

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS The process of preparing the soils to sustain adequate vegetative stabilization.

To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies: Where vegetative stabilization is to be established

A. Soil Preparation

STANDARD SYMBOL

₹

EARTH DIKE

DATE

Temporary Stabilization a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope. b. Apply fertilizer and lime as prescribed on the plans.

Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means. a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:

i. Soil pH between 6.0 and 7.0. ii. Soluble salts less than 500 parts per million (ppm). iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay)

would be acceptable. iv. Soil contains 1.5 percent minimum organic matter by weight.v. Soil contains sufficient pore space to permit adequate root penetration. b. Application of amendments or topsoil is required if on-site soils do not meet the above conditions. c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches. B.13 d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test. e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of

soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas. Topsoiling
Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation. 2. Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA—NRCS. Topsoiling is limited to areas having 2:1 or flatter slopes where:

a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth. b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients. c. The original soil to be vegetated contains material toxic to plant growt d. The soil is so acidic that treatment with limestone is not feasible. . Areas having slopes steeper than 2:1 require special consideration and design. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria: Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand.

Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified. c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

a. Erosion and sediment control practices must be maintained when applying topsoil. b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets. c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the

subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading B.14 and seedbed preparation. C. Soil Amendments (Fertilizer and Lime Specifications) . Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a

recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses. 2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer. 3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve. 4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by

lisking or other suitable means. 5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

Hardiness Zone (from Figure B.3): ___6b__

Seed Mixture (from Table B.1): ____

TEMPORARY STABILIZATION SPECIFICATIONS TABLE

Fertilizer Rate

Lime Rate

No.	Species	Application	Rate (lb/ac)	Seeding Dates	Seeding Depths	Depths (10-			ine Rute
	ANNUAL RYEGRASS	40		MAR. 1 - MAY 15 AUG. 1 - OCT. 15	0.5 INCHES	436 lb	/ac	2 tons/ac	
	FOXTAIL MILLET	30		JUNE 1 - JULY 31	0.5 INCHES		10 lb/1000 sf) (90 lb/1000		
		7	PERMANENT S (from Figure B.3): m Table B.3):	PECIFICATIONS TA	ABLE Fertilizer Rate (10-20-20)			Lime Rate	
No.	Species	Application Rate (lb/ac)	₃ Seeding Dates	Seeding Depth	s N	P205	K20	0	
	kentucky bluegrass	20	Mar. 1-May 15 Aug. 1-Oct.15	1/4-1/2 in	45 pounds per acre	90 lb/ac	90 lb/a		2 tons/ac
				1/4-1/2 in	(1.0 lb/	(2lb/1000 sf)	16/1000	0 sf)	(90 lb/ 1000 sf)

1/4-1/2 in

1000 sf)

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. 18417, EXPIRATION

Thomas

THOMPSON."

DUST CONTROL DUST CONTROL METHOD FOR THIS SITE TO PREVENT BLOWING AND MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES: CALCIUM CHLORIDE SHALL BE APPLIED TO EXPOSED SURFACES AT A RATE THAT WILL KEEP SURFACE MOIST UNTIL SOIL IS STABILIZED ACCORDING TO VEGETATIVE SPECS. FOR THIS SITE AND AREAS TO BE PAVED ARE COMPLETED.

STANDARD STABILIZATION NOTE FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN: A. THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER

DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND B. SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

DATE: 9/18/17/

Lower

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

The application of seed and mulch to establish vegetative cover.

To protect disturbed soils from erosion during and at the end of construction.

Conditions Where Practice Applies:

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading. A. Seeding

1. Specifications

a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject

to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 reaarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate. b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws. c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Températures above 75 to 80 degrees Fahrenheit can

weaken bacteria and make the inoculant less effective. d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

a. Dry Seeding: This includes use of conventional drop or broadcast spreaders. i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries. ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact, B.16 b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil. . Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.

ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer). i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P2 05 (phosphorous), 200 pounds per acre; K2 0 (potassium), 200 pounds per acre. ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseedina). Normally, not more than 2 tons are applied by hydroseeding at any one

time. Do not use burnt or hydrated lime when hydroseeding. iii. Mix seed and fertilizer on site and seed immediately and without interruption. v. When hydroseeding do not incorporate seed into the soil.

1. Mulch Materials (in order of preference) a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. Note: Use only sterile straw mulch in areas where one species of grass is desired. b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose

processed into a uniform fibrous physical state. i. WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry. ii. WCFM, including dye, must contain no germination or growth inhibiting factors. iii. WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings. iv. WCFM material must not contain elements or compounds at concentration levels that will

v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum. B.17 2. Application a. Apply mulch to all seeded areas immediately after seeding.

b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre. c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard: i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land,

this practice should follow the contour. ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water. iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited. iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long

B-4-8 STANDARDS AND SPECIFICATIONS STOCKPILE AREA

A mound or pile of soil protected by appropriately designed erosion and sediment control

To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Conditions Where Practice Applies Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan. 2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be

provided in accordance with Section B-3 Land Grading. Runoff from the stockpile area must drain to a suitable sediment control practice. . Access the stockpile area from the upgrade side. 5. Clear water runoff into the stockpile area must be minimized by use of a diversion

device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner. 6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.

7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement

as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary 8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B—4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section

HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES

1) A pre-construction meeting must occur with the Howard County Department of Public Works, Construction Inspection Division (CID), 410-313-1855 after the future LOD and protected area marked clearly in the field. A minimum of 48 hour notice to CID must be given a the following stages:

a. Prior to the start of earth disturbance, b. Upon completion of the installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading, c. Prior to the start of another phase of construction or opening of another grading unit, d. Prior to the removal or modification of sediment control practices

Other building or grading inspection approvals may not be authorized until this initial approval by inspection agency is made. Other related state and federal permits shall be referenced. to ensure coordination and to avoid conflicts with this plan.

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 2011 "MARYLAND STANDARDS AND SPECIFICATIONS FOR THE SOIL EROSION AND SEDIMENT CONTROL", and revisions thereto. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization is

required within three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and seven (7) calendar days as to all other disturbed areas on the project site except for those areas under active grading.

4) All disturbed areas must be stabilized within the time period specified above in accordance with the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR TOPSOIL (Sec. B-4-2), permanent seeding (Sec. B-4-5), temporary seeding (Sec.

ft. must be benched with stable outlet. All concentrated flow, steep slope, and highly erodible areas shall receive soil stabilization matting (Sec. B-4-6). 5) All sediment control structures are to remain in place and are to be maintained in operative

B-4-4) and mulching (Sec. B-4-3). Temporary stabilization (Sec. B-4-8) in excess of 20

condition until permission for their removal has been obtained from the CID. Site Analysis: Total Area of Site Area Disturbed 1.01 Acres 0.16 Acres. Area to be roofed or paved Area to be vegetatively stabilized 0.85 Acres. Total Cut

Total Fill

Offsite waste/borrow area location Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance. 8) Additional sediment control must be provided, if deemed necessary by the CID. The site and all controls shall be inspected by the contractor weekly; and the next day after each rain event. A written report by the contractor, made available upon request, is part of every inspection and should include:

 Inspection date * Inspection type (routine, pre-storm event, during rain event)

* Name and title of inspector Weather information (current conditions as well as time and amount of last recorded

* Evidence of sediment discharges * Identification of plan deficiencies Identification of sediment controls that require maintenance * Identification of missing or improperly installed sediment controls

* Compliance status regarding the sequence of construction and stabilization requirements * Photographs * Monitoring/sampling * Maintenance and/or corrective action performed

* Other inspection items as required by the General Permit for Stormwater Associated with

* Brief description of project's status (e.g. percent complete) and/or current activities

Construction Activities (NPDES, MDE). 9) Trenches for the construction of utilities is limited to three pipe lengths or that which can and shall be back-filled and stabilized by the end of each workday, whichever is shorter. 10) Any major changes or revisions to the plan or sequence of construction must be reviewed and approved by the HSCD prior to proceeding with construction. Minor revisions may allowed by

the CID per the list of HSCD—approved field changes. 1) Disturbance shall not occur outside the L.O.D. A project is to be sequenced so that grading activities begin on one grading unit (maximum acreage of 20 ac. per grading unit at a time. Work may proceed to a subsequent grading unit when at least 50 percent of the disturbed area in the preceding grading unit has been stabilized and approved by the CID. Unless otherwise specified and approved by the CID, no more than 30 acres cumulatively may be disturbed at a given time.

12) Wash water from any equipment, vehicles, wheels, pavement, and other sources must b treated in a sediment basin or other approved washout structure. 13) Top soil shall be stockpiled and preserved on-site for redistribution onto final grade.

14) All Silt Fence and Super Silt Fence shall be placed on—the—contour, and be imbricated at 25' minimum interval, with lower ends curled uphill by 2' in elevation. 15) Stream channels must not be disturbed during the following restricted time periods (inclusive): * Use I and IP March 1 - June 15 * Use III and IIIP October 1 -April 30

* Use IV March 1 - May 31

16) A copy of this plan, the 2011 MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL, and associated permits shall be on-site and available when the site is active.

SEQUENCE OF CONSTRUCTION

1. OBTAIN ALL REQUIRED GRADING, MDE PERMITS, APPROVALS AND LICENSES FROM APPROPRIATE AGENCIES.

2. NOTIFY SEDIMENT CONTROL INSPECTOR AT LEAST THREE (3) WORKING DAYS PRIOR TO STARTING WORK.

3. INSTALL STABILIZED CONSTRUCTION ENTRANCE, SILT FENCE AND OTHER SEDIMENT CONTROL DEVICES AS SHOWN IN THE SEDIMENT \CONTROL PLAN.

4. STABILIZE ALL THE GRADED AREAS UP TO 20' OUTSIDE OF THE LIMIT OF GRADING AS PER PERMANENT SEEDING NOTES.

5. EXCAVATE HOUSE FOUNDATION, CONSTRUCT HOUSE AND INSTALL UTILITIES, 6. ANY AREAS THAT CAN BE TEMPORARILY SEEDED DURING CONSTRUCTION

MUST BE TEMPORARILY STABILIZED PER SEEDING NOTES. 7. INSTALL PRIVATE BIORETENTION FACILITIES AND DRIVEWAYS.

8. STABILIZE DISTURBED AREAS PER PERMANENT SEEDING NOTES. 9. UPON APPROVAL OF SEDIMENT CONTROL INSPECTOR; REMOVE ALL TEMPORARY SEDIMENT CONTROL DEVICES FOR HOUSE CONSTRUCTION.

10. NOTIFY INSPECTOR FOR FINAL INSPECTION.

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN OF DEVELOPMENT FOR SEDIMENT AND EROSION CONTROL, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT."

DEVELOPER TIMOTHY BUKAN DATE

ENGINEER'S CERTIFICATE:

DEVELOPER'S CERTIFICATE:

I HEREBY 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 AND THE 2011 MARYLAND STANDARDS & SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND

CONSERVATION DISTRICT

GENERIC BOX

SITE DEVELOPMENT PLAN SEDIMENT AND EROSION CONTROL, NOTES AND DETAILS **GUILFORD LANDING**

LOTS 1 - 3 HOWARD COUNTY PLAT No. 23444-23445 10072, 10074 AND 10076 GUILFORD ROAD 6TH ELECTION DISTRICT - HOWARD COUNTY, MARYLAND T.M. 47, GRID 6, P/O PARCEL 604 ZONING: R-12 SINGLE FAMILY HOMES DATE: FEBRUARY 2016

RELATED DPZ FILES WP-10-174, W\$S 24-261 1-D WP-11-123, WP-12-113, WP-15-026 \$ F-09-064 → VANMAR ASSOCIATES, INC.

Engineers Surveyors Planners 310 South Main Street Mount Airy, Maryland 21771. (301) 829-2890 (301) 831-5015 (410) 549-2751 Fax (301) 831-5603 @Copyright, Latest Date Shown

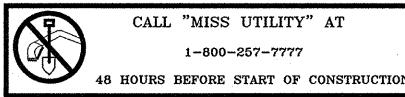
SHEET NO. 2 OF 3

4/7/2016

CINNABAR DRIVE, LLC

5300 DORSEY HALL DR. #107 ELLICOTT CITY, MD 21042 443-367-0422

OWNER / DEVELOPER:



DATE | REVISIONS

THE ALLOWABLE MATERIALS TO BE USED IN BIORENTENTION AREA ARE DETAILED IN TABLE B.4.1 2. PLANTING SOIL

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE BIORETENTION AREA THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

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

5.2 - 7.0 ORGANIC MATTER 15 - 4% (BY WEIGHT)

MAGNESIUM 35 LB/OC PHOSPHORUS (PHOSPHATE - P205) 75 LB/OC POTASSIUM (POTASH-K20) 85 LB/OC

SOLUBLE SOILS NOT TO EXCEED 500 PPM

ALL BIORENTENTION AREAS SHALL HAVE A MINIMUM OF ONE TEST. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, PHOSPHORUS, POTASSIUM AND ADDITIONAL TESTS OF ORGANIC MATTER AND SOLUBLE SOILS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED. SINCE DIFFERENT LABS CALIBRATE THEIR TESTING EQUIPMENT DIFFERENTLY, ALL TESTING RESULTS SHALL COME FROM

SHOULD THE PH FALL OUT OF THE ACCEPTABLE RANGE, IT MAY BE MODIFIED (HIGHER) WITH LIME OR (LOWER) WITH IRON SULFATE PLUS SULFUR.

3. COMPACTION:

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF BIORETENTION RUBBER TIRES WITH LARGE LUGS, OR HIGH PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES, IT 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 A CHISEL PLOW RIPPER OR SUBSOILER. THESE TILLING OPERATIONS AREA TO REFRACTURE THE SOIL PROFILE THROUGH 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 FOR HEAVY EQUIPMENT. ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL

SAND LAYER, PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL TO FINAL GRADE. WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN, HEAVY EQUIPMENT CAN BE USED AROUNG THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

4. PLANT MATERIAL: RECOMMENDED PLANT MATERIAL FOR BIORETENTION AREAS CAN BE FOUND IN APPENDIX A', SECTON A.2.3.

MULCH SHOULD BE PLACED TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED 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 ACCEPABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCPTANCE. ROOT STOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHALL BE PLANTED SO THAT 1/8 OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST 6" LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS, THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION.

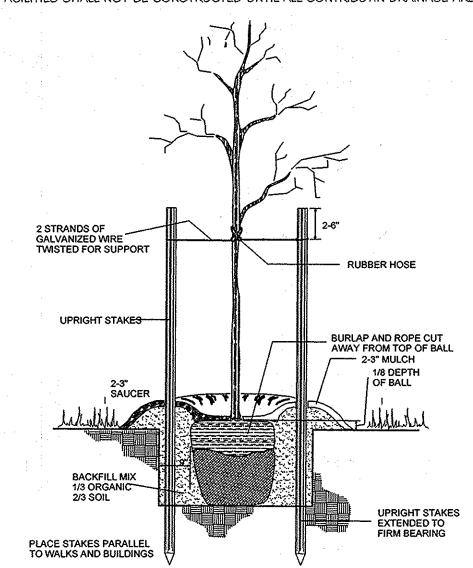
TREES SHALL BE BRACED USING 2" X 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL, GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS 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 DEFEATS, OR AT A MINIMUM, IMPEDES TO 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.

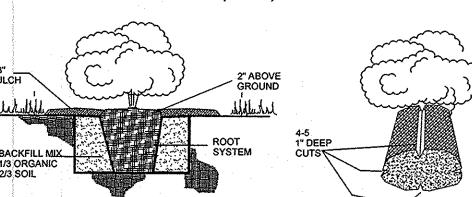
6. UNDERDRAINS:

UNDERDRAINS ARE TO BE PLACED ON A 3'-O" WIDE SECTION OF FILTER CLOTH. PIPE IS PLACED NEXT, FOLLOWED BY THE GRAVEL BEDDING. THE ENDS OF UNDERDRAIN PIPES NOT TERMINATING IN AN OBSERVATION WELL SHALL BE CAPPED. THE 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 1000 SQUARE FEET OF SURFACE AREA).

7. MISCELLANEOUS: THE BIORETENTION FACILITIES SHALL NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTIN DRAINAGE AREA HAS BEEN STABILIZED.



TREE PLANTING/ STAKING DETAIL (N.T.S)



TYPICAL CONTAINER-GROWN PLANTING DETAIL

APPROVED: HOWARD COUNT	TY DEPARTMENT OF PLANNING AND ZONING
Valling zou	ic 5-11-16
Director	Date
CHIEF, DIVISION OF LAND DE	EVELOPMENT DATE MAN
TANKS TO THE TAKE	
Chil Edulion	5.5-16
CHIEF, DEVELOPMENT ENGIN	NEERING DIVISION NO DATE

Appendix B.3. Construction Specifications for Sand Filters, Bioretention and Open Channels

B.3.C Specifications for Open Channels and Filter Strips

1. Material Specifications

The recommended construction materials for open channels and filter strips are detailed in Table

2. Dry Swales

Permeable soil mixture (20" to 30" deep) should meet the bioretention "planting" soil specifications.

Check dams, if required, shall be placed as specified.

System to have 6" of freeboard, minimum above 2 year water surface elevation.

Side slopes to be 3:1 maximum; (4:1 or flatter is preferred).

No gravel or perforated pipe is to be placed under driveways.

Bottom of facility to be above the seasonally high water table per Table 2 of Appendix D.1.

Seed with flood/drought resistant grasses; see Appendix A, Section 2.4.

Longitudinal slope to be 4%, maximum.

Bottom width to be 8' maximum to avoid braiding; larger widths may be used if proper berming is supplied. Width to be 2' minimum.

3. Wet Swales

Follow above information for dry swales, with the following exceptions: the seasonally high water table may inundate the swale; but not above the design bottom of the channel [NOTE: if the water table is stable within the channel, the WO_v storage may start at this point – see Figure 3.19]

Excavate into undisturbed soils; do not use an underdrain system.

4. Filter Strips

Construct pea gravel diaphragms 12" wide, minimum, and 24" deep minimum.

Pervious berms to be a sand/gravel mix [sand (35-60%), silt (30-55%), and gravel (10-25%)]. Berms to have overflow weirs with 6 inch minimum head.

Slope range to be 2% minimum to 6% maximum.

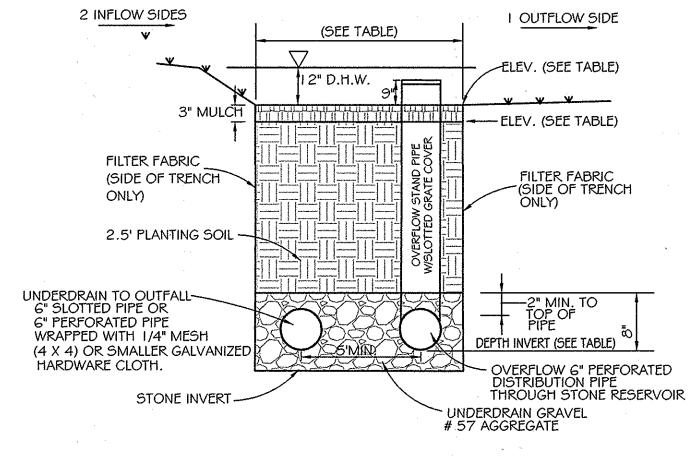
5. Plant Selection

Recommended grass species for use in establishing permanent ground cover are provided in Section 2.4 of Appendix A.

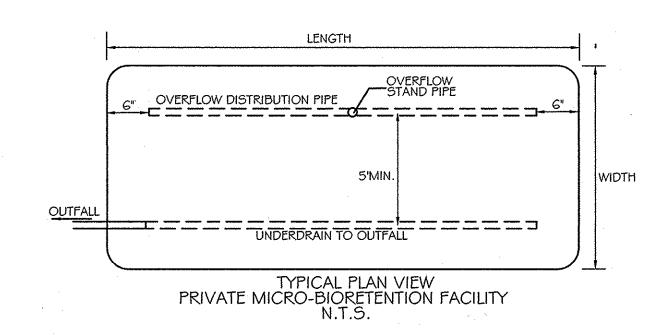
Table B.3.3 Open Channel Systems and Filter Strip Materials Specifications

Material	Specification	Size	Notes - The Control of the Control o
dry swale soil	USCS; ML, SM, SC	n/a	soil with a higher percent organic content is preferred
dry swale sand	ASTM C-33 fine aggregate concrete sand	0.02" to 0.04"	
check dam (pressure treated)	AWPA Standard C6	6" by 6" or 8" by 8"	do not coat with creosote; embed at least 3' into side slopes
check dam (natural wood)	Black Locust, Red Mulberry, Cedars, Catalpa, White Oak, Chestnut Oak, Black Walnut	6" to 12" diameter; notch as necessary	do not use the following, as these species have a predisposition towards rot: Ash, Beech, Birch, Elm, Hackberry, hemlock, Hickories, Maples, Red and Black Oak, Pines, Poplar, Spruce, Sweetgum, Willow
filter strip sand/gravel pervious berm	sand: per dry swale sand gravel; AASHTO M-43	sand: 0.02" to 0.04" gravel: ½" to 1"	mix with approximately 25% loam soil to support grass cover crop; sand (35-60%), silt (30-55%), and gravel (10-25%) see Bioretention planting soil notes for more detail.
pea gravel diaphragm and curtain drain	ASTM D 448	varies (No. 6) or (1/8" to 3/8")	use clean bank-run gravel
underdrain gravel	AASHTO M-43	0.25" to 0.75"	
underdrain	F 758 Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel ove pipes; not necessary underneath pipes
geotextile	Class "C" - apparent opening size (ASTM-D-4751), grab tensile strength (ASTM-D-4632), puncture resistance (ASTM-D-4833)	n/a	
rip rap	per county criteria; if none given, use MSHA Standards and Specs Section 905	size per county DOT requirements based on 10-year design flows	

Material	Specification	Size	Notes well from the mean and the region of the particular
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%), coarse sand (30%) & 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)		
Mulch	shredded hardwood		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")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO, 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
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 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f' _c = 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 pre-cast) not using previously approved State 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 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand
	F .	1	· ·



TYPICAL SECTION FOR PROPOSED PRIVATE MICRO-BIORETENTION FACLITIES N.T.S.



PERMEABLE ASPHALT: PAVEMENT (OPTIONAL) 2' PLANTING MEDIA Plan View Maintenance Criteria: The following items should be addressed to ensure proper maintenance and long-term

PPROVED PLAN CHANNEL WIDTH

Figure 5.18 Bio-Swale

performance of swales:

- ☐ For grassed swales, regular mowing (at least bi-annually) is critical in order to reduce competition from weeds and irrigation may be needed during dry weather to establish vegetation. Sparsely vegetated areas need to be re-seeded to maintain dense coverage.
- ☐ If water does not drain within 48 hours, the bottom soil should be tilled and revegetated.
- ☐ Inspections should be performed once a year to assess slope integrity, vegetative health, soil stability, compaction, erosion, ponding, and sedimentation. Periodic removal of sediment, litter, or obstructions should be done as needed. Eroded side slopes and the swale bottom should be repaired and stabilized where needed.

OPERATION AND MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION (M-6) \$ BIORETENTION SWALE (M-8)

- A. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTAINANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT, ANY MULCH RELPLACEMENT SHALL BE DONE IN THE SPRING, PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTAINANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTIBLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II. TABLE A.4.1 AND 4.2.
- 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 PLANT 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
- D. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER AND AFTER EACH HEAVY STORM.

MICRO-BIORETENTION FACILITY DIMENSION TABLE

WICK-DIORETENTION PACIETY DIVIENDION PACIETY										
FACILIY NO.	LOCATION	WIDTH	LENGTH	SQUARE FEET	DEPTH INVERT *	STONE INVERT **	INV. OUT	TOP MULCH ELEV.	GROUND ELEV. OUTFLOW SIDE	GROUNDWATER DEPTH
l	LOT 3	10'	10'	100	3.42'	11"	256.58	260.00	261.00	6'
2	LOT 3	10'	6'	60	3.42'	10"	256.08	259.50	260.50	6'
3	LOT 2	10,	11'	110	3.42'	11"	248.58	252.00	253.00	5'
4	LOT I	10'	10'	100	3.42'	12"	241.58	245.00	246.00	5'

INVERT = OUTFALL PIPE INVERT

M-8: BIO Swale

* DEPTH OF FACILIY FROM TOP OF MULCH TO INVERT OF 6" UNDERDRAIN ** DEPTH OF STONE BELOW UNDERDRAIN

SWM TREATMENT SUMMARY										
	Area		ESDv Volume (cft)							
Practice	Treated	Methodology	Required	Provided						
M-6: Micro Bioretention Facility #1	Lot 3 Driveway	75% storage above filter media	149	159						
M-6: Micro Bioretention Facility #2	Lot 3 Rooftop	75% storage above filter media	83	99						
M-6: Micro Bioretention Facility #3	Lot 2 Rooftop	75% storage above filter media	165	174						
M-6: Micro Bioretention Facility #4	Lot 2 Rooftop	75% storage above filter media	158	161						

UIC Drive

and

driveways

BIO-RETENTION FACILITY PLANT SIZING AND SPACING

PLANT SPACING

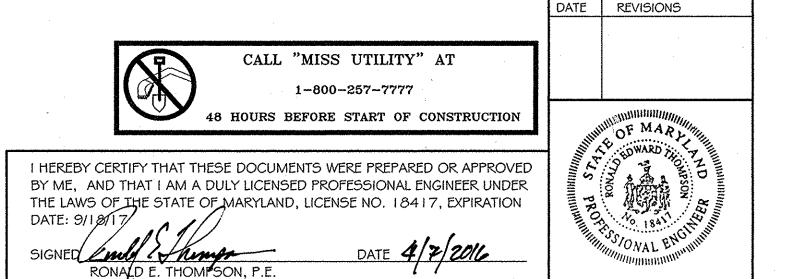
PERENNIALS - 12" ON CENTER FOR QUART SIZE 18" ON CENTER FOR GALLON SIZE SHRUBS - 3'-4' ON CENTER FOR QUART / GALLON SIZE

PLANT SPECIES

PLANT SPECIES SHALL BE SELECTED FROM "PLANT SPECIES APPROPRIATE FOR USE IN BIORETENTION AREAS", PRINCE GEORGE COUNTY DEP, MD. (www.lowimpactdevelopment.org)

OWNER / DEVELOPER:

CINNABAR DRIVE, LLC 5300 DORSEY HALL DR. #107 ELLICOTT CITY, MD 21042 443-367-0422



ESDv = Rv*Pe*A/12

SITE DEVELOPMENT PLAN
PRIVATE MICRO-BIORETENTION FACILITY & BIO-SWALE NOTES, DETAILS AND SPECIFICATIONS GUILFORD LANDING LOTS 1 - 3

HOWARD COUNTY PLAT No. 23444-23445 10072, 10074 AND 10076 GUILFORD ROAD 6TH ELECTION DISTRICT - HOWARD COUNTY, MARYLAND T.M. 47, GRID 6, P/O PARCEL 604 ZONING: R-12 SINGLE FAMILY HOMES DATE: FEBRUARY 2016

RELATED DPZ FILES WP-10-174, W\$S 24-261 1-D WP-11-123, WP-12-113, WP-15-026 \$ F-09-064 VANMAR ASSOCIATES, INC. **Engineers Surveyors Planners** 310 South Main Street Mount Airy, Maryland 21771

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