.

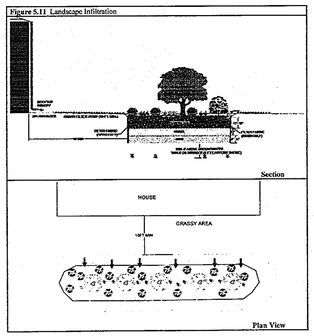
- **Soils:** *Landscape infiltration shall be installed in HSG A or B. The depth from the bottom of the facility to the seasonal high water table, bedrock, hard pan, or other confining layer shall be greater than or equal to four feet (two feet on the lower Eastern Shore).*
- **Flow Splitter:** A flow splitter should be provided to divert excess runoff away from landscape infiltration. An elevated yard inlet may also be used in the facility for this purpose.
- **Setbacks:**
  - *Landscape infiltration shall be located down gradient of building structures and shall be setback at least 10 feet from buildings, 50 feet from confined water supply wells, 100 feet from unconfined water supply wells, and 25 feet from septic systems.*
  - *Landscape infiltration shall be sized and located to meet minimum local requirements for clearance from underground utilities.*
- **Observation Wells:** *An observation well consisting of an anchored, perforated pipe (4" to 6" diameter) shall be provided. The top of the observation well shall be at least six inches above grade.*
- **Landscaping:** *Landscaping plans shall be provided according to the guidance in Appendix A. Plant tolerance to saturated and inundated conditions shall be considered as part of the design.* A dense and diverse planting plan will provide an aesthetically pleasing design, which will enhance property value and community acceptance.

Construction Criteria:

The following items should be addressed during construction of projects with landscape infiltration:

- **Erosion and Sediment Control:** Final grading for landscape infiltration should not take place until the surrounding site is stabilized. *If this cannot be accomplished, runoff from disturbed areas shall be diverted around the proposed location of the facility.*
- **Soil Compaction:** *Sub soils shall not be compacted.* Excavation should be conducted in dry conditions with equipment located outside of the practice to minimize bottom and sidewall compaction. Construction of the should be performed with lightweight, wide-tracked equipment to minimize disturbance and compaction. Excavated materials should be placed in a contained area.
- **Planter Boxes:** Planter boxes may be made of stone, brick, or concrete.

Figure 5.11 Landscape Infiltration



- **Filter Cloth:** *Filter cloth shall not be installed on the bottom of any landscape infiltration practice.*

Landscape infiltration may be constructed as an excavated trench in natural ground and backfilled with sand, gravel, and planting soil. These applications should use non-woven filter cloth to line the sides of the facility to prevent clogging.

- **Gravel and Filter Media:** See Appendix B.4 for material specifications for the sand, gravel, and planting soil media.
- **Landscape Installation:** The optimum planting time is during the autumn months. Spring is also acceptable but may require watering.

Inspection:

- Regular inspections shall be made during the following stages of construction:
  - *During excavation to subgrade.*
  - *During placement of backfill and observation well.*
  - *During placement of filter fabric, soil, and gravel media.*
  - *During construction of appurtenant conveyance structures.*
  - *Upon completion of final grading and establishment of permanent stabilization.*

Maintenance Criteria:

The following items should be addressed to ensure proper maintenance and long-term performance of landscape infiltration:

- *Privately owned practices shall have a maintenance plan and shall be protected by easement, deed restriction, ordinance, or other legal measures preventing its neglect, adverse alteration, and removal.*
- During the first year of operation, inspection frequency should be after every major storm and poorly established areas revegetated.
- Sediment accumulation on the surface of the facility should be removed and the top two to three inches of surface layer replaced as needed.
- The top few inches of the planting soil should be removed and replaced when water ponds for more than 48 hours or there is algal growth on the surface of the facility.
- If standing water persists after filter media has been maintained, the gravel, soil, and sand may need to be cleaned and/or replaced.
- Occasional pruning and replacement of dead vegetation is necessary. If specific plants are not surviving, more appropriate species should be used. Watering may be required during prolonged dry periods.

M-8. Swales

Swales are channels that provide conveyance, water quality treatment, and flow attenuation of stormwater runoff. Swales provide pollutant removal through vegetative filtering, sedimentation, biological uptake, and infiltration into the underlying soil media. Three design variants covered in this section include grass swales, wet swales, and bio-swales. Implementation of each is dependent upon site soils, topography, and drainage characteristics.

Applications:

Swales can be used for primary or secondary treatment on residential, commercial, industrial, or institutional sites. Swales can also be used for retrofitting and redevelopment. The linear structure allows use in place of curb and gutter along highways, residential roadways, and along property boundaries. Wet swales are ideal for treating highway runoff in low-lying or flat terrain with high groundwater. Bio-swales can be used in all soil types due to the use of an underdrain. Grass swales are best suited along highway and roadway projects.

Performance:

The P_E values determined by the equations 5.2 and 5.3 (reprinted below) may be applied to the ESD sizing criteria when grass swales and bio-swales are designed according to the guidance provided below. For wet swales, P_E for the contributing drainage area is based on the volume captured. Re, requirements are also met when the applicable P_E meets or exceeds the soil specific recharge factor listed in Section 2.2.

Swales should not be designed to meet Q_p or Q_f requirements except under extremely unusual conditions. Swales may be used to convey runoff for these larger storm events however, the ESD$_v$ should be treated separately. This can be accomplished with a flow splitter or diversion so that the entire design storm is passed safely.

Constraints:

The following constraints are critical when considering the use of swales to capture and treat stormwater runoff:

- **Topography:** Steep slopes will increase velocity, erosion, and sediment deposition thus shortening the design life of the swale.
- **Soils:** Design variants are dependent upon soil types. Grass swales work best in HSG A, B, or C and wet swales are best suited for HSG C or D. Bio-swales typically include an underdrain and may be installed in all soil types. Extreme temperatures and frozen ground need to be considered when calculating design volumes.
- **Drainage Area:** The drainage area contributing to all design variants should be less than one acre. Practices in Chapter 3 should be considered for larger drainage areas.
- **Hotspot Runoff:** Swales should not be used to treat hotspots that generate higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff and may contaminate groundwater.
- **Location:** The location of swales needs to be considered carefully. Wet swales are not recommended for residential developments due to the potential nuisance or mosquito breeding conditions. Swales along roadways can be damaged by off-street parking and are susceptible to winter salt applications. Also, the choice of vegetation and landscaping can be limited in adjacent areas.

Design Guidance:

The following conditions should be considered when designing swales:

- **Conveyance:** Stormwater discharged into and through swales needs to be non-erosive. Sheetflow should be promoted wherever possible using precise grading, level earthen weirs, or pea gravel diaphragms. If concentrated flow is delivered from curb cuts or storm drain pipes, some form of energy dissipation (e.g., plunge pools or rip-rap) is needed.
- **Treatment:** All swales shall meet the following criteria:
  - *Swales shall have a bottom width between two and eight feet.*
  - *The channel slope shall be less than or equal to 4.0%.*
  - *The maximum flow velocity for the ESD$_v$ shall be less than or equal to 1.0 fps.*
  - *Swales shall be designed to safely convey the 10-year, 24-hour storm at a non-erosive velocity with at least six inches of freeboard.*
  - *Channel side slopes shall be 3:1 or flatter.*
  - *A thick vegetative cover shall be provided for proper function.*

The following criteria apply to each specific design variant:

Grass swales: *Grass swales shall be used for linear applications (e.g., roadway) only, and shall be as long as the treated surface. The surface area (A$_f$) of the swale bottom shall be at least 2% of the contributing drainage area, and a P_E value based on Equation 5.3 shall be applied to the contributing drainage area.* The maximum flow depth for ESD$_v$ treatment should be 4 inches, and the channel should have a roughness coefficient (Manning's *n*) value of 0.15. This can be accomplished by either maintaining vegetation height equal to the flow depth or using energy dissipaters like check dams, infiltration berms, or riffle/pool combinations.

$$P_E = 10^* \times \frac{A_f}{DA} \quad \text{(Equation 5.3)}$$

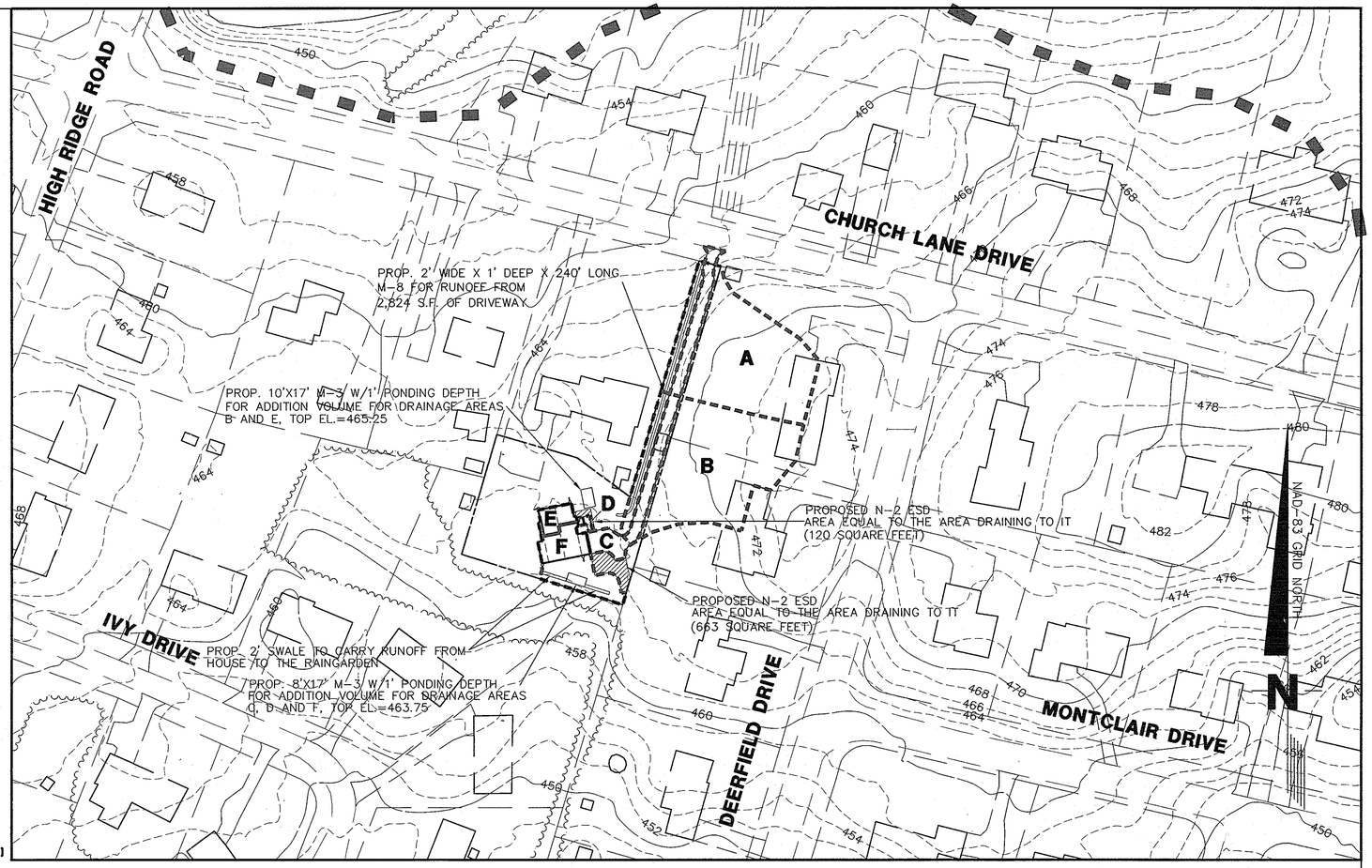
OPERATION AND MAINTENANCE SCHEDULE FOR LANDSCAPE INFILTRATION (M-3) AND SWALES (M-8)

A. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II, TABLE A.4.1 AND 2.

B. THE OWNER SHALL PERFORM A PLANT IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION, THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.

C. THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.

D. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.



PROPOSED DRAINAGE AREA
SCALE: 1"=60'

DRAINAGE AREA 'A'
DRAINAGE AREA = 0.275 AC.

DRAINAGE AREA 'B'
DRAINAGE AREA = 0.3118 AC.

DRAINAGE AREA 'C'
DRAINAGE AREA = 0.0152 AC.

DRAINAGE AREA 'D'
DRAINAGE AREA = 0.0024 AC.

DRAINAGE AREA 'E'
DRAINAGE AREA = 0.0144 AC.

DRAINAGE AREA 'F'
DRAINAGE AREA = 0.0262 AC.

AUGER PROBE SUMMARY

Auger Probe #	Depth	Description	Infiltration Rates* in/hr
B-1	0.0'-1.0'	Brown sandy silt USC: (SM) USDA: (Sandy Loam)	1.02
	1.0'-6.0'	Brown silty sand with trace of silt, stone and mineral stone USC: (SM) USDA: (Loamy Sand)	2.41
		No water encountered	

- Based on USDA Guide lines

Auger Probe #	Depth	Description	Infiltration Rates* in/hr
B-2	0.0'-4.5'	Brown sandy silt USC: (SM) USDA: (Sandy Loam)	1.02
	4.5'-10.0'	Brown silty sand with trace of silt, stone and mineral stone USC: (SM) USDA: (Loamy Sand)	2.41
		No water encountered	

- Based on USDA Guide lines

APPROVED : HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Division of Land Development — Date 11/14/12

Chief, Development Engineering Division — Date 11/16/12

Director — Date 11/16/12

This development plan is approved for soil erosion and sediment control by the HOWARD COUNTY SOIL CONSERVATION DISTRICT.

Howard SCD — Date 11/1/12

M.A.F. & ASSOCIATES, LLC
526 HOODS MILL ROAD
WOODBINE, MD 21797
PHONE: 410-552-5541
FAX: 410-552-5546
EMAIL: MFORGEN@AOL.COM

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONEL 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"

DEVELOPER: TREVILLIAN PROPERTIES, LLC.
WILLIAM C. TREVILLIAN — Date 10/24/12

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 conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District"

MICHAEL J. WERNER
MD REG #23380 — Date 10/24/12

STATE OF MARYLAND · MICHAEL JOSEPH WERNER · NO. 23380 · PROFESSIONAL ENGINEER

OWNER/DEVELOPER:
TREVILLIAN PROPERTIES, LLC
7865 QUARTERFIELD ROAD
SEVERN, MD. 21144
410-761-2430

ENVIRONMENTAL CONCEPT PLAN

PROJECT NUMBER:

KHAN PROPERTY
LOT 2
8305 CHURCH LANE DRIVE
ELLICOTT CITY MD 21043

TAX MAP 18 BLOCK 13 PARCEL 103 TAX ACCOUNT #: 2-392410 ZONING: R-20

DATE: MARCH 20, 2012

SECOND ASSESSMENT DISTRICT HOWARD COUNTY, MARYLAND

SHEET SDP-2 of SDP-2

SDP-12-065