

**SITE DATA**  
 LOCATION: TAX MAP 37, BLOCK 7  
 PARCEL: 230  
 DEED REFERENCE: L. 2181 / F. 172  
 6TH ELECTION DISTRICT  
 PRESENT ZONING: R-20  
 DRZ REFERENCES: 2181 / F. 172  
 GROSS AREA OF PROJECT: 1.50 AC.  
 LIMIT OF DISTURBANCE: 1.21 AC.  
 PROPOSED USE OF SITE: RESIDENTIAL (SFD)  
 NUMBER OF RESIDENTIAL LOTS PROPOSED: 3 LOTS  
 AREA OF PROPOSED RESIDENTIAL LOTS: 1.41 AC.  
 OPEN SPACE REQUIRED: 0.09 AC. (1.50 AC. x 6% = 0.09 AC. (3,920 SF))  
 OPEN SPACE PROVIDED: 0.00 AC. (FEE-IN-LIEU)  
 IMPERVIOUS AREA: 0.29 AC.  
 AREA OF STREAM/BUFFER: 0.00 AC.  
 AREA OF WETLANDS/BUFFER: 0.00 AC.  
 AREA OF STEEP SLOPES (15% OR GREATER): 0.00 AC.  
 AREA OF FLOODPLAIN: 0.00 AC.  
 NET PROJECT AREA: 1.50 AC.  
 AREA OF EXISTING FOREST COVER: 0.00 AC.  
 AREA OF ERODIBLE SOILS: 0.38 AC.  
 AREA OF RIGHT OF WAY DEDICATION: 0.09 AC.  
 AREA MANAGED BY ESDV (\*THIS PLAN): 1.21 AC.  
 \*IMPERVIOUS AREA: 0.29 AC.  
 \*GREEN AREA: 0.92 AC.

- GENERAL NOTES**
- THE PROJECT BOUNDARY SHOWN HEREON IS BASED ON A FIELD RUN BOUNDARY SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED AUGUST 2012.
  - THE TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD RUN TOPOGRAPHIC SURVEY WITH 2'-FOOT CONTOURS PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED AUGUST 2012.
  - THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
  - THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO START OF WORK.
  - ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST HOWARD COUNTY STANDARDS AND SPECIFICATIONS. ALL WORK AND MATERIALS SHALL COMPLY WITH O.S.H.A. STANDARDS.
  - ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
  - THE SUBJECT PROPERTY IS ZONED "R-20" IN ACCORDANCE WITH THE 10/06/13 COMPREHENSIVE ZONING PLAN.
  - THIS PLAN IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS (COUNCIL BILL 45-2003). DEVELOPMENT OR CONSTRUCTION ON THESE LOTS MUST COMPLY WITH SETBACK AND BUFFER REGULATIONS IN EFFECT AT THE TIME OF SUBMISSION OF THE SITE DEVELOPMENT PLAN, WAIVER PETITION APPLICATION OR BUILDING AND GRADING PERMITS.
  - TO THE BEST OF THE OWNER'S KNOWLEDGE, THERE ARE NO BURIAL GROUNDS, CEMETERIES, OR HISTORIC STRUCTURES LOCATED ON THE SUBJECT PROPERTY.
  - NO RARE, THREATENED, OR ENDANGERED SPECIES WERE OBSERVED ON THE PROPERTY.
  - THERE IS NO 100-YR FLOODPLAIN LOCATED WITHIN THE LIMITS OF THIS SITE.
  - THERE ARE NO STREAMS, OR STREAM BUFFERS LOCATED WITHIN THE LIMITS OF THIS SITE.
  - THERE ARE NO WETLAND BUFFERS LOCATED WITHIN THE LIMITS OF THIS SITE.
  - THERE ARE NO STEEP SLOPES LOCATED WITHIN THE LIMITS OF THIS SITE.
  - THIS PROPERTY IS NOT LOCATED IN A HISTORIC DISTRICT.
  - THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT.
  - OLD MONTGOMERY ROAD IS NOT A SCENIC ROAD.
  - SPECIMEN TREES 'A' (42" SILVER MAPLE) AND 'B' (32.5" SILVER MAPLE) ARE TO BE REMOVED DUE TO THEIR PROXIMITY TO THE EXISTING FOUNDATION (TO BE REMOVED) AND THE PROPOSED HOUSE. SPECIMEN TREE 'C' (32.5" BLACK CHERRY) WILL BE RETAINED.
  - A SIMPLIFIED FOREST STAND DELINEATION AND ENVIRONMENTAL RESOURCES ASSESSMENT WAS PERFORMED BY JOHN CANOLES OF ECO-SCIENCE PROFESSIONALS, INC., DATED SEPTEMBER 2013.
  - SHOULD ANY TREE DESIGNATED FOR PRESERVATION, FOR WHICH CREDIT IS GIVEN, DIE PRIOR TO RELEASE OF BONDS, THE OWNER WILL BE REQUIRED TO REPLACE THE TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE LANDSCAPE MANUAL.
  - THE FOREST CONSERVATION OBLIGATION WILL BE MET BY A FEE-IN-LIEU PAYMENT OF \$6,534.00 MADE OUT TO HOWARD COUNTY FOREST CONSERVATION FUND FOR THE 0.20 ACRE AFForestation REQUIREMENT FOR THIS PROJECT.
  - A FEE-IN-LIEU OF OPEN SPACE FOR THREE LOTS SHALL BE PROVIDED UNDER THE FINAL PLAN IN THE AMOUNT OF \$4,500.00.
  - A TOTAL OF 3 LOTS ARE PROPOSED UNDER THIS PLAN.
  - A NOTICE WALL IS NOT REQUIRED FOR THIS PROJECT.
  - THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NUMBERS 3513 AND 4100 WERE USED FOR THIS PROJECT.
  - EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, FIELD SURVEYS, PUBLIC WATER AND SEWER EXTENSION PLANS AND AVAILABLE RECORD DRAWINGS. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTOR'S INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
  - PUBLIC WATER AVAILABLE THROUGH CONTRACT NO. 44-1689 AND PUBLIC SEWER AVAILABLE THROUGH CONTRACT NO. 20-1264. WATER AND SEWER SERVICE WILL BE GRANTED UNDER THE PROVISIONS OF SECTION 18.122B OF THE HOWARD COUNTY CODE.
  - SEDIMENT AND EROSION CONTROL WILL BE PROVIDED FOR THIS SITE.
  - STORMWATER MANAGEMENT FOR THIS PROJECT IS BEING PROVIDED BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO BIO-RETENTION FACILITIES (M-6), ROOFTOP DISCONNECTS (N-1), AND NON-ROOFTOP DISCONNECTS (N-2) TO ACCOMMODATE THE TOTAL ESD VOLUME REQUIRED. SWM FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED. REFERENCE 2010 MDE STORMWATER DESIGN MANUAL (CHAPTER 5).
  - APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION AND/OR SITE DEVELOPMENT PLAN.
  - SITE DEVELOPMENT PLAN APPROVAL BY THE DEPARTMENT OF PLANNING AND ZONING IS REQUIRED PRIOR TO BUILDING PERMITS BEING ISSUED FOR THE CONSTRUCTION OF RESIDENTIAL DWELLINGS ON THESE LOTS.
  - THIS DEVELOPMENT IS DESIGNED TO BE IN ACCORDANCE WITH SECTION 16.127 RESIDENTIAL INFILL DEVELOPMENT OF SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. THE DEVELOPER OF THIS PROJECT SHALL CREATE COMPATIBILITY WITH THE EXISTING NEIGHBORHOOD THROUGH THE USE OF ENHANCED PERIMETER LANDSCAPING, BERMS, FENCES, SIMILAR HOUSING UNIT TYPES AND THE DIRECTIONAL ORIENTATION OF THE PROPOSED HOUSES.
  - REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION AND SITE PLAN STAGES. THEREFORE, THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED COMMENTS (INCLUDING THOSE THAT MAY ALTER OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES.

**ENVIRONMENTAL SITE DESIGN NARRATIVE**

- THE PROPERTY DOES NOT CONTAIN ANY FOREST, WETLANDS, STREAMS OR 100 YEAR FLOODPLAIN. THERE ARE NO ENVIRONMENTAL FEATURES IMPACTED AND THE CONCEPT PLAN PROVIDES FOR THE SAFE DISCHARGE OF THE TREATED RUNOFF.
- THE SITE DRAINAGE IS SPLIT IN TWO DIRECTIONS WITH THE MAJORITY SLOPING TO THE NORTH AND APPROXIMATELY ONE THIRD SLOPING TOWARD OLD MONTGOMERY ROAD. THE PROPOSED DEVELOPMENT WILL HAVE NO CHANGE IN THE EXISTING CHARACTER OF THE EXISTING NATURAL FLOW PATTERNS.
- THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT TO THE MAXIMUM EXTENT PRACTICABLE (MEP). THE ESD CONCEPT PROPOSES THE USE OF MICRO BIO-RETENTION FACILITIES (M-6), AND ROOFTOP DISCONNECTS (N-1). THE PROPOSED ESD PRACTICES SHALL BE PRIVATELY OWNED AND MAINTAINED.
- SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE OF PERIMETER CONTROLS (SILT FENCE, SUPER SILT FENCE & EARTH DIKES) AND INLET PROTECTION. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH THE CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT.
- AS STATED IN #3 ABOVE, STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF MICRO BIO-RETENTION FACILITIES (M-6), AND ROOFTOP DISCONNECTS (N-1).
- NO WAIVERS ARE ANTICIPATED TO FULFILL THIS CONCEPT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Chief, Development Engineering Division  
 Chief, Division of Land Development

SHEET INDEX		
DESCRIPTION	SHEET NO.	
LAYOUT PLAN	1 OF 3	
GRADING, SEDIMENT, AND EROSION CONTROL PLAN AND SOILS MAP	2 OF 3	
SWM DRAINAGE AREA MAP, SWM NOTES AND DETAILS	3 OF 3	

# ENVIRONMENTAL CONCEPT PLAN

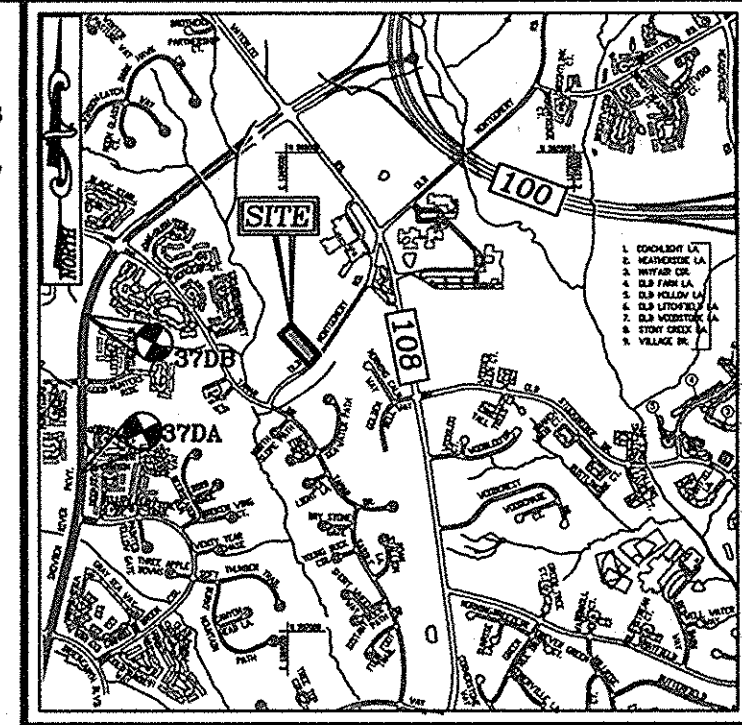
## BRIAN SMITH PROPERTY

8302 OLD MONTGOMERY ROAD  
 COLUMBIA, MD 21045  
 L. 2181 / F. 172

**BENCHMARKS**  
 HOWARD COUNTY BENCHMARK 37DA  
 N 558667.5329 E 1366857.4659 ELEV. 379.708  
 HOWARD COUNTY BENCHMARK 37DB  
 N 560307.4266 E 1366898.1604 ELEV. 395.417

MINIMUM LOT SIZE CHART				
LOT	GROSS AREA	PIPESTEM AREA	NET AREA	MIN. LOT SIZE
1	18,000 SF*	NA	18,000 SF*	20,000 SF
2	19,927 SF**	1,765 SF	18,162 SF**	20,000 SF
3	23,333 SF	3,333 SF	20,000 SF	20,000 SF

- \* USE 2,000 SQUARE FEET FROM RIGHT-OF-WAY DEDICATION TO MAKE 20,000 SQUARE FEET MINIMUM LOT SIZE PER SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, SECTION 16.120(b)(2)(ii)
- \*\* USE 1,838 SQUARE FEET FROM RIGHT-OF-WAY DEDICATION TO MAKE 20,000 SQUARE FEET MINIMUM LOT SIZE PER SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, SECTION 16.120(b)(2)(ii)



**VICINITY MAP**  
 SCALE: 1"=2000'  
 ADC MAP COORDINATE: 4936/C8

**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING CURB AND GUTTER
	EXISTING EDGE OF PAVING
	PROP. 30' FRONT USE-IN-COMMON ACCESS & UTILITY EASEMENT FOR THE BENEFIT OF LOTS 1-3
	EXISTING UTILITY POLE
	EXISTING SIGN
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY LINE
	EXISTING CLEANOUT
	EXISTING FIRE HYDRANT
	EXISTING WATER LINE
	EXISTING TREE LINE
	EXISTING TREES
	EXISTING FENCE
	PROPOSED TREE LINE
	MICRO-BIORETENTION (M-6)

**SPECIMEN TREE CHART**

NO.	SIZE (DBH) (FEET RADII)	CRZ	COMMON NAME	CONDITION	COMMENTS
ST-A	42"	63'	SILVER MAPLE	GOOD	TO BE REMOVED
ST-B	32.5"	48.75'	SILVER MAPLE	FAIR, CROWN DIEBACK NOTED	TO BE REMOVED
ST-C	32.5"	48.75'	BLACK CHERRY	POOR, SIGNIFICANT CROWN DIEBACK	TO REMAIN

**OWNER/DEVELOPER**

BRIAN E. SMITH  
 SHARON R. SMITH  
 8302 OLD MONTGOMERY RD.  
 COLUMBIA, MD 21045  
 443-864-8141

NO.	REVISION	DATE

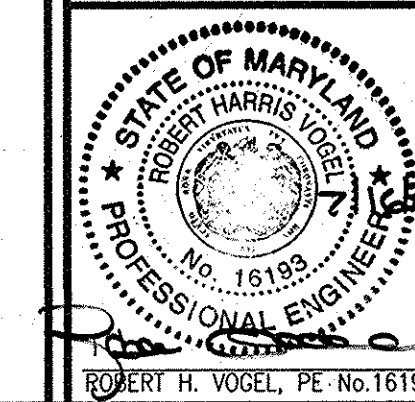
**ENVIRONMENTAL CONCEPT PLAN**

**LAYOUT PLAN**

**BRIAN SMITH PROPERTY**  
 8302 OLD MONTGOMERY ROAD  
 COLUMBIA, MD 21045  
 L. 2181 / F. 172

PARCEL: 230  
 TAX MAP: 37 GRID: 07  
 6TH ELECTION DISTRICT

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 8407 MAIN STREET  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961



**PROFESSIONAL CERTIFICATE**  
 DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: APRIL 2014  
 SCALE: AS SHOWN  
 W.O. NO.: 13-24

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE 09-27-2014.

1 OF 3

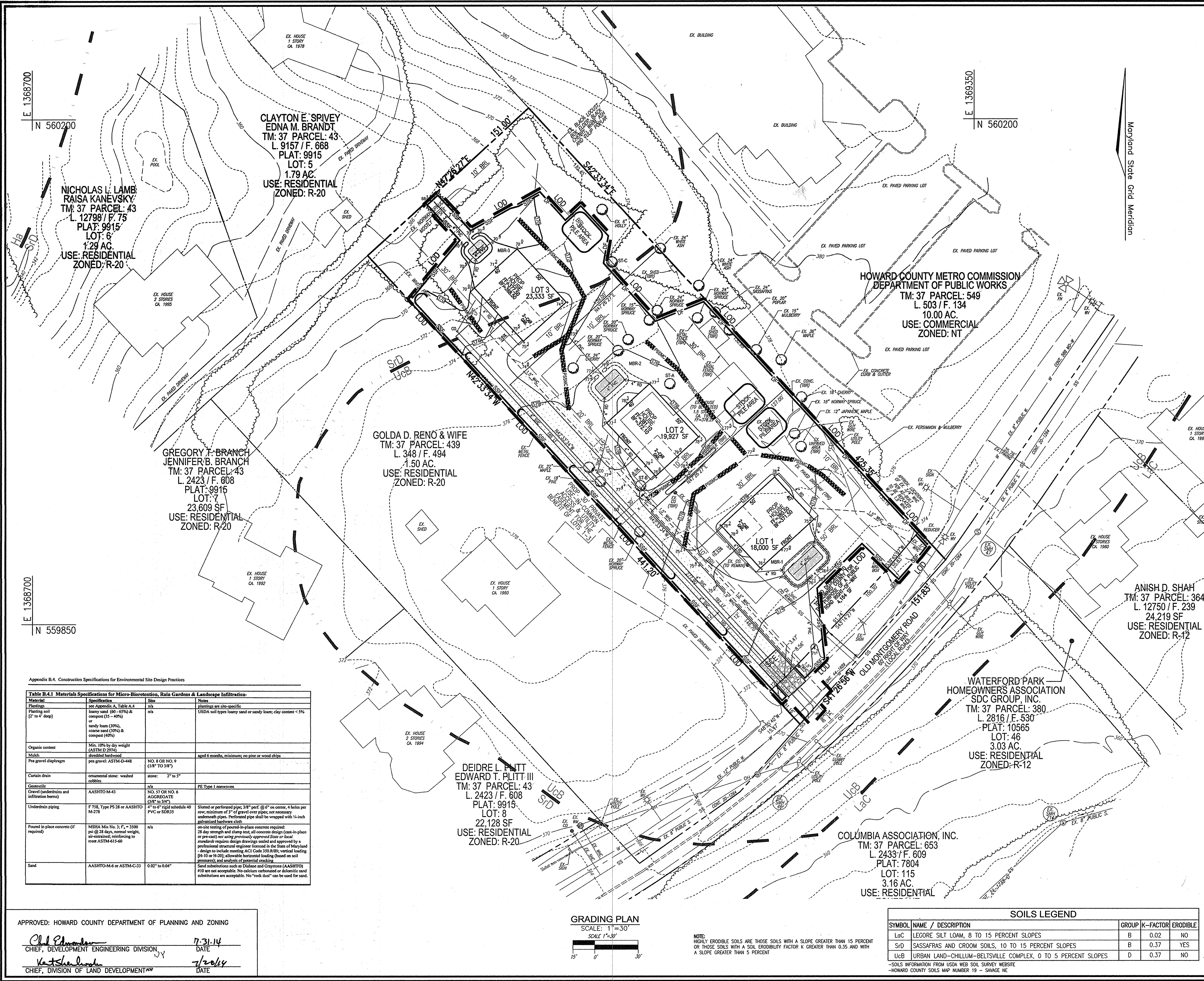
**COLUMBIA ASSOCIATION, INC.**  
 TM: 37 PARCEL: 653  
 L. 2433 / F. 609  
 PLAT: 7804  
 LOT: 115  
 3.16 AC.  
 USE: RESIDENTIAL  
 ZONED: NT

**WATERFORD PARK HOMEOWNERS ASSOCIATION**  
 SDC GROUP, INC.  
 TM: 37 PARCEL: 380  
 L. 2816 / F. 530  
 PLAT: 10565  
 LOT: 46  
 3.03 AC.  
 USE: RESIDENTIAL  
 ZONED: R-12

**GOLDA D. RENO & WIFE**  
 TM: 37 PARCEL: 439  
 L. 348 / F. 494  
 1.50 AC.  
 USE: RESIDENTIAL  
 ZONED: R-20

**DEIDRE L. PLITT**  
**EDWARD T. PLITT III**  
 TM: 37 PARCEL: 43  
 L. 2423 / F. 608  
 PLAT: 9915  
 LOT: 8  
 22,128 SF  
 USE: RESIDENTIAL  
 ZONED: R-20

**LAYOUT PLAN**  
 SCALE: 1"=30'  
 SCALE 1"=30'



**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING CURB AND GUTTER
	EXISTING EDGE OF PAVING
	PROP. 30' PRIVATE USE-IN-COMMON ACCESS UTILITY EASEMENT FOR THE BENEFIT OF LOTS 1-3
	EXISTING UTILITY POLE
	EXISTING SIGN
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY LINE
	EXISTING CLEANOUT
	EXISTING FIRE HYDRANT
	EXISTING WATER LINE
	EXISTING TREE LINE
	EXISTING TREES
	EXISTING FENCE
	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	SOILS
	PROPOSED TREE LINE
	PROPOSED 10' CONTOUR
	PROPOSED 2' CONTOUR
	PROPOSED SPOT ELEVATION
	PROPOSED DIVERSION FENCE
	PROPOSED SILT FENCE
	PROPOSED LIMIT OF DISTURBANCE
	PROPOSED EROSION CONTROL, MATTING
	PROPOSED STABILIZED CONSTRUCTION ENTRANCE
	MICRO-BIORETENTION (M-6)

NOTE: STOCKPILING WILL BE PERMITTED ON EACH LOT ONLY.

**OWNER/DEVELOPER**  
 BRIAN E. SMITH  
 SHARON R. SMITH  
 8302 OLD MONTGOMERY RD.  
 COLUMBIA, MD 21045  
 443-864-8141

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN  
 GRADING, SEDIMENT, AND EROSION CONTROL  
 PLAN AND SOILS MAP**  
**BRIAN SMITH PROPERTY**  
 8302 OLD MONTGOMERY ROAD  
 COLUMBIA, MD 21045  
 L. 2181 / F. 172

PARCEL: 230  
 TAX MAP: 37 GRID: 07  
 6TH ELECTION DISTRICT

ZONED: R-20  
 USE: RESIDENTIAL  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL  
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 8407 MAIN STREET  
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 TEL: 410.461.7666  
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DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: APRIL 2014  
 SCALE: AS SHOWN  
 W.O. NO.: 13-24

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2014

2 SHEET OF 3

Appendix B.4. Construction Specifications for Environmental Site Design Practices

**Table B.4.1 Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration:**

Material	Specification	Site	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2" to 4" deep]	loamy sand (60-65%) & compost (35-40%) or sandy loam (30%) & compost (70%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)	n/a	aged 6 months, minimum; no pine or wood chips
Mulch	shredded hardwood	n/a	aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	n/a
Curtain drain	ornamental stone: washed cobble	stone: 2" to 5"	n/a
Geotextile	n/a	n/a	PE Type 1 nonwoven
Gravel (condensates and infiltration berm)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	n/a
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe, 3/8" perf. @ 6" on center, 4 holes per row; minimum of 2" of gravel over pipe; use necessary underdrain pipes. Perforated pipe shall be wrapped with 1/4 inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3, F <sub>c</sub> = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or precast) not using previously approved design or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 318.1R-09; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil strength) and analysis of potential tipping. Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbide or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
Sand	AASHTO-M-6 or ASTM-C-33	0.075 to 0.04"	n/a

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Chad Edmister*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 7-31-14

*Katherine...*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 7/20/14

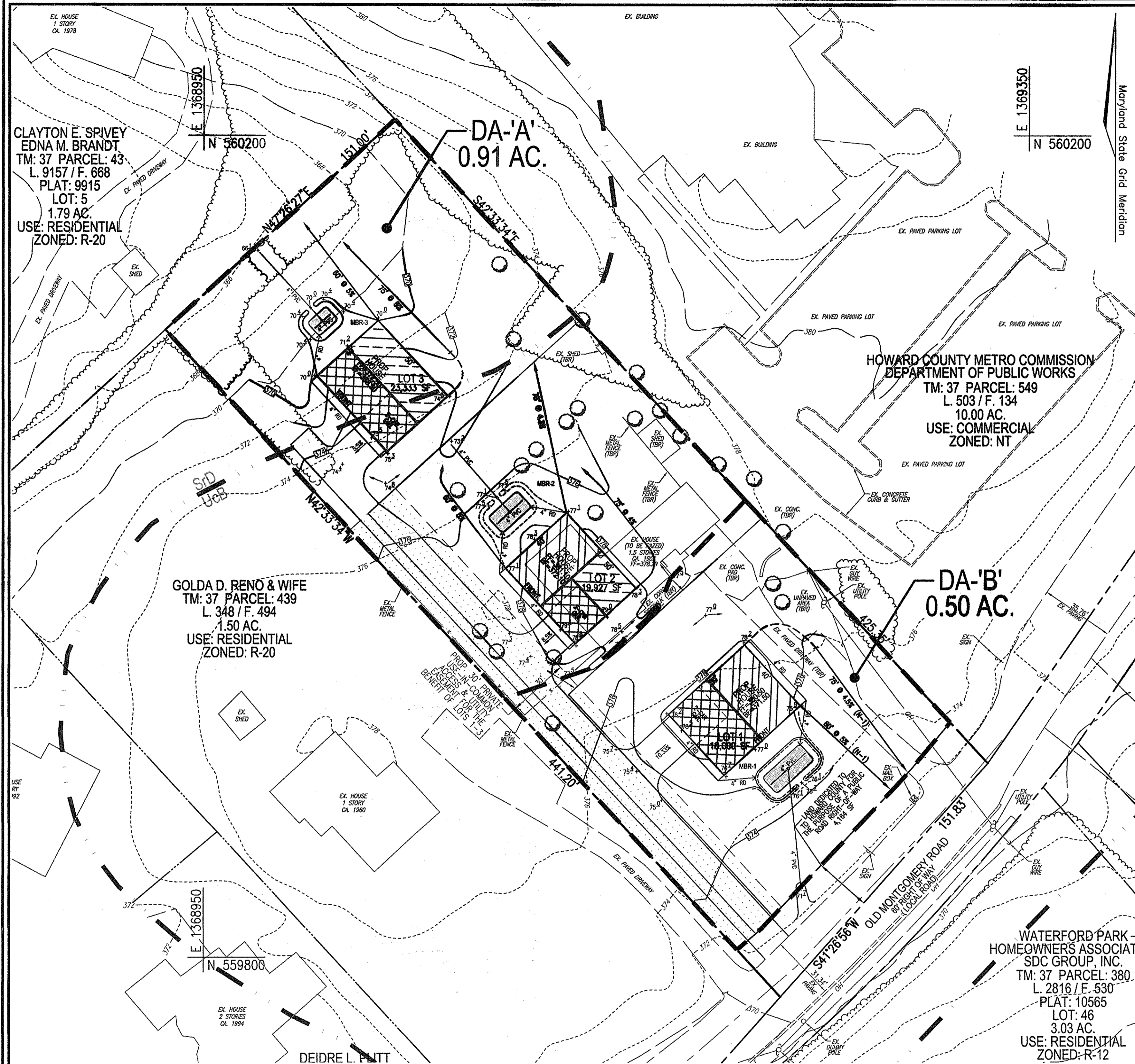
**GRADING PLAN**  
 SCALE: 1" = 30'  
 SCALE: 1" = 30'

NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
LcC	LEGORE SILT LOAM, 8 TO 15 PERCENT SLOPES	B	0.02	NO
SrD	SASSAFRAS AND CROOM SOILS, 10 TO 15 PERCENT SLOPES	B	0.37	YES
UcB	URBAN LAND-CHILLUM-BELTSVILLE COMPLEX, 0 TO 5 PERCENT SLOPES	D	0.37	NO

-SOILS INFORMATION FROM USDA WEB SOIL SURVEY WEBSITE  
 -HOWARD COUNTY SOILS MAP NUMBER 19 - SAVAGE NE



SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR
LcC	LEGORE SILT LOAM, 8 TO 15 PERCENT SLOPES	B	0.02
SrD	SASSAFRAS AND CROOM SOILS, 10 TO 15 PERCENT SLOPES	B	0.37
UCB	URBAN LAND-CHILLUM-BELTSVILLE COMPLEX, 0 TO 5 PERCENT SLOPES	D	0.37

NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL EROSION FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Paul Canda*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 7-31-14

*W. K. ...*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 7/24/14

**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING CURB AND GUTTER
- EXISTING EDGE OF PAVING
- PROPOSED 30' PRIVATE USE-IN-COMMON ACCESS & UTILITY EASEMENT FOR THE BENEFIT OF LOTS 1-3
- EXISTING UTILITY POLE
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TREELINE
- EXISTING TREES
- EXISTING FENCE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED TREELINE
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED SPOT ELEVATION
- DRAINAGE AREA DIVIDE
- ROOFTOP DISCONNECT (N-1)
- MICRO-BIORETENTION (M-6)
- AREA OF ROOFTOP TO ROOFTOP DISCONNECT (N-1)
- AREA OF ROOFTOP TO MICRO-BIORETENTION (M-6)
- AREA OF ROOFTOP TO ROOFTOP DISCONNECT (N-1) & MICRO-BIORETENTION (M-6)

**N-1. DISCONNECTION OF ROOFTOP RUNOFF**

**CONSTRUCTION CRITERIA:**

THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING THE CONSTRUCTION OF PROJECTS WITH PLANNED ROOFTOP DISCONNECTIONS:

- EROSION AND SEDIMENT CONTROL: EROSION AND SEDIMENT CONTROL PRACTICES (E.G., SEDIMENT TRAPS) SHALL NOT BE LOCATED IN VEGETATED AREAS RECEIVING DISCONNECTED RUNOFF
- SITE DISTURBANCE: CONSTRUCTION VEHICLES AND EQUIPMENT SHOULD AVOID AREAS RECEIVING DISCONNECTED RUNOFF TO MINIMIZE DISTURBANCE AND COMPACTION. SHOULD AREAS RECEIVING DISCONNECTED RUNOFF BECOME COMPACTED, SCARPING THE SURFACE OR ROTOTILLING THE SOIL TO A DEPTH OF FOUR TO SIX INCHES SHALL BE PERFORMED TO ENSURE PERMEABILITY. ADDITIONALLY, AMENDMENTS MAY BE NEEDED FOR TIGHT, CLAYEY SOILS.

**INSPECTION:**

A FINAL INSPECTION SHALL BE CONDUCTED BEFORE USE AND OCCUPANCY APPROVAL TO ENSURE THAT SIZING FOR TREATMENT AREAS HAVE BEEN MET AND PERMANENT STABILIZATION HAS BEEN ESTABLISHED.

**MAINTENANCE CRITERIA:**

MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION (E.G., BY PLANTING TREES OR SHRUBS ALONG THE PERIMETER). IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

**DETAIL - MICROBIORETENTION/RAIN GARDEN (M-7)**

NOT TO SCALE

- NOTES**
- THE SIDES OF THE MBR'S ARE TO BE WRAPPED IN FILTER FABRIC. FILTER FABRIC SHALL NOT BE INSTALLED BETWEEN THE MBR LAYERS OR AT THE BOTTOM OF THE MICRO-BIORETENTION AS IT WILL CAUSE THE MBR TO FAIL.
  - THE PERFORATED UNDERDRAIN PIPE OF THE MBR SHOULD BE WRAPPED WITH 1/4" MESH (4x4) OR SMALLER GALVANIZED HARDWARE CLOTH.

SWMPRACTICE CHART	
ESD PRACTICES BY LOT	
LOT #	ESD PRACTICE
#1	DISCONNECT ROOFTOP RUNOFF (N-1), AND MICRO BIO-RETENTION (M-6)
#2	DISCONNECT ROOFTOP RUNOFF (N-1), AND MICRO BIO-RETENTION (M-6)
#3	DISCONNECT ROOFTOP RUNOFF (N-1), AND MICRO BIO-RETENTION (M-6)

**APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS**

**1. MATERIAL SPECIFICATIONS**

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

**2. FILTERING MEDIA OR PLANTING SOIL**

THE SOIL SHALL BE A UNIFORM MIXTURE OF STONES, STAMPS, OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERBERIS GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.06.02.02.

THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

- SOIL COMPOSITION - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURE CLASSIFICATION)
- ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COARSE SAND (35%-40%) OR SANDY LOAM (50%), COARSE SAND (30%), AND COMPOST (40%).
- CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
- PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.

THESE SHALL BE AT LEAST ONE SOIL TEST PER PRACTICE. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH AND ADDITIONAL TESTS OF ORGANIC MATTER AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION INSIDE THE PRACTICE AND DOCUMENTED.

**3. COMPACTION**

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION WHEELS TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR WASH TRUCK EQUIPMENT, OR LEAVE EQUIPMENT WITH TIRES OFF. USE OF EQUIPMENT WITH WASH TRUCKS OR WASH TRUCKS, RUBBER TIRES WITH LARGE LOGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO RESTRUCTURE THE SOIL PROFILE THROUGHOUT THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT. ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP-AND-FLOODED WATER BEFORE PREPARING (ROTOTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL IN 1 INCH COSES.

WHEN BACKFILLING THE BIORETENTION FACILITY PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION FACILITY. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE DESIGN TO STRIP SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH WASH TRUCKS.

**4. PLANT MATERIAL**

RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

**5. PLANT INSTALLATION**

COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL KEPT TO 12 MONTHS FOR ACCEPTANCE.

ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/2" FROM THE BALL IS ABOVE FINAL GROUND. THE GROWER OF THE PLANTING MATERIAL SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL SET AND MAINTAIN THE PLANT STRAIGHT DURING THE OTHER PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLANTS SHALL BE PLANTED FOLLOWING THE NON-GROSS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFATS, OR AT A MINIMUM, WEXES THE GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

**6. UNDERDRAINS**

UNDERDRAINS MUST MEET THE FOLLOWING CRITERIA:

- PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F756, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G. PVC OF HOPE).
- PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/16" DIAMETER LOCATED 4" ON CENTER WITH A MINIMUM OF FOUR HOLES PER FOOT. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 6) GALVANIZED HARDWARE CLOTH.
- GRAVEL - THE GRAVEL LAYER AND 57 STONE PERFORATION SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.
- THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.
- A 12" HIGH-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE UNDERDRAIN.
- A 4" LAYER OF PEA GRAVEL (1/8" TO 3/16" STONES) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT Migration OF FINES IN TO THE UNDERDRAIN. THIS LAYER OF GRAVEL SHALL BE CONSIDERED PART OF THE FILTER MEDIA WORK BED THICKNESS.
- THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1,000 SQUARE FEET OF SURFACE AREA).

**7. MISCELLANEOUS**

THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

**OPERATION AND MAINTENANCE SCHEDULE FOR LANDSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIOTENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)**

- 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 PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 2.
- 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 PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.
- 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.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

MICRO-BIORETENTION (M-6) ELEVATIONS										
LOT #	FACILITY #	1	2	3	4	5	6	7	4" INV. OUTFALL	
LOT 1	MBR-1	376.10	375.70	374.70	374.45	372.95	372.62	371.79	372.04	371.70
LOT 2	MBR-2	377.50	377.10	376.10	375.85	374.35	374.02	373.19	373.44	373.20
LOT 3	MBR-3	370.40	370.00	369.00	368.75	367.25	366.92	366.09	366.34	366.10

**OWNER/DEVELOPER**

BRIAN E. SMITH  
 SHARON R. SMITH  
 8302 OLD MONTGOMERY RD.  
 COLUMBIA, MD 21045  
 443-864-8141

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN**  
**SWMP DRAINAGE AREA MAP**  
**SWMP NOTES AND DETAILS**  
**BRIAN SMITH PROPERTY**  
 8302 OLD MONTGOMERY ROAD  
 COLUMBIA, MD 21045  
 L. 2181 / F. 172

PARCEL: 230  
 TAX MAP: 37 GRID: 07  
 6TH ELECTION DISTRICT

ZONED: R-20  
 USE: RESIDENTIAL  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
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DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: APRIL 2014  
 SCALE: AS SHOWN  
 W.O. NO.: 13-24

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. MY LICENSE NO. IS 16193. EXPIRATION DATE: 09-27-2014.

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