## HOWARD COUNTY CONTROL STATION FINAL ROAD CONSTRUCTION PLANS LOCATION: TAX MAP 38, PARCEL 235 FIRST ELECTION DISTRICT EXISTING ZONING: R-12 GROSS AREA OF PARCEL: 8.90212 ACRES PER LIBER 8848, FOLIO 244 SHADY LANE CROSSING AREA OF 1871 ACCESS EASEMENT: 8072.43 SF (0.185 AC.) PER LIBER 3436, FOLIO 410 AREA OF RIGHT OF WAY: 0.67845 ACRES ELEVATION 124.653' (NAVD 1988) AREA OF FLOODPLAIN: 0.16460 AC. AREA OF STEEP SLOPES: 0.059 AC. NET AREA OF PROJECT: 8.90212 AC. - 0.16460 AC. = 8.7375 AC. NUMBER OF PROPOSED RESIDENTIAL LOTS: 21 LOTS 1 THRU 25 AREA OF PROPOSED RESIDENTIAL LOTS: 4.9896 AC AREA OF OPEN SPACE LOTS: 3.44 ACRES HOWARD COUNTY, MARYLAND AREA OF OPEN SPACE REQUIRED: 30% OF GROSS AREA OF PARCEL (2.6706 AC.) TOTAL AREA OF CREDITED OPEN SPACE PROVIDED: 3.02 ACRES (LOTS 12, 13 AND 19) TOTAL AREA OF NON-CREDITED OPEN SPACE PROVIDED: 0.32 ACRES (LOTS 24 AND 25) AREA OF RECREATION OPEN SPACE REQUIRED: 4200 SF AREA OF RECREATION OPEN SPACE PROVIDED: 4366 SF ON LOT SHEET INDEX **LEGEND** AS-BUILT CERTIFICATION VICINITY MAP SCALE 1"=2000" COVER SHEET 50 RIGHT- OF-WAY ROAD PLAN AND PROFILE I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE 10' PRIVATE DRAINAGE AND STORM DRAIN DRAINAGE AREA MAP UTILITY EASEMENT AS-BUILT PLANS AND MEETS THE APPROVED PLANS NO WOODY VEGETATION STORMWATER MANAGEMENT NOTES AND DETAILS AND SPECIFICATIONS. STORMWATER MANAGEMENT NOTES TTTT THE MAINTENANCE - dae Car ROBERT H. VOGEL PE NO. 16193 LANDSCAPE AND FOREST CONSERVATION PLAN LOT 11 OPEN SPACE OWNERS: SCHUTT GRACE TAYLOR WILLIAMS KNOLLS, ADDRESS: 6132 HANGVER RD RETAINING WALL PLAN SECIION 1 DEED: L3436 F.401 RETAINING WALL PLAN LOCATION: TAXMAP 38 PARCEL 731 PIAT 13084-13085 11. FOREST CONSERVATION PLAN PREPARED BY FREDERICK WARD AND ASSOCIATES, DATED JANUARY 2002. FOREST CONSERVATION PLAN PREPARED BY FREDERICK WARD AND ASSOCIATES, DATED JANUARY 2002. FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1202 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY THE RETENTION OF 1.87 AC. (81457.2 x \$0.20 = \$16,291.44) OF FOREST IN A FOREST CONSERVATION EASEMENT PAYABLE BY DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT. A FEE-IN-LIEU PAYMENT FOR REMAINING 1.06 AC. (46,173.60 x \$0.75 = \$34,630.20) IS REQUIRED, WHICH IS PAID TO THE FOREST CONSERVATION FUND. 12. APFO TRAFFIC STOLYPPORTER BY THE TRAFFIC GROUP, DATED FEBRUARY, 2000. LOT 45 WILLIAMS KNOLLS SECTION II PLAT 13085 ZCNED: R-SC LOT 46 WILLIAMS KNOLLS SECTION II ZONE): R-SC N 7705 28 E 108 31 FOREST CONSERVATION LOT 9 LOT 7 RETENTION LOT 47 FILLIAMS KNOLLS 26. ON 2/7/02, DPW BUREAU OF ENGINEERING APPROVED 8 LOTS TO HAVE NO BASEMENT GRAVITY SEWER SERVICE. SAID LOTS SECTION II LOT 3 PLAT 13085 7. THIS PLAN IS SUBJECT TO A DESIGN WAVER TO DESIGN MANUAL, VOLUME III SECTION 2.5.2.H APPROVED APRIL 10,2003. THIS APPROVAL IS DUE TO THE FOLLOWING: ZONED: R-SC DEPARTMENT OF RECREATION AND PARKS IN-COMMON ACCESS EASEMENT FOR LOTS 7-9 TREAM LOT 48 2. THE PROPOSED INTERSECTIONS AS DESIGNED WILL MEET THE REQUIREMETHS FOR ADEQUATE STOPPING SIGHT DISTANCE. WILLIAMS KNOLLS, 28. THIS PLAN IS SUBJECT TO WP-03-65 TO WAIVE SECTION 16.116(0) TO ALLOW DISTURBANCE OF WETLANDS, WETLANDS BUFFER AND STREAM BUFFER FOR THE CONSTRUCTION OF A USE-IN-COMMON DRIVEWAY TO SERVE 4 RESIDENTIAL LOTS. THE CROSSING FOR THE SEWER MAIN WAS APPROVED. THE THREE CONDITIONS FOR APPROVAL OF WP-03-65 ARE AS FOLLOWS. 1. COMPLY WITH THE COMMENTS FROM THE DEVELOPMENT ENGINEERING DIVISION REGARDING CULVERT CAPACITY AND LIMITING DISTURBANCE TO THAT SHOWN ON THE EXHIBITS DATED 1-14-03 WHICH ACCOMPANIED THE REVISED WAIVER PETITION. PROPOSED STORMWATER CREDIT SECTION I MAND UTILITY EASEMENT PLAT 13085 ZONED: R-SC COMPLY WITH THE COMMENTS FROM THE SOIL CONSERVATION DISTRICT DURING SUBDIVISION DESIGN DEVELOPEMENT TO MINIMIZE THE IMPACT OF THE DESIGN AND CONSTRUCTION OF THE DRIVEWAY ON THE WETLANDS. LOT 8 THE DEVELOPER MUST OBTAIN ALL NECESSARY STATE AND/OR COE PERMITS FOR THE PROPOSED ENVIRONMENTAL IMPACTS. THE TRACKING NUMBER IS 200763552\07-NT-3202. CONCRETE 29. A STOP SIGN IS REQUIRED AT THE INTERSECTION OF HANOVER ROAD. 30. THIS SUBMISSION IS SUBJECT TO THE 5TH EDITION SUBDIVISION REGULATIONS, THE ZONING REGULATIONS, AND THE 1993 ZONING REGULATIONS AMENDED BY CB 50-2001, EFFECTIVE 1-08-02. 1. ALL SIGN POST USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE POST (14 CAUGE) INSERTED INTO A 2-1/2" CALVANIZED STEEL, PERFORATED SQUARE TUBE SLEEVE (12 GAUGE - 3' LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST. WILLIAMS KNOLL LOT 22 SECTION II 33. NO WELLS OR SEPTIC SYSTEMS WERE FOUND ONSITE. IF WELLS AND/OR SEPTIC SYSTEMS ARE ENCOUNTERED DURING GRADING GRADING, CONTRACTOR TO CONTACT THE HEALTH DEPARTMENT FOR PROPER ABANDONMENT. XNED: R-SC F.0637 34. ALL RETAINING WALLS LOCATED IN PRIVATE PROPERTY SHALL BE MAINTAINED BY HOMEOWNER'S ASSOCIATION (H.O.A.) ALL RETAINING WALLS LOCATED IN THE COME SWM FACILITY AND STORMDRAIN & UTILITY EASEMENTS" SHALL BE MAINTAINED BY THE HOA. LOT 50 WILLIAMS KNOLLS SECTION II PLAT 13085 37. WATER AND SEWER FOR THIS PROJECT WILL BE PUBLIC. SEWER WILL BE PROVIDED THROUGH CONTRACT NO. 649-S AND 650-S. WATER TO BE PROVIDED THROUGH CONTRACT NO. 650-S. ZONED: R-SC LOT 21 LOT 14 LOT 15 LOT 18 38. DRIVEWAYS SHALL BE PROVIDED PRIOR TO RESIDENTIAL OCCUPANCY TO INSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE SHIFT GUARDRAIL, SUBSTITUTE SWM PLANTINGS REVISE STORM DRAIN TO ACCOMODATE EXISTING CONDITIONS (12414 REQUIREMENTS: REVISE T-TURNAROUND, AND REVISE POND TO AS-BUILT A) WIDTH - 12 FEET (16 FEET IF SERVING MORE THAN ONE RESIDENCE) SHOW REVISED RETAINING WALL DESIGN AT THE POND, SUBSTITUTE SHEETS 1612, ADD NEW SHEET 18 04/29/13 DATE -20' PUBLIC DRAINAGE AND C) GEOMETRY — MAXIMUM 14% GRADE, MAXIMUM 10% GRADE CHANGE, AND MINIMUM 45 FOOT TURNING RADIUS 10' PRIVATE DRAINAGE AND UTILITY EASEMENT STRUCTURES (CULVERTS/BRIDGES) - MUST SUPPORT 25 GROSS TON **COVER SHEET** LOADING (H25 LOADING) E) DRAINAGE ELEMENTS — CAPABLE OF SAFELY PASSING 100 YEAR FLOOD EVENTS WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY SURFACE FINAL ROAD CONSTRUCTION PLANS PARCEL 871 SCHAFFNER PROPERTY F) STRUCTURE CLEARANCES - MINIMUM 12 INCHES schaffner properi SHADY LANE CROSSING MAINTENANCE – SUFFICIENT TO INSURE ALL WEATHER USE OWNER: MICHELLE GREENE ADDRESS: 6200 HANOVER RD 21076 LOT 2 F-98-124 F-98-124 LOTS 1 THRU 25 ZONED: R-12 DEED: L.5669 F.565 ZOMED: R-12 ZOMED: R-12 PARCEL 235 TAX MAP #38 GRID 9 HOWARD COUNTY, MARYLAND 1ST ELECTION DISTRICT OURB CUT ROBERT H. VOGEL RECORD PLAT **PLAN VIEW** END CONSTRUCTION \_ STA 5+17.03 13565 41. RETAINING WALLS WILL BE PRIVATELY OWNED AND ENGINEERING, INC. T-TURN AROUND DETAIL ENGINEERS . SURVEYORS . PLANNERS PROFESSIONAL CERTIFICATION COORDINATE TABLE BY THE DEVELOPER: BY THE ENGINEER: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND 8407 Main Street Tel: 410.461.7666 ELLIGOTT CITY, MD 21043 FAX: 410.461.8961 REVIEWED FOR HOWARD S.C.D. & MEETS TECHNICAL REQUIREMENTS. **BOUNDARY POINTS** APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS "I/WE CERTIFY THAT ALL DEVELOPEMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON SETTE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT "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." THAT I AM A DULY LICENSED PROFESSIONAL NORTHING **EASTING** POINT ENGINEER UNDER THE LAWS OF THE STATE OF CHIEF, BUREAU OF HIGHWAYS HE DATE OF MARK RJ/JCO MARYLAND, LICENSE NO. 16193 DESIGN BY: 702 559187.4866 1391152.9777 EXPIRATION DATE: SEPTEMBER 27, 2008." DRAWN BY: RJ/JCO APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 1391141.0682 559139.4407 1391104.1708 CHECKED BY: 558978.6191 1391096.7964 705 558758.8283 DATE: SEPTEMBER, 2008 CHIEF, DIVISION OF LAND DEVELOPMENT 6168 INVESTMENT & RENTAL PROPERTIES, LLC 707 559000.8020 1390164.5732 5705 LANDING ROAD ELKRIDGE, MARYLAND 21075 (410) 796-1850 SCALE:

SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE)

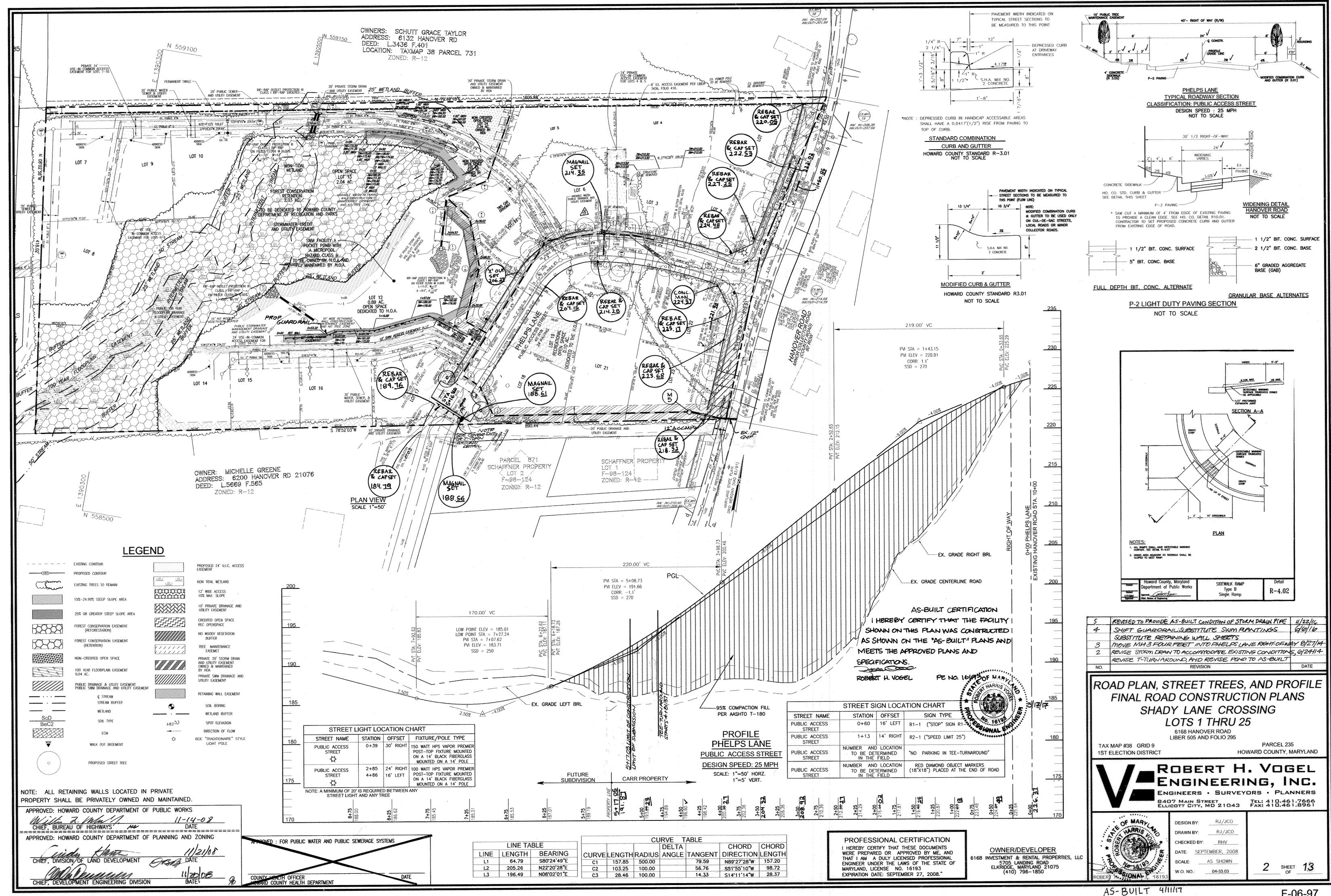
CHIEF, DEVELOPMENT ENGINEERING DIVISION

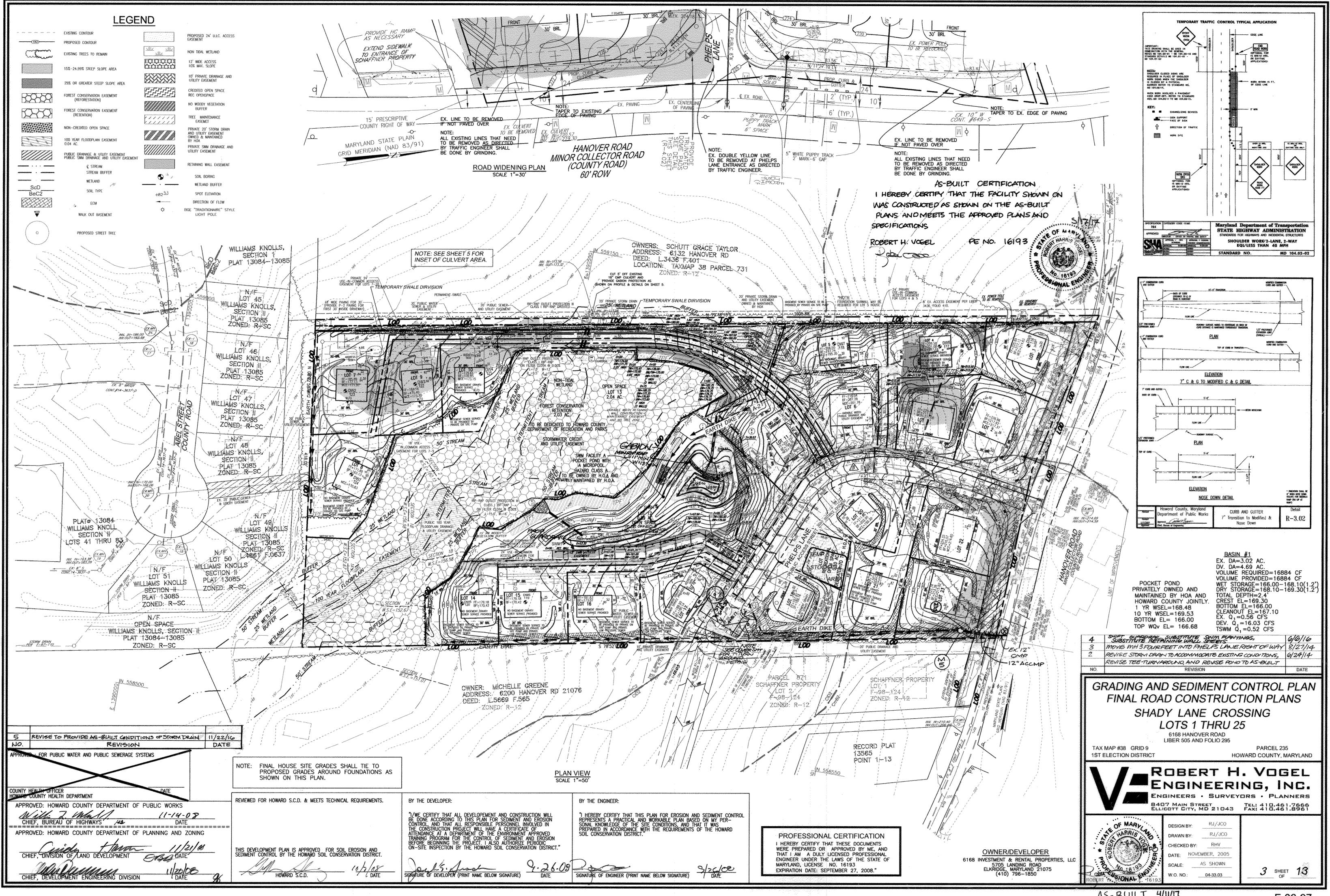
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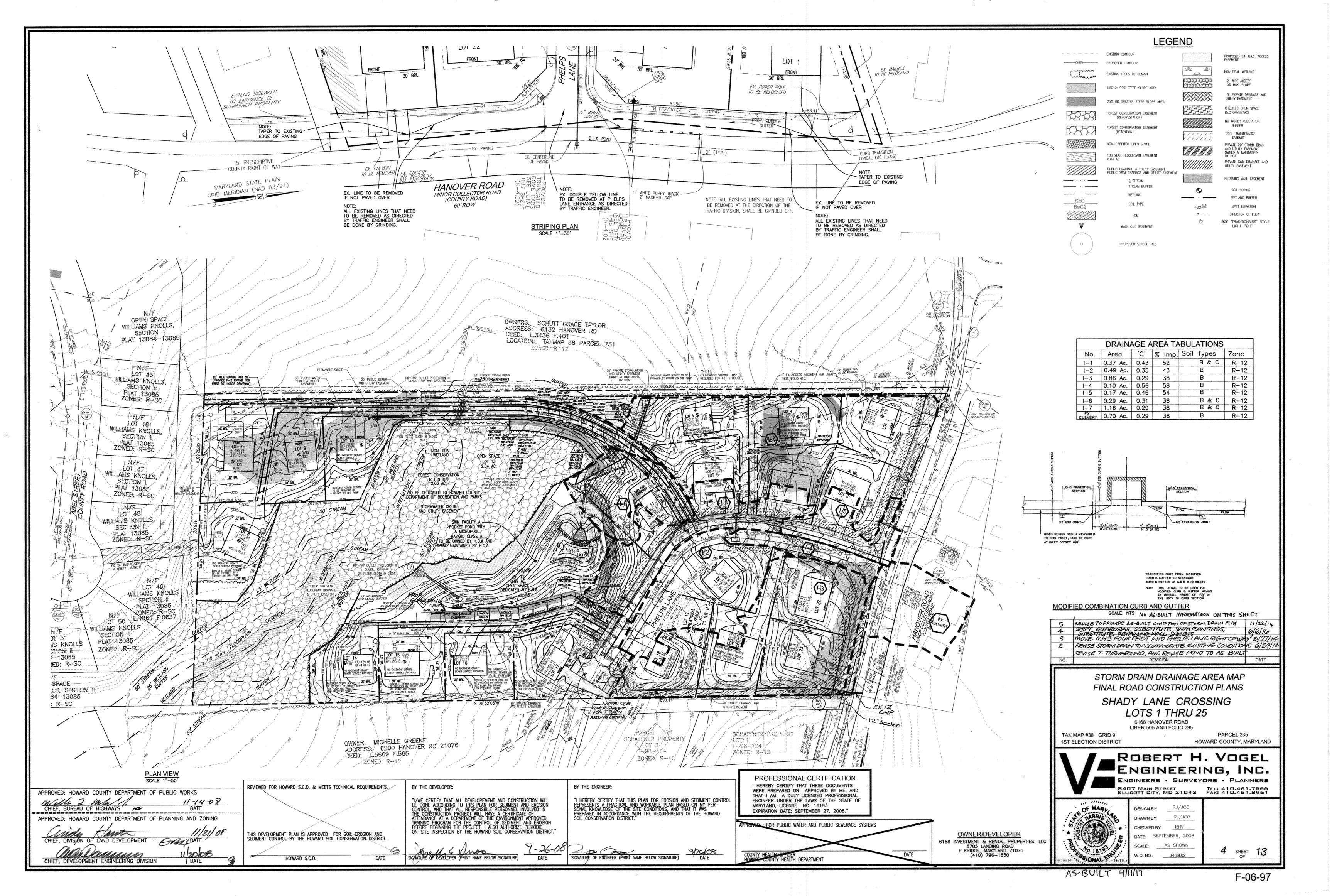
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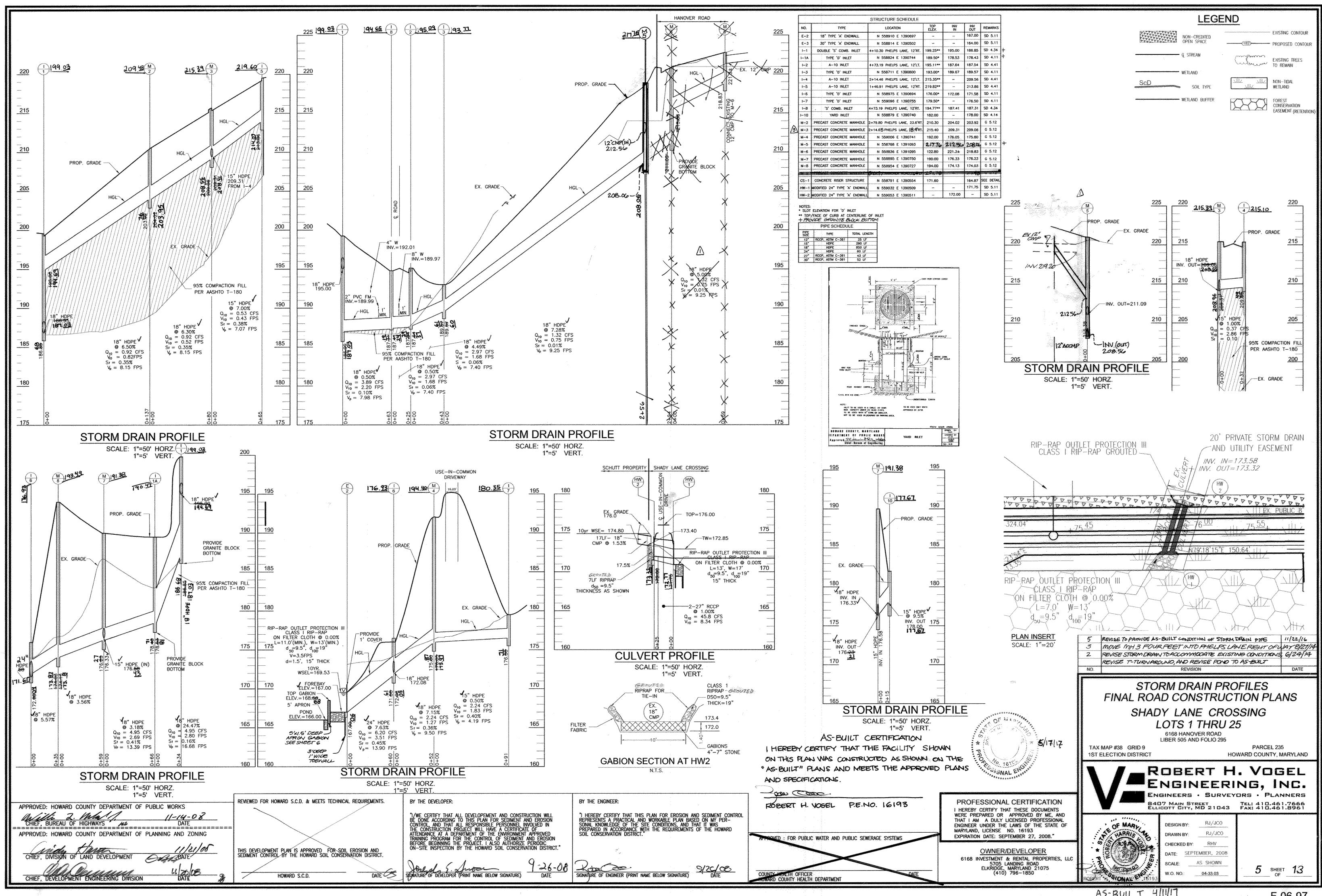
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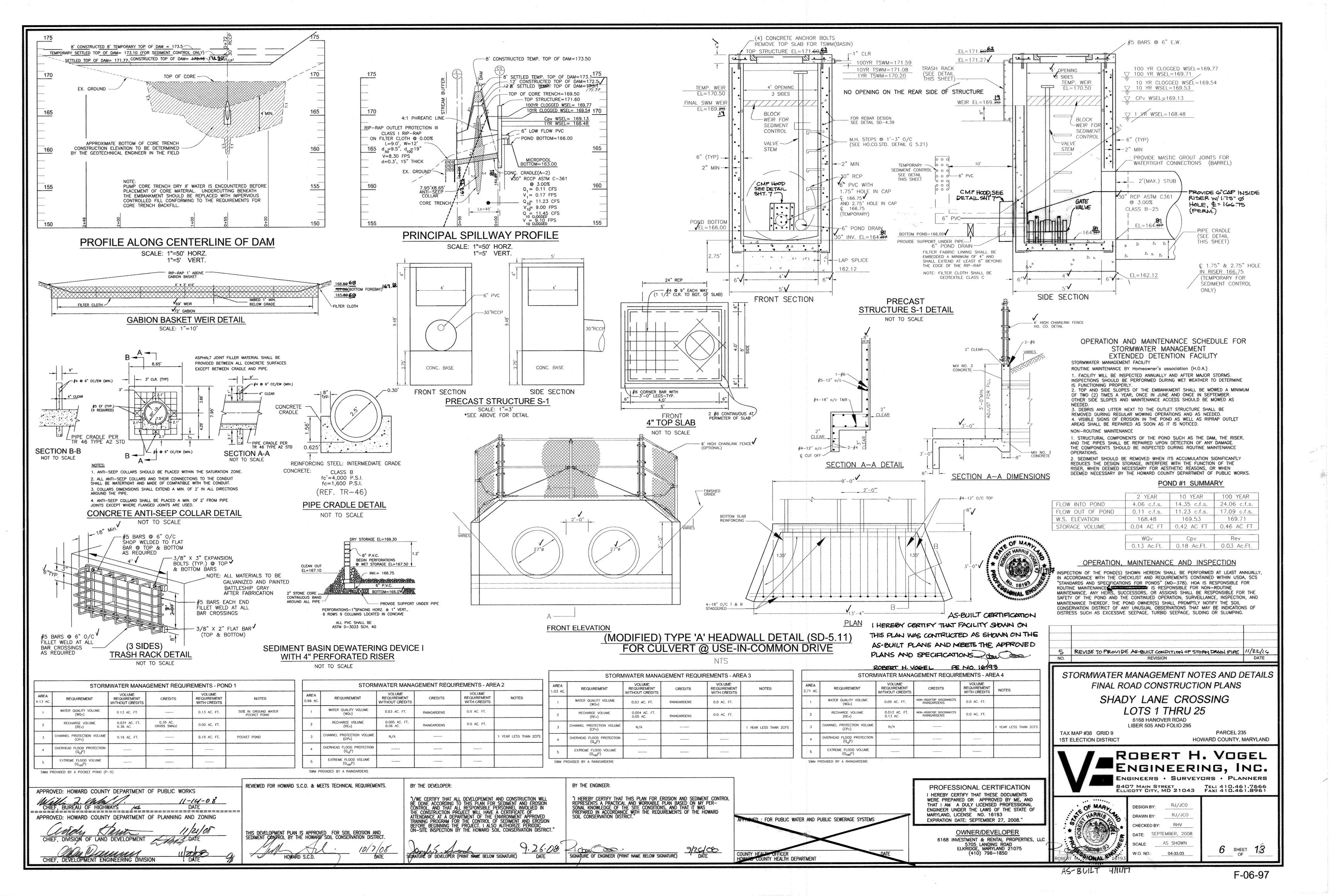
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MARYLAND 378

STORMWATER MANAGEMENT POND CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All

references to ASTM and AASHTO specifications apply to the most recent version.

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the tow of the

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6° frozen or other objectionable materials. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer. Materials used in the outer shell of the embankment must have the capability to support vegetation of the auglity required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within +\-2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the core shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed currently with the outer shell of the outer shell of the embankment.

# Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operated closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi; 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2.000 chm-cm. Material shall be placed such that minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sides of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of the structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill (flowable fill)zone shall be of ype and quality conforming to that specified for the core of the embankment or other embank

# All pipes shall be circular in cross section.

Pipe Conduits

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

. Materials - (Polymer Coated steel pipe)- Steel pipes with polymeric coating shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.

Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are

to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling, bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at lease 24 mils in thickness.

Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be rerolled an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches diameter: flanges on both ends of the pipe with a circular 3/8 inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4(four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8'inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or

4. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support,

Backfilling shall conform totructure Backfill ".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-361.

Beddina - Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel

Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.

- 4. Backfilling shall conform totructure Backfill "
- Other details (anti-seep collars, valves, etc.) shall be shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:

. Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" -10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.

2. Joints and connections to anti-seep collars shall be completely watertight.

3. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform t&tructure Backfill '

Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection

Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction Materials, Section 311.

Geotexile shall be placed under all riprap and shall meet requirements of Maryland Department of Transportation,

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

All borrow areas shall be graded to provide proper drainage and left I a sightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

# Erosion and Sediment Control

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.

# POND BOTTOM SOIL CONDITIONS

If broken rock fragments are encountered at finished pond bottom, under cut a minimum of 12" below basin grade and to a horizontal distance of at least 18" beyond each edge of the broken rock and backfill with fine-grained ML or CL soils compacted to a firm condition. This procedure should be performed under the supervision of the project Geotechnical Engineer

# GEOTECHNICAL RECOMMENDATIONS

The subsurface conditions at the site were evaluated with a total of thineen (13) test borings, none (9) for the drywells designated DW-1 through DW-9, and four (4) for the stormwater

and 46 blows per foot indicating soft to hard consistencies

management pond, designated SWM-1 through SWM The encountered soil generally consisted of about 4 to 6 inches topsoil underlain by the Sand-Gravel and Silt-Clay Facies of the Patuxent Formation of the Constal Province. The encountered Patuxent Formations were classified as SILT to Sandy SILT (ML), Clavey SILT (ML), Sity CLAY (CL), SAND (SP), and Silty SAND (SM) soils. The SPT N-Values of the Silty-Clay Pacies soils generally ranged between 10 and 58 blows per foot indicating medium stiff to very hard consistencies. The SPT N-Values in the Sand-Gravel Facies generally ranged between 4

Ground water level observations were made in each of the uncased boreholes during the drilling operations and after the completion of drilling operations. Cave in depths were also measured in

Groundwater was encountered in Borings DW-5, SWM-3, and SWM-4 during drilling at depths between 8 and 14 feet below existing ground surface or EL 160 and EL 153. At completion of 24 hours after completion, groundwater was encountered in Borines SWM-2, SWM-3 and SWM-4 between the depths of 8.3 and 10.8 feet or EL 161.5 and EL162.5. The Cave-in depths for the borings varied between the depths of 6.3 and 11.1 feet below the existing site grades. More details about the encountered groundwater level and cave in depths are included on the

The recorded water levels, or absence of water, reflect the conditions at the time of this exploration only. Fluctuations in the location of hydrostatic groundwater level and perched water levels can occur as a result of seasonal variations in evaporation, precipitation, surface water run-off, and other factors.

# RECOMMENDATIONS

Stormwater Management Pond and Drywells At the time this subsurface investigation was performed, specific details regarding the proposer elevations for the stormwater management pond and drywells were not available. However, it was understood that the SWM pond bottom and dam top are being planned at EL 166 and EL 170, respectively. Therefore, based on the site topography it is anticipated that the pond embankments will consist of both cuts and fills. Infiltration rates and construction recommendations for the SWM pond and drywells are presented below.

## Infiltration Rates for SWM Pond and Drywells

Based on the available site plan, the stormwater management (SWM) pond is planned to be constructed in the central part of the site. In addition, nine (9) infiltration drywells are being planned for the site. The drywells are planned to be located in Lots 1, 4, 5, 7, 8, 9, 10, 14 and 15. Four (4) test borings were drilled within the proposed SWM nond location, namely Boring SWM-1 through SWM-4, and one boring was drilled within each proposed drywell for a total of 9 borings. Borings drilled within the drywells were designated DW-1 through DW-9. In addition to the test borings, four (4) field infiltration tests were performed near borings SWM-2, DW-2. DW-6 and DW-7 at an approximate depth of 5 feet. It was understood that the proposed infiltration dryweil bottoms are being planned to be at about 4 to 5 feet below existing ground

The soils encountered near the proposed pond below elevation consisted primarily of LOAM (Sandy SILT (ML), SILT (ML), Clayey SILT (ML)) and SANDY LOAM (Silty SAND (SM)). Field infiltration test was performed near Boring SWM-2 at a depth of about 5 feet from existing ground surface. Based on Boring SWM-2 the soil at the 5 feet depth consisted of LAOM (SILT (ML)) with Sand and Gravel. The infiltration rate as determined by the field infiltration test was 0.32 inches/hour. In addition, laboratory USDA classification by hydrometer was performed on two (2) soil samples obtained from Borings SWM-2 and SWM-3 near the proposed pond bottom clevation. Based on the laboratory hydrometer results, the soil in Boring SWM-2 was classified as LOAM with an empirical minimum infiltration rate of 0.52 inch per hour and the soil from Boring SWM-3 was classified as SANDY LOAM with a minimum infiltration rate of 1.02 inch per hour. However based on the on-site infiltration tests the minimum field determined infiltration rate of the LOAM soils is 0.32 inch per hour. Therefore, for infiltration design purposes an infiltration rate of 0.32 inch per hour should be use

Groundwater was encountered at the end of drilling or after 24 hours in Borings SWM-2, SWM-3 and SWM-4 at depths ranged between 8.3 and 10.8 feet below existing ground surface or between EL 161,5 and EL162 which is about 4 to 4.5 feet below the proposed SWM pond bottom elevation. A CLAY layer was encountered in Borings SWM-1 and SWM-4 at a depth of about 8.5 feet below existing ground surface or EL 164.5 and EL 159.5 which is about 1.5 to 6.5 feet below the proposed pond bottom elevation. Based on the obtained field infiltration rate of 0.32 inch per hour and the proximity of groundwater level and the clay layer, infiltration appears not to be feasible at the proposed SWM pond location

The soil encountered near the proposed drywell bottom which is understood to be at a depth of 5 feet below the existing grades consisted mainly of Sandy SILT (ML), Silty SAND (SM) and SAND (SP). Field infiltration test was performed near Borings DW-2, DW-6 and DW-7 at a depth of about 5 feet below existing ground surface. Based on the test borings, the soil at the 5 feet depth consisted of SANDY LOAM (Sandy SILT (ML)) at Borings DW-2 and DW-6 and SANDY LOAM (Silty SAND (SM)) at Boring DW-7. The infiltration rates as determined by the field infiltration tests were 0.73 inches/hour, 0.16 inches/hour and 6.52 inches/hour near Borings DW-2, DW-6 and DW-7, respectively. In addition, laboratory USDA classification by drometer was performed on two (2) soil samples obtained from Borings DW-2 and DW-7 near the proposed drywell bottom elevations. Based on the laboratory hydrometer results, the soil in both borings was classified as SANDY LOAM with an empirical minimum infiltration rate of 1.02 inch per hour. Based on visual classification, the soil encountered near the proposed cryweil bottoms in borings DW-1, DW-2 and DW-3 are very likely to have similar infiltration characteristics. Based on the test borings, laboratory results and field infiltration test results, a minimum infiltration rate of 0.16 inches/hour should be considered in the design for DW-1, DW-2 and DW-4. Similarly the soils encountered in Borings DW-4, DW-5 and DW-6 are very likely to have similar infiltration characteristics with a minimum infiltration rate of 0.73 inches/hour to be considered in the design. At Borings DW-7, DW-8 and DW-9, a minimum infiltration rate of 1.02 inches/hour should be considered in the design.

Groundwater was only encountered during drilling in Boring DW-5 at a depth of 8 feet from existing ground surface. Groundwater was absence to the cave-in depth of 6.3 feet after 24 hours

Pond Construction Riser Structure

The soil encountered within the Stormwater Management Pond at this site are generally suitable for the construction of conventional spread footing bearing on natural firm soils for a net allowable soil bearing pressure of 3,000 pounds per square foot (psf). The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation bearing soils in excess of the final overburden pressure at the footing bearing level.

Total settlements of individual footings are anticipated to be on the order of 1 inch; and maximum differential settlements are expected to be on the order of 1/2 inch over 30 feet

In order to reduce the possibility of foundation bearing failure and excessive settlement due to local shear or "punching" action, we recommend that footings have a minimum lateral dimension of 2.5 feet. In addition, footings should be placed at least 30 inches below final grade to provide

# Cut-Off Trench and Impervious Core Construction

According to the site grading plan, cut-off trenches and impervious cores will be required at the proposed SWM pond. The construction of the proposed SWM basin area will require excavations on the order of 8 feet below existing grades on the eastern side and the embankment area will be constructed on the western side with maximum cuts/fills on the order of about 4 feet to achieve the top of embankment elevation of 170 feet.

In accordance with Maryland Code 378 requirements, the cutoff trench should extend at least 4 fect below the principal spillway pipe, have a minimum width of 4 feet, and have side slopes of 1H: 1V, or flatter. The impervious core should extend vertically upward from the cutoff trench to the 10-year stormwater surface elevation. Fill materials for the cutoff trench and impervious core construction should consist of GC, SC, CL, or CH soil types, having at least 30 percent by weight passing the No. 200 sieve. The remainder of the embankment (outer shell) may be constructed of the same material as the core, or any other materials which meet the requirements for compacted fill as required by Code 378 and are capable of supporting vegetation.

Based upon the results of the soil borings, there appears to be an insufficient quantity of GC, SC, CL, and CH fills materials at the project site for use in cutoff trench and impervious core construction. These materials will need to be imported to the project site after prior approval for use in construction by the Geotechnical Engineer.

Fill materials for the cut-off trench and impervious core should be placed in 8-inch loose lifts and compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor test method, ASTM D 698. We recommend that moisture contents at the time of construction should generally be within the range of the optimum moisture content to 3 percentage points wet of the optimum moisture content. It is recommended that a sheepsfoot ype roller be used in the core trench areas. Although a smooth drum roller is recommended for sealing the on-site soils, it should not be used as the primary compaction method for the construction of core trench areas to prevent the formation of seepage planes between fill lifts Placement and compaction of the cut-off trench and impervious core fill materials should be nonitored by the Geotechnical Engineer on a full-time basis to ensure that fill materials are being placed and compacted in accordance with plans and specifications

# General Embankment Construction

Detailed plan of the SWM pond was not available at the time this report was prepared. However, it is anticipated that embankments will be required at the southern section of the pond The results of the borings indicate that the cut slopes should primarily contain Silty SAND (SM)

# GEOTECHNICAL RECOMMENDATIONS (CONT'D

and Sandy SILT (ML) soils. Based on the results of the test borings, the natural soils ncountered in the cut slopes should be suitable for a 3H:1V or flatter slopes. The fill slopes should consist of embankment fill as recommended in the Fill Placement and Compaction

Embankment soils placed outside the limits of the cut-off trench and impervious core should consist of soils classified as CL, ML, SC, SM, SC-SP, or SM-SP in accordance with ASTM D-2487 and should be suitable for 3H:1V or flatter slopes. Soils of these types should be readily available from excavated materials associated with the pond construction, although care will need to be exercised to ensure that the materials do not contain excessive amounts of organics.

To facilitate complete compaction of new fill materials within the planned sloped areas for the proposed SWM ponds and to prevent the formation of potential slip surfaces, any new fill naterials must be adequately benched into competent natural soils and the filling operations should be extended laterally (i.e. overfilled) beyond the planned final grades. Subsequent to compacting the embankment or slope materials beyond the planned final grades, the overfill materials should be carefully removed to create the proposed slope configuration and to maintain e compacted surface. The compacted slope surface must be scarified before the placement of topsoil in order to provide for adherence of the topsoil to the slope configuration and stabilized with vegetation as expeditiously as possible after grading.

# Earthwork Operations

1.1

Subgrade preparation generally should include the removal of the topsoil and the removal of soft or loose soils and other unsuitable materials from any proposed construction areas. The actual lepths, quantities, and quality of surface materials must be determined during the removal perations. We recommend that earthwork clearing be extended a minimum of 10 feet beyond the proposed construction limits. Stripping limits should be extended an additional 1 foot for each foot of fill required at the exterior edges.

Prior to the placement of any fill materials or subbase materials, the exposed subgrade soils should be examined by a qualified representative of the Geotechnical Engineer. The exposed soils should be thoroughly prooffolled by a vehicle having an axle weight of at least 10 tons, such as a loaded tandem-axle dump truck. This procedure is intended to assist in identifying any localized yielding materials. In the event that any yielding areas are encountered during the proofrolling operations, the subgrade should be either thoroughly densified in-place. scarified/scrated and recompacted, or undercut to firm ground and replaced with controlled

Fill Placement and Compaction Prior to placement of compacted fill, representative bulk samples (about 50 pounds) should be taken of the proposed fill soils and laboratory tests should be conducted to determine Atterberg Limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. In general, any materials to be used as structural fill should consist of those materials previously described in the previous sections pertaining to Cut-off Trench and Impervious Core Construction and General Embankment Construction. Materials acceptable for use in engineered fills should be free of organic matter (less than 3 percent by weight) and debris, containing no rocks greater than 4 inches in their largest dimension. Any off-site borrow soils, if required, should meet the same material requirements and should be approved by the

The on-site soils generally should be acceptable for re-use as embankment fill with the restrictions previously addressed. As previously mentioned, there appears to be an insufficient quantity of the on-site soils suitable for use in the construction of the cutoff trenches and impervious cores. This material will need to be imported to the project site. Bulk samples should be taken of the proposed impervious soils and submitted to the Geotechnical Engineer for approval prior to the importation of this material to the site.

Due to the textural variations of the on-site soils, variations in moisture-density relationships should be anticipated. Such changes must be determined in the field by the Geotechnical Engineer, or his authorized representative, during the earthwork operations and treat-

All structural fill should be placed in loose lifts which do not exceed 8 inches in thickness, and should be compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor compaction test method (ASTM D 698). Generally, the moisture content of the fill materials should be maintained within ±2 percentage points of the optimum moisture content (OMC) for the fill materials, as determined by ASTM D 698

The footprints of the SWM embankment should be well defined, including the limits of the fill zones, at the time of fill placement. Grade controls should be maintained throughout the filling operations. All filling operations should be observed on a full-time basis by a qualified representative of the Geotechnical Engineer to determine that the minimum compaction requirements are being achieved. A minimum of one compaction test per lift and every 2,500 square foot of lift area should be made. The elevations and locations of the tests should be

At the end of each work day, all fill areas should be eraded to facilitate positive drainage of any precipitation and the surface should be sealed by use of a smooth-dram roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the contractor should scarify existing subgrades so that a weak plane will not be formed between the new fill and the existing subgrade soils. We recommend that subgrade soils be scarified to depths of about 6 inches prior to placement of new fill

excessively wet. Borrow fill materials should not contain frozen materials at the time of placement. All frozen or frost-heaved soils should be removed prior to placement of controlled and compacted fill, granular subbase materials, foundation or slab concrete, and/or asphalt pavement materials. Similarly, excessively wet soils should be scarified and aerated and properly compacted.

Fill materials should not be placed on frozen soils or frost-heaved soils and/or on soils that are

If any problems are encountered during the earthwork operations, or if site conditions deviate from those encountered during our subsurface exploration, the Geotechnical Engineer should be

# Construction Consideration

Due to the presence of fines, some of the near surface on-site soils will be sensitive to moisture and disturbance. Construction activities in the presence of excess moisture can lead to softening of the subgrade soils and loss of bearing capacity. Therefore, it will be prudent to schedule earthwork operations during the warmer and drier seasons that typically extend from late spring to early fall. Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas, including structural and payement areas. It is advisable to designate hand roads and traffic areas to limit the areas of disturbance and to prevent construction traffic from excessively degrading the sensitive subgrade soils, especially the very moisture sensitive clayey soils.

A firm work surface should be established prior to construction of new fills. Also, the moisture contents of the fill soils at the time of placement should be carefully controlled. These measures are necessary to ensure that the required compaction effort can be achieved without excessive pumping or movement of the fill mass.

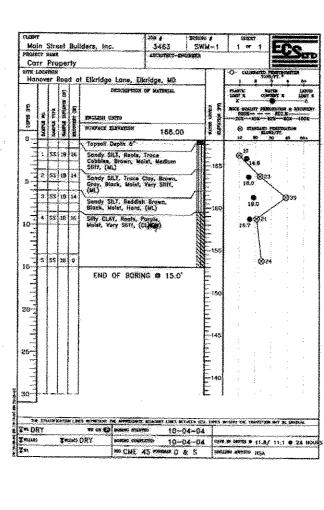
Based on the test borings, the encountered groundwater should not pose any significant problem on the construction. Any groundwater encountered during construction will most likely be a result of surface water infiltration and perched water conditions, and should be readily managed by interceptor trenches and localized systems of sumps and pump

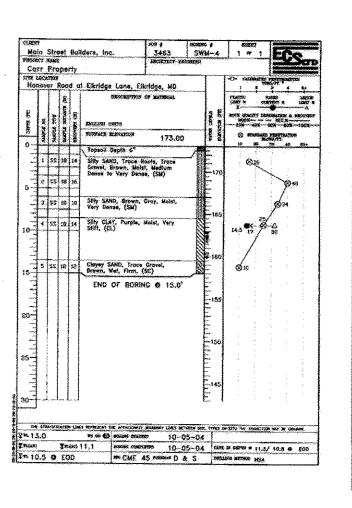
Surface drainage conditions should be properly maintained. Surface water should be directed away from the construction area, and the work area should be sloped at a grade of 1 to 2 percent to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each work day, the subgrade should be sealed by rolling the surface with a smooth drum roller to minimize infiltration of surface wate

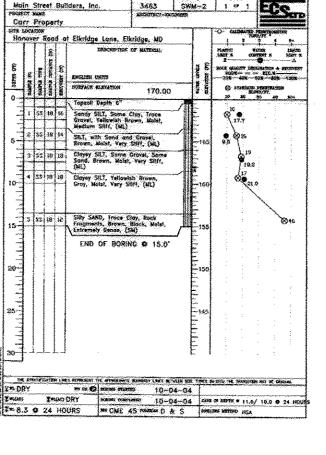
All foundation excavations must be protected to prevent the disturbance of the subgrade materials and to minimize any potential loss of support capacity. Foundation concrete should be placed on the same day that foundation excavations are excavated and approved. Should excavation and placement of foundation concrete the same day not be practical, we recommend that a concrete mud mat, 2 inches to 3 inches thick, be placed to protect the subgrade soils from moisture changes, and disturbance during construction activity. If protection of the soils is not provided, then undercutting of soft or loose soils and replacement with controlled fill may be necessary prior to the placement of reinforcing steel and foundation concrete. Prior to the placement of any foundation concrete or mad mat, the subgrade soils must be carefully examined and tested by the Geotechnical Engineer to confirm the availability of the design soil hearing capacity. To minimize disturbance to the subgrade soils during excavation, we recommend that a bucket without scarifying teeth and hand excavation be utilized during the final phases of the excavation for the foundations.

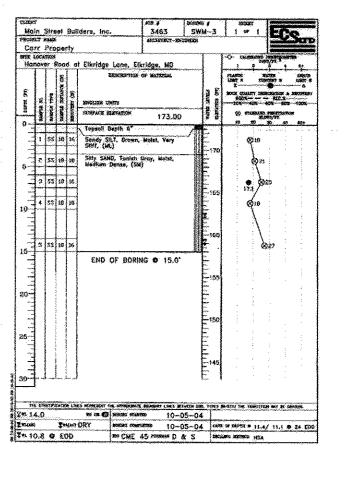
Cuts or excavations associated with building and utility excavations may require forming or bracing, slope flattening or other physical measures to control sloughing and/or prevent slope ailures. Contractors should be familiar with applicable OSHA and MOSHA codes to ensure that adequate protection of the excavations and trench walls is provided.

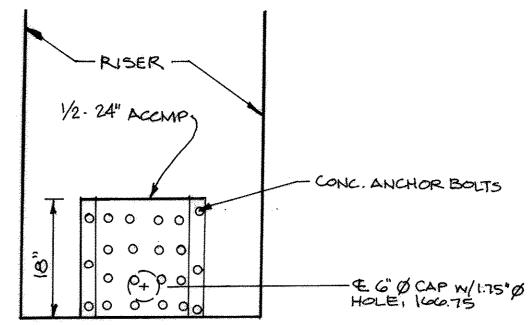
The surface soils will be crodible. Therefore, the contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current local requirements.





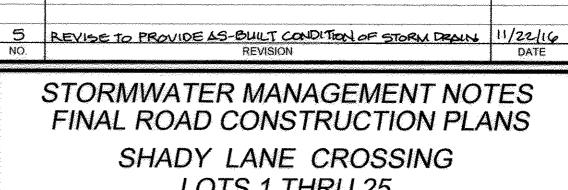






LOW FLOW HOOD DETAIL

NO AS-BUILT INFORMATION ON THIS SHEET

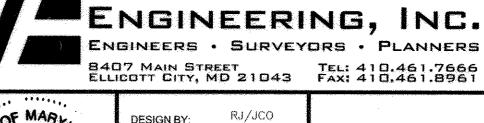


LOTS 1 THRU 25 6168 HANOVER ROAD

TAX MAP #38 GRID 9

LIBER 505 AND FOLIO 295

PARCEL 235 HOWARD COUNTY, MARYLAND ROBERT H. VOGEL





**1ST ELECTION DISTRICT** 

DRAWN BY: CHECKED BY: SCALE: W.O. NO.:

RJ/JCO DATE: SEPTEMBER, 2008 AS SHOWN 04-33.03

11-14-08 CHIÉF, BUREAU OF HIGHWAYS /45 DATE APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, DEVELOPMENT ENGINEERING DIVISION

REVIEWED FOR HOWARD S.C.D. & MEETS TECHNICAL REQUIREMENTS

BY THE DEVELOPER:

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

"I HEREBY CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PER—SONAL KNOWLEDGE OF THE SITE CONDITIONS, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT."

SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE)

BY THE ENGINEER:

Y HE THE OFFICER TO COUNTY HEALTH DEPARTMENT

FOR PUBLIC WATER AND PUBLIC SEWERAGE SYSTEMS

5705 LANDING ROAD ELKRIDGE, MARYLAND 21075 (410) 796-1850

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS

THAT I AM A DULY LICENSED PROFESSIONAL

EXPIRATION DATE: SEPTEMBER 27, 2008."

MARYLAND, LICENSE NO. 16193

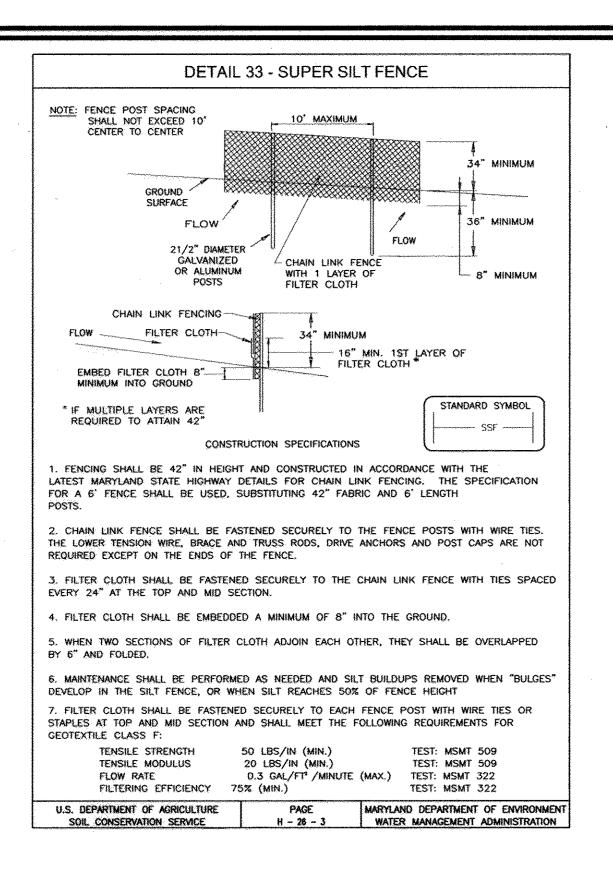
WERE PREPARED OR APPROVED BY ME, AND

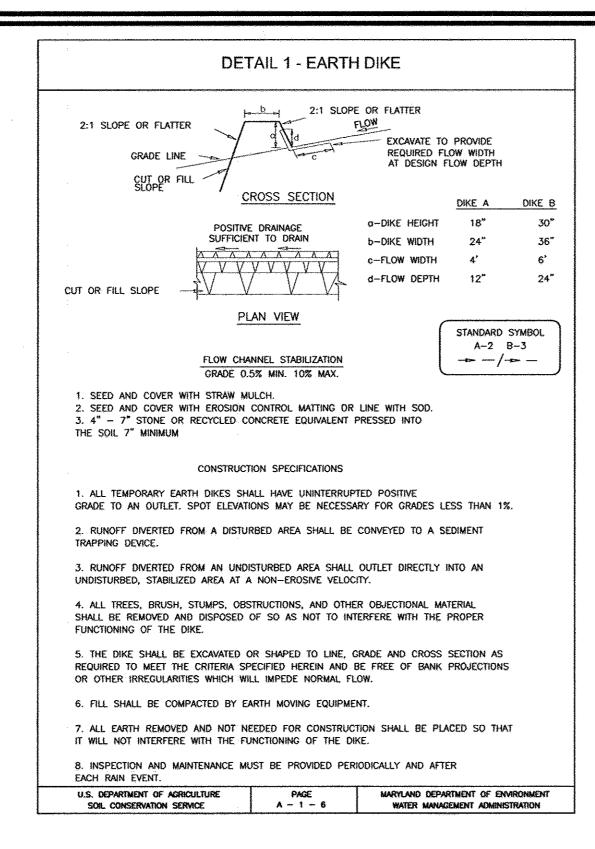
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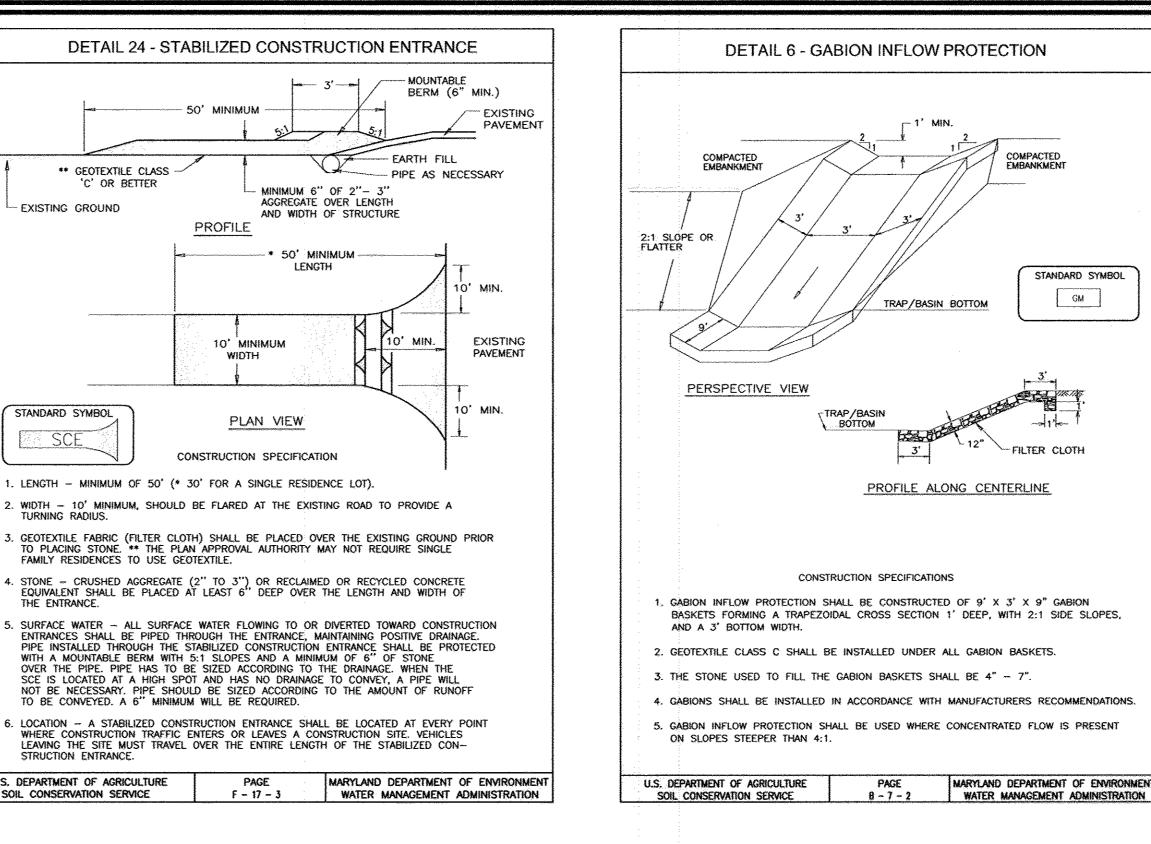
OWNER/DEVELOPER

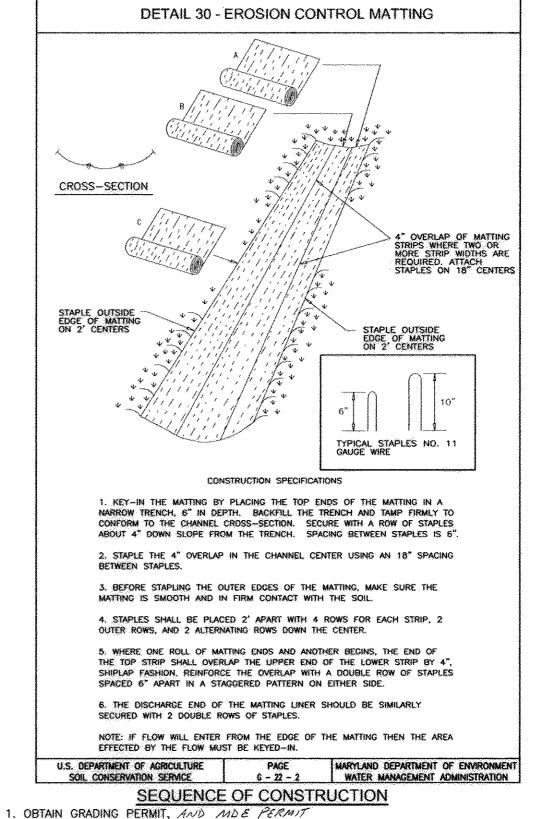
6168 INVESTMENT & RENTAL PROPERTIES, LLC

SHEET 13









# 21.0 STANDARDS AND SPECIFICATIONS FOR TOPSOIL

PLACEMENT OF TOPSOIL OVER A PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION.

TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETABLE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.

# CONDITIONS WHERE PRACTICE APPLIES

CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.

LIMESTONE IS NOT FEASIBLE.

AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL

# CONSTRUCTION AND MATERIAL SPECIFICATIONS

MUST MEET THE FOLLOWING:

TOPSOIL SHALL BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR A SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. REGARDLESS, TOPSOIL SHALL NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND SHALL CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS ROOTS, TRASH, OR OTHER MATERIALS LARGER THAT 1 AND 1/2" IN

II. TOPSOIL MUST BE FREE OF PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACKGRASS, JOHNSONGRASS, NUTSEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.

III. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 4-8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL. LIME SHALL BE DISTRIBUTED UNIFORMLY OVER DESIGNATED AREAS AND WORKED INTO THE SOIL IN CONJUNCTION WITH TILLAGE OPERATIONS AS DESCRIBED IN THE FOLLOWING PROCEDURES.

II. FOR SITES HAVING DISTURBED AREAS UNDER 5 ACRES:

III. FOR SITES HAVING DISTURBED AREAS OVER 5 ACRES I. ON SOIL MEETING TOPSOIL SPECIFICATIONS, OBTAIN TEST RESULTS DICTATING FERTILIZER AND LIME AMENDMENTS REQUIRED A. PH FOR TOPSOIL SHALL BE BETWEEN 6.0 AND 7.5. THE TESTED SOIL DEMONSTRATES A PH OF LESS THAN

PHYTO-TOXIC MATERIALS.

NATURAL TOPSOIL

V. TOPSOIL APPLICATION

SEDIMENT TRAPS AND BASINS.

- R" HIGHER IN FLEVATION.

OR WATER POCKETS.

00 PARTS PER MILLION SHALL NOT BE USED. D NO SOD OR SEED SHALL BE PLACED ON SOIL SOIL WHICH

USED FOR WEED CONTROL UNTIL SUFFICIENT TIME

ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF

BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY

THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF

II. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMMENDMENTS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION—SECTION I—VEGETATIVE

WHEN TOPSOILING, MAINTAIN NEEDED EROSION AND

II. GRADES ON THE AREAS TO BE TOPSOILED, WHICH HAVE

III. TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED IN A 4" -

8" LAYER AND LIGHTLY COMPACTED TO A MINIMUM THICKNESS OF 4".

SPREADING SHALL BE PERFORMED IN SUCH A MANNER THAT SODDING

CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS

IV. TOPSOIL SHALL NOT BE PLACE WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL

IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE

DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL

RESULTING FROM TOPSOILING OR OTHER OPERATIONS SHALL BE

PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE

SEDIMENT CONTROL PRACTICES SUCH AS DIVERSIONS, GRADE

STABILIZATION STRUCTURES, EARTH DIKES, SLOPE SILT FENCE AND

BEEN PREVIOUSLY ESTABLISHED, SHALL BE MAINTAINED, ALBEIT 4"

NOTE: TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED

HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS

), SUFFICIENT LIME SHALL BE PRESCRIBED TO RAISE HE PH TO 6.5 OR HIGHER. B. ORGANIC CONTENT OF TOPSOIL SHALL BE NOT LESS THAN 1.5 PERCENT BY WEIGHT TOPSOIL HAVING SOLUBLE SALT CONTENT GREATER THAN

THIS PRACTICE IS LIMITED TO AREAS HAVING 2:1 OR FLATTER

A. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL

3. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH

THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.

THE SOIL IS SO ACIDIC THAT TREATMENT WITH

II. FOR THE PURPOSE OF THESE STANDARDS AND SPECIFICATIONS. CONSIDERATION AND DESIGN FOR ADEQUATE STABILIZATION. AREAS HAVING SLOPES STEEPER THAN 2:1 SHALL HAVE THE APPROPRIATE STABILIZATION SHOWN ON THE PLANS.

TOPSOIL SALVAGED FROM THE EXISTING SITE MAY BE USED PROVIDED THAT IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOLIND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PURISHED BY USDA-SCS IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENTAL STATION.

I. TOPSOIL SPECIFICATIONS - SOIL TO BE USED AS TOPSOIL

PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION -

SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS.

# PERMANENT SEEDING NOTES

APPLY TO GRADED OR CLEARED AREAS NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY

SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ONE OF

THE FOLLOWING SCHEDULES: 1) PREFERRED-APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS) 100 SO FT.) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS.) 1000 SQ.FT.) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ.FT.)

2) ACCEPTABLE-APPLY 2 TONS PER ACRE DOLOMATIC LIMESTONE (92 LBS/ 1000 SQ.FT.) AND APPLY 1000 LBS. PER ACRE 10-10-10- FERTILIZER (23 LBS./1000 SQ.FT.) BEFORE SEEDING. HARROW OR DISC INTO UPPER

SEEDING: FOR THE PERIODS MARCH 1 THRU APRIL 30, AND AUGUST 1 THRU OCTOBER 15, SEED WITH 60 LBS. PER ACRE (1.4 LBS/1000 SQ.FT.) OF KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 THRU JULY 31, SEED (.05 LBS./1000 SQ.FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THRU FEBRUARY 28, PROTECT SITE BY: OPTION (1) 2 TONS PER ACRE WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) USE SOD. OPTION (3) SEED WITH 60 LBS/ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS/ACRE WELL ANCHORED

MULCHING: APPLY 1 1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ. FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ.FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ.FT.) FOR ANCHORING.

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.

# TEMPORARY SEEDING NOTES

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY

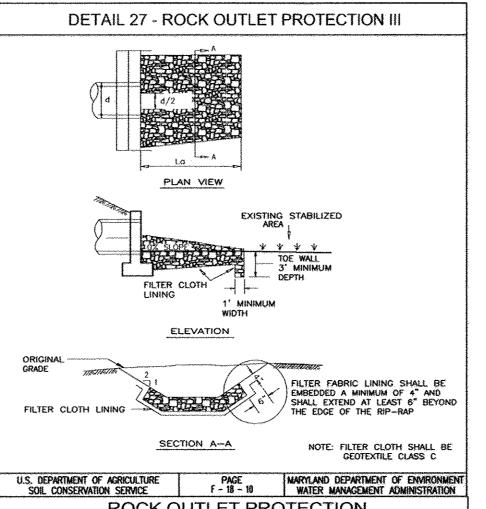
SOIL AMENDMENTS: APPLY 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ.FT). SEEDING: FOR PERIODS MARCH 1 THRU APRIL 30 AND FROM AUGUST 15 THRU NOVEMBER 15, SEED WITH 2 1/2 BUSHEL PER ACRE OF ANNUAL RYE (3.2 LBS./1000 SQ.FT.) FOR THE PERIOD MAY 1 THRU AUGUST 14, SEED WITH 3 LBS. PER ACRE OF WEEPING LOVEGRASS (.07 LBS./1000 SQ.FT.). FOR THE PERIOD NOVEMBER 1 THRU FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE

MULCHING: APPLY 1 1/2 TO 2 TONS PER ACRE (70 TO 90 LBS./1000 SQ.FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ.FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ.FT.) FOR ANCHORING.

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

# SEDIMENT CONTROL NOTES

- 1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSE AND PERMITS SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (313-1855).
- 2. ALL VEGETATION AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: (A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3:1, (B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE
- 4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 7, HOWARD COUNTY
- 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, SOD, TEMPORARY SEEDING AND MULCHING (SEC. G). TEMPORARY STABILIZATION WITH MULCH ALONE SHALL 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 : AREA DISTURBED AREA TO RE ROOFED OR PAVED AREA TO BE VEGETATIVELY STABILIZED OFFSITE WASTE/BORROW AREA LOCATION
- 8. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROLS 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 WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.
- \* TO BE DETERMINED BY CONTRACTOR, WITH PRE-APPROVAL OF THE SEDIMENT CONTROL INSPECTOR WITH AN APPROVED AND ACTIVE GRADING PERMIT



ROCK OUTLET PROTECTION CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER, RIP-RAP, OR GABION SHALL BE PREPARED TO THE REQUIRED LINES AND GRADES. ANY FILL REQUIRED IN THE SUBGRADE SHALL BE COMPACTED TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL

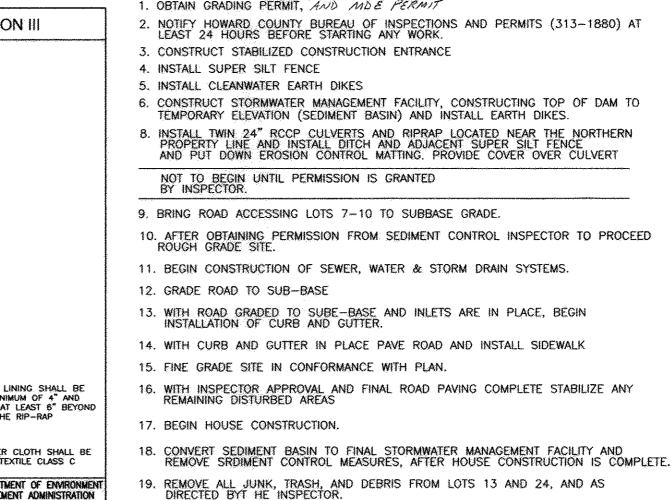
2. THE ROCK OR GRAVEL SHALL CONFORM TO THE SPECIFIED GRADING LIMITS WHEN INSTALLED RESPECTIVELY IN THE RIP-RAP OR FILTER.

3. GEOTEXTILE SHALL BE PROTECTED FROM PUNCHING, CUTTING, OR TEARING. ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE SHALL BE REPAIRED BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. ALL OVERLAPS WHETHER FOR REPAIRS OR FOR JOINING TWO PIECES OF GEOTEXTILE SHALL BE A MINIMUM OF ONE FOOT.

4. STONE FOR THE RIP-RAP OR GABION OUTLETS MAY BE PLACED BY EQUIPMENT. THEY SHALL BE CONSTRUCTED TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. THE STONE FOR RIP-RAP OR GABION OUTLETS SHALL BE DELIVERED AND PLACED IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. RIP-RAP SHALL BE PLACED IN A MANNER TO PREVENT DAMAGE TO THE FILTER BLANKET OR GEOTEXTILE. HAND PLACEMENT WILL BE REQUIRED TO THE EXTENT NECESSARY TO PREVENT DAMAGE TO THE PERMANENT WORKS.

5. THE STONE SHALL BE PLACED SO THAT IT BLENDS IN WITH THE EXISTING GROUND. IF THE STONE IS PLACED TOO HIGH THEN THE FLOW WILL BE FORCED OUT OF THE CHANNEL AND SCOUR ADJACENT TO THE STONE WILL OCCUR. U.S. DEPARTMENT OF AGRICULTURE PAGE MARYLAND DEPARTMENT OF ENVIRONMENT

SOIL CONSERVATION SERVICE | F - 18 - 8A | WATER MANAGEMENT ADMINISTRATION



NOTES DURING GRADING AND AFTER EACH RAINFALL, THE CONTRACTOR SHALL INSPECT AND PROVIDE THE NECESSARY MAINTENANCE ON THE SEDIMENT AND EROSION CONTROL MEASURES SHOWN

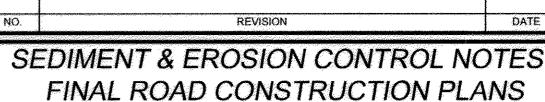
20. INSTALL STREET TREES AND ALL LANDSCAPING

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLIED

A. 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, SWALES, DITCH PERIMETER SLOPES

NO AS-BUILT INFORMATION ON THIS SHEET SLOPES AND ALL SLOPES GREATER THAN 3:1.

B. 14 CALENDAR DAYS FOR ALL OTHER DISTURBED AREAS.



# SHADY LANE CROSSING

LOTS 1 THRU 25 6168 HANOVER ROAD

LIBER 505 AND FOLIO 295

TAX MAP #38 GRID 9

1ST ELECTION DISTRICT

PARCEL 235 HOWARD COUNTY, MARYLAND

**DURATION** 

1 DAY

1 DAY

2 DAYS

3 WEEKS

2 WEEKS

1 WEEK

5 DAYS

1 WEEK

1 WEEK

2 DAYS

3 DAYS

1 WEEK

WEEK

3 DAYS

5 DAYS

1 DAY

1 YEAR

2 DAY

1 DAY

WEEK

ROBERT H. VOGEL ENGINEERING, INC. ENGINEERS . SURVEYORS . PLANNERS

8407 MAIN STREET TEL: 410.461.7666 ELLICOTT CITY, MD 21043 FAX: 410.461.8961



RJ/JCO DESIGN BY: DRAWN BY: CHECKED BY: DATE: SEPTEMBER, 2008 SCALE: W.O. NO.:

RJ/JCO AS SHOWN SHEET 13

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF HIGHWAYS \_\_\_\_\_\_\_\_\_\_ APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION

REVIEWED FOR HOWARD S.C.D. & MEETS TECHNICAL REQUIREMENTS.

HOWARD S.C.D.

BY THE DEVELOPER:

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

SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE)

BY THE ENGINEER: "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."

SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE)

FOR PUBLIC WATER AND PUBLIC SEWERAGE SYSTEMS

COUNTY HEALTH DEPARTMENT

OWNER/DEVELOPER 6168 INVESTMENT & RENTAL PROPERTIES, LLC 5705 LANDING ROAD ELKRIDGE, MARYLAND 21075 (410) 796-1850

PROFESSIONAL CERTIFICATION

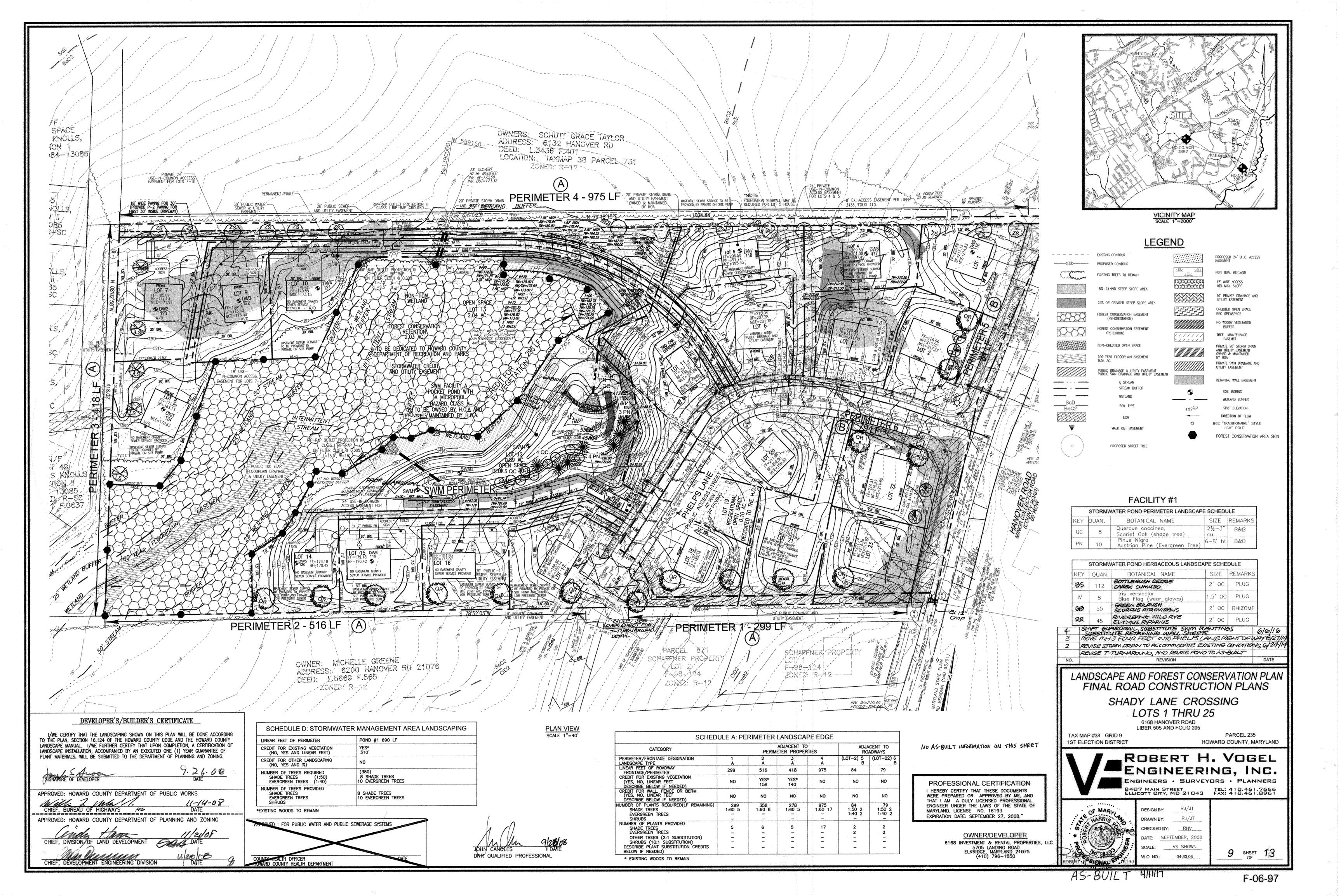
WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL

ENGINEER UNDER THE LAWS OF THE STATE OF

EXPIRATION DATE: SEPTEMBER 27, 2008."

MARYLAND, LICENSE NO. 16193

I HEREBY CERTIFY THAT THESE DOCUMENTS



# FOREST RETENTION AREAS AND NOTES

- FORESTED STREAM BUFFERS ARE RETAINED IN OPEN SPACE LOTS.

  NO RARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THIS SITE.
- 3. THE WOODED STEEP SLOPES ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.
- 4. FORESTED AREAS ADJACENT TO FLOODPLAINS AND STREAM BUFFERS ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.
- 5. THERE ARE NO ISOLATED FOREST STANDS ON THIS SITE. 6. CHANGES IN GRADING AND RUNOFF WITHIN CONSTRUCTION/INSTALLATION AREAS WILL NOT ADVERSELY AFFECT THE SOILS WITHIN THE FOREST RETENTION AREA. SEDIMENT CONTROL MEASURES WILL REDIRECT CONCENTRATED FLOW RUNOFF TO STORMWATER MANAGEMENT FACILITIES, RETAIN SEDIMENT WITHIN THE CONSTRUCTION SITE, AND/OR REDIRECT CLEAN WATER AWAY FROM CONSTRUCTION AREAS.
- 7. FOREST CONSERVATION PLAN PREPARED BY FREDERICK WARD AND ASSOCIATES, DATED JANUARY 2002. FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1202 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION
- MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY THE RETENTION OF 1.87 AC. (81457.2 × \$0.20 = \$16292) OF FOREST IN A FOREST CONSERVATION EASEMENT PAYABLE BY DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT. A FEE-IN-LIEU PAYMENT FOR REMAINING 1.06 AC. (46,173.60 × \$0.75= \$34,630.20) IS REQUIRED, WHICH IS PAID TO THE FOREST CONSERVATION FUND.
- 8. THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.

# FOREST PROTECTION NOTES

# PRE-CONSTRUCTION ACTIVITES

- 1. FOR RETENTION AREAS, INSTALL BLAZE ORANGE FENCE AND RETENTION SIGNS BEFORE CONSTRUCTION BEGINS.
- FENCING SHALL BE MAINTAINED IN GOOD CONDITION AND
- PROMPTLY REPAIRED OR RESTORED AS THE SITUATION WARRANTS. 3. A QUALIFIED TREE CARE EXPERT SHALL DETERMINE IF ROOT PRUNING IS REQUIRED ALONG THE LIMIT OF DISTURBANCE. ROOT PRUNE TREES AS REQUIRED. WATER ANY ROOT-PRUNED TREES IMMEDIATELY AFTER ROOT-PRUNING AND

# CONSTRUCTION PHASE

NO DISTURBANCE OR DUMPING IS ALLOWED INSIDE THE TREE RETENTION AREA.

MONITOR FOR SIGNS OF STRESS DURING CONSTRUCTION.

- 2. NO EQUIPMENT SHALL BE OPERATED INSIDE THE TREE RETENTION AREA INCLUDING TREE CANOPIES.
- 3. IN THE EVENT OF DROUGHT, THE PROTECTED TREES SHALL BE MONITORED FOR SIGNS OF STRESS AND WATERED AS NEEDED.

# POST-CONSTRUCTION ACTIVITIES

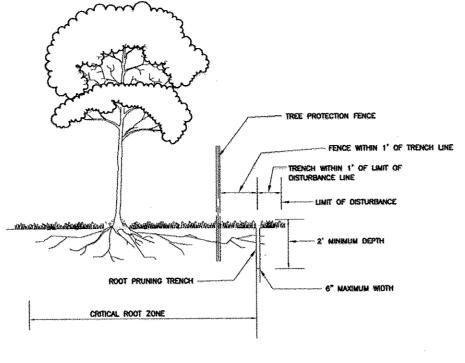
- 1. AT THE DIRECTION OF A QUALIFIED TREE CARE EXPERT, DAMAGES TO RETAINED TREES SHALL BE REPAIRED BY THE CONTRACTOR.
- 2. FENCE REMOVAL AND STABILIZATION SHALL BE AS PER THE
- 3. DO NOT REMOVE SIGNS.

COST ESTIMATE: (For bonding purposes, only) RETENTION OF 1.87 AC.

SEDIMENT AND EROSION CONTROL PLAN

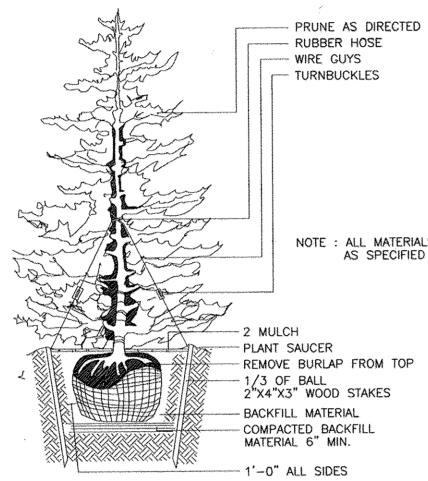
1.87 ACRES OF RETENTION WILL BE RETAINED IN A FOREST CONSERVATION EASEMENT (0.2X81,457SF=\$16,291.40) AND FEE-IN-LIEU OF 1.06 ACRES (0.5X46,174=\$23,087.00).

THE FEE IS TO BE PAID WITH THE DEVELOPERS AGREEMENT.



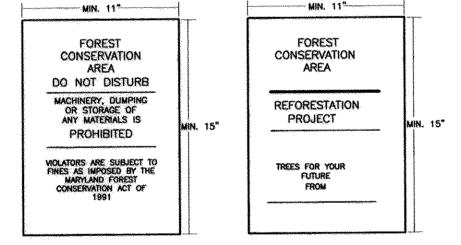
. RETENTION AREAS TO BE ESTABLISHED AS PART OF THE FOREST CONSERVATION PLAN REVIEW PROCESS. 2. BOUNDARIES OF RETENTION AREAS TO BE STAKED, FLAGGED AND/OR FENCED PRIOR TRENCHING. EXACT LOCATION OF TRENCH SHOULD BE IDENTIFIED. 4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH SOIL REMOVED OR ORGANIC SOIL. 5. ROOTS SHOULD BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.

# **ROOT PRUNING**



TYPICAL EVERGREEN TREE PLANTING DETAIL NOT TO SCALE

# NOTE : ALL MATERIALS



- 1. BOTTOM OF SIGNS TO BE HIGHER THAN TOP OF TREE PROTECTION FENCE. 2. SIGNS TO BE PLACED APPROXIMATELY 100' FEET APART. CONDITIONS ON SITE AFFECTING VISIBILITY MAY WARRANT PLACING SIGNS CLOSER OR FARTHER APART.
- 3. ATTACHMENT OF SIGNS TO TREES IS PROHIBITED.

FOREST CONSERVATION AREA SIGN NTS

# HIGHLY VISABLE FLAGGING -USE 2" X 4" LUMBER FOR ANCHOR POSTS SHOULD BE MINIMUM 2" STEEL "U" CHANNEL MAXIMUM 8 FEET OR 2" X 2" TIMBER, 6' IN LENGTH. USE 8' WIRE "U" TO SECURE FENCE BOTTOM. - ANCHOR POSTS MUST BE INSTALLED TO A DEPTH OF NO LESS THAN 1/3 OF THE TOTAL HEIGHT OF THE POST.

1. FOREST PROTECTION DEVICE ONLY.
2. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS. BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE. 4. ROOF DAMAGE SHOULD BE AVOIDED. 5. PROTECTION SIGNAGE SHOULD BE USED.
6. DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION.

BLAZE ORANGE PLASTIC MESH TYPICAL TREE PROTECTION FENCE DETAIL

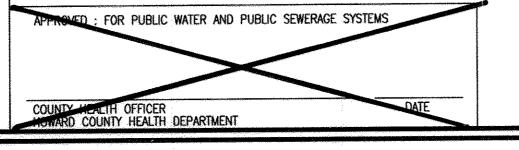
# I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

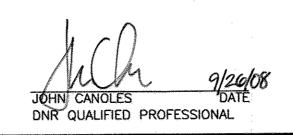
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS DATE APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DEVELOPER'S/BUILDER'S CERTIFICATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION





# FOREST CONSERVATION WORKSHEET

# NET TRACT AREA: A. TOTAL TRACT AREA B. AREA WITHIN 100 YEAR FLOODPLAIN

C. NET TRACT AREA LAND USE CATEGORY (FROM TABLE 3.2.1, PAGE 40, MANUAL)

INDUT THE NUMBER "1" HADER THE APPROPRIE LAND LISE

			ONE ENTRY		LAND (	JSE		
ARA	MDR	IDA	HDR	MPD	CIA			
0	0	0	1	0	0			
D. AFFOREST E. CONSERVA							= 1.31 = 1.75	
EXISTING FOR	EST COVER	:						
F, EXISTING I G. AREA OF	FOREST CO FOREST ABO	VER (EXCL OVE CONS	UDING FLOO ERVATION TI	DPLAIN) HRESHOL		6.59 4.84		
BREAK EVEN	POINT:							
H. BREAK EV I. CLEARING			MITIGATION	manus .		2.72 3.87		
PROPOSED F	OREST CLEA	ARING:						

K. TOTAL AREA OF FOREST TO BE CLEARED =

L. TOTAL AREA OF FOREST TO BE RETAINED =

PLANTING REQUIREMENTS:	
M. REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD = N. REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD = P. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD =	1.18 0.00 0.12
Q. TOTAL REFORESTATION REQUIRED = R. TOTAL AFFORESTATION REQUIRED = S. TOTAL REFORESTATION AND AFFORESTATION REQUIRED =	1.06 0.00 1.06

FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1202 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY THE RETENTION OF 1.87 AC. (81457.2 x \$0.20 = \$16,291.44) OF FOREST IN A FOREST CONSERVATION EASEMENT PAYABLE BY DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT. A FEE-IN-LIEU PAYMENT FOR REMAINING 1.06 AC. (46173.6 x \$0.75 = \$34,630.20) IS REQUIRED, WHICH IS PAID TO THE FOREST CONSERVATION FUND.

1.87 AC

0.16 AC

8.74 AC

1. THE TOPOGRAPHY SHOWN HEREIN IS BASED ON A TOPOGRAPHIC SURVEY PREPARED BY FREDERICK WARD ASSOCIATES IN JANUARY 2002.

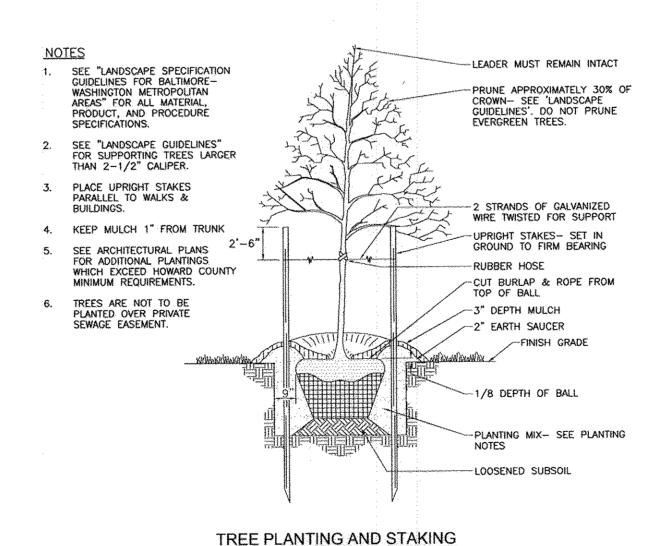
# **GENERAL NOTES**

A MINIMUM SPACING OF 20' SHALL BE MAINAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED WITH THE DEVELOPER'S AGREEMENT AS PART OF THE FINAL PLAN

# **DEVELOPER'S AGREEMENT**

FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING PROVIDED PER THE LANDSCAPE MANUAL TO BE POSTED WITH THE DEVELOPER'S AGREEMENT. THE AMOUNT WILL BE \$11,700 FOR 4 EVERGREEN TREES AND 37 SHADE TREES. THE AMOUNT FOR STREET TREES WILL BE \$9,600 FOR 32 SHADE TREES.



DECIDUOUS TREES UP TO 2-1/2" CALIPER

NOT TO SCALE

PROFESSIONAL CERTIFICATION 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: SEPTEMBER 27, 2008.

OWNER/DEVELOPER INVESTMENT & RENTAL PROPERTIES, LLC 5705 LANDING ROAD ELKRIDGE, MARYLAND 21075 (410) 796-1850

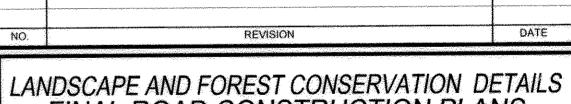
KEY	QUAN.	BOTANICAL NAME	SIZE	REM.
	5	LIQUIDAMBAR STYRACIFLUA AMERICAN SWEETGUM (SHADE)	2 1/2"-3" Cal.	B & B
, or,	15	QUERCUS ROBUR 'FASTIGIATA' COLUMNAR ENGLISH OAK (SHADE)	2 1/2"-3" Cal.	B & B
(żs)	17	ZELKOVA SERRATA 'VILLAGE GREEN' VILLAGE GREEN ZELKOVA (SHADE)	2 1/2"-3" Cal.	8&8
<b>2</b>	4	CUPRESSOCYPARIS LEYLANDI LEYLAND CYPRESS (EVERGREEN)	5' – 6' Ht.	B & B
CONFO WITH L 2. CONTR 3. FINAL TREES	RM TO THE CAMW PLA ACTOR SHA LOCATION SHALL NO	RIALS SHALL BE FULL AND HEAVY, BE WEUE MOST CURRENT AAN SPECIFICATIONS AND NTING SPECIFICATIONS.  ALL VERIFY LOCATION OF ALL UNDERGROUN OF PLANT MATERIAL MAY NEED TO VARY TO THE POTTOM OF DRAINAUTHE SPECIFY OF BUILD VERIFY PLANT CHANTITIES PRIOR TO BE	BE INSTALLED IN AC D UTILITIES PRIOR TO D MEET FINAL FIELD C SE SWALES.	CORDANCE DIGGING, CONDITIONS

CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

STREET TREE CALCULATIONS						
STREET NAME	LINEAR FEET	REQUIRED TREES	PROVIDED TREES			
PUBLIC ACCESS STREET-RAW 938/40		23	23			
HANOVER RD-RW	335/40	9	9			

STREET TREE PLANT LIST						
SYMBOL	QTL	BOTANICAL NAME	SIZE	REMARKS		
•	23	SHADE TREES ACER RUBRUM/ RED MAPLE	2 1/2" -3"Cal.	8&8		
( <del>+</del> )	9	PRUNUS SARGENTII SARGENT CHERRY	2 1/2" -3"Cal.	8&8		

# NO AS-BUILT INFORMATION ON THIS SHEET



# FINAL ROAD CONSTRUCTION PLANS SHADY LANE CROSSING

LOTS 1 THRU 25 6168 HANOVER ROAD

LIBER 505 AND FOLIO 295 TAX MAP #38 GRID 9

PARCEL 235 HOWARD COUNTY, MARYLAND



ROBERT H. VOGEL ENGINEERING, INC. ENGINEERS . SURVEYORS . PLANNERS



**1ST ELECTION DISTRICT** 

RJ/JCO DESIGN BY: RJ/JCO DRAWN BY: CHECKED BY: DATE: SEPTEMBER, 2008 SCALE:

SHEET 13

# RETAINING WALL SPECIFICATION GUIDELINES PART 3: INSTALLATION 1.01 Description A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall be careful not to disturb embankment and foundation materials beyond lines shown. B. All existing topsoil, rootmat and other soft or unsuitable materials shall, at a minimum, be removed from A. Retaining walls must be constructed under the supervision of a Maryland Registered Professional Engineer. B. Work includes furnishing and installing concrete modular block retaining wall units to the lines and grades shown on the construction drawings and as specified herein. C. Work includes preparing foundation soil, furnishing and installing leveling pad, unit fill and reinforced backfill to the lines and grades shown on the construction drawings. the footprint of the retained soil mass. C. If groundwater is encountered during the excavation of the backslope, a backslope drainage system shall be utilized. The system shall tie into the internal wall drainage system to provide adequate release of any water which accumulates behind the reinforced zone. D. Work includes furnishing and installing all related materials required for construction of the retaining wall as shown on the construction drawings. 1.02 Reference Standards A. Foundation shall be excavated as required for leveling pad dimensions shown on the construction drawings, or as directed by the Geotechnical Engineer. B. The required begring pressure beneath the footing of the wall must be verified in the field by a Geotechnical Engineer. Load Bearing Concrete Masonry Units. Sampling and Testing Concrete Masonry Units. Sizes of Aggregate for Road and Bridge Construction. Laboratory Compaction Characteristics using Standard Effort. C. Unsuitable soils shall be removed and replaced with approved material. D. Over—excavated areas shall be backfilled with approved, compacted backfill material or as approved by the 1.03 Delivery, Storage and Handling 3.03 Base Leveling Pad Contractor shall check the materials upon delivery to assure that proper materials have been received. Contractor shall prevent excessive mud, wet cement, epoxy, and similar materials (which may affix themselves) from coming in contact with the materials. Contractor shall protect the materials from damage and exposure to sunlight. Damaged materials shall not A. Leveling pad materials shall be placed upon an approved foundation as shown on the construction drawings B. Aggregate material shall be compacted to provide a dense, level surface on which to place the first course of modular units. Compaction shall be to at least 95% of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D 698). Leveling pad shall be prepared and leveled to ensure complete contact of retaining wall unit with base. 3.04 Unit Installation A. Owner will be responsible for soil testing and construction observations for quality control during earthwork and retaining wall construction operations. A. The first course of concrete modular units shall be carefully placed on the base leveling pad. Each unit shall be checked for level (in both directions) and alignment. checked for level (in both directions) and alignment. B. Install fiberglass connecting pins and fill all voids in and around the modular units with unit fill material. Tamp or rod unit fill to ensure that all voids are completely filled. C. Sweep excess material from top of units and install the next course. Ensure that the units of each course are completely filled, backfilled and compacted prior to proceeding to next course. D. Place each subsequent course, ensuring that pins protrude into adjoining courses a minimum of 1 inch. Two pins are required per unit. Pull each unit forward to obtain the desired offset (as noted on the plans), away from the fill zone, locking against the pins in the previous course and backfill as the course is completed. E. Repeat procedure to the extent of wall height. Wall construction shall not exceed 2 courses in height before reinforced backfill is placed. F. Follow wall erection and unit fill placement closely with any other backfilling required. Compaction of all soils shall be to 95% of the maximum dry density as determined in accordance with ASTM D 698. G. As appropriate where the wall changes elevation, units can be stepped with the grade or turned into the embankment with a convex return end. Provide appropriate buried units on compacted leveling pad in area of convex return end. PART 2: MATERIALS 2,01 Definitions A. Modular Wall Units - KEYSTONE or equivalent modular concrete facing and corner units, machine made from A. Modular Wail Units - KEYSTONE or equivalent modular concrete facing and corner units, machine made from portional cement, water, and mineral aggregates. B. Structural Geogrid - a structural geogrid formed by a regular network of integrity connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement. C. Unit Fill/Dirainage Aggregate - drainage aggegrate, such as No. 57 Stone, which is placed within the cells of the modular concrete units and immediately behind the units to a width of at least 12 inches. D. Reinforced Backfill - Compacted soil which is within the reinforced soil volume as shown on the plans. E. Excavation Face - The interface between the reinforced backfill and the retained fill. During construction, measures shall be taken to avoid developing a shear plane at this interface. F. Retained Backfill - On-site material located behind the reinforced zone of soil. 3.05 Geogrid Installation A. The geogrid type and length (direction perpendicular to the wall face) shall conform to those indicated on the construction drawings. Geogrid shall be laid continuously at the proper elevations and orientation as shown on the construction drawings or as directed by the Geotechnical Engineer. B. Correct orientation (roll direction) of the geogrid shall be verified by the Contractor. C. The geogrid shall be connected to the modular wall units by placing the geogrid over fiberglass pins and laying the grid back to the fill side. D. A filtering, non-woven geotextile shall be located between the drainage aggregate/unit fill and the reinforced backfill. The geotextile shall be folded back parallel, above and below the geogrid as necessary to ensure A. Concrete segmental units shall conform to the requirements of NCMA TEK 2-4 and have a minimum 28-day compression strength of 4,000 psi. The units shall also pass 150 freeze thaw cycles in water with less than 1% weight loss for samples tested in accordance with ASTM C-1262. B. Wall Face Units for general wall construction shall be KEYSTONE Standard II Units or equivalent. Sculptured face or straight (flat) face may be used. C. Top of wall Cap Units shall be KEYSTONE Cap Units or equivalent with fiberglass connecting pins. backfill. The geotextile shall be folded back parallel, above and below the geogrid as necessary to ensure continuous grid placement. E. The geogrid shall be pulled taut to set the geogrid against the fiberglass pins and to eliminate loose folds in the material. The fill surface shall be level. To tension the geogrid, backfill shall be placed over the geogrid from immediately behind the wall to the back end of the geogrid. F. No geogrid overlaps will be allowed in any length of geogrid perpendicular to the wall face except at corners or angled locations. The geogrid shall overlap rather than provide no coverage. A minimum of 4 inches of soil cover is 2.03 Fiberglass Connecting Pins A. Connecting pins shall be 1/2" diameter thermoset isopathalic polyester resin-pultruded fiberglass reinforcement rods supplied by the unit manufacturer. Construction adhesive for top of wall cap blocks shall be KEYSTONE KapSeaITM or an approved equivalent construction adhesive. Material shall conform to ASTM 2339 and shall be supplied by the block unit supplier. A. Backfill material shall be placed in 8 inch loose lifts and compacted to at least 95% of the maximum dry density as determined by ASTM D 698. The in-place moisture content shall be in the range of at the optimum moisture content to 2 percentage points higher than the optimum moisture content, as determined in accordance with ASTM D 698. A. Base Leveling and Pad Material . Material shall consist of crushed stone (GA S/B) as shown on the construction drawing. The leveling pad B. Backfill shall be placed, spread and compacted in such a manner that minimizes the development of slack or loss of pretension of the geogrid. Backfill shall be placed in horizontal layers. The excavation face shall be stepped or notched to provide compaction of backfill on a level surface and to increase the interlock between the retained soils and the reinforced backfill. C. Only hand—operated compaction equipment shall be allowed within 5 feet of the back surface of the KEYSTONE. shall be, at a minimum, 6-inches thick. MSHA No. 57 Stone or pea gravel is not permitted. Fill for units shall be free draining crushed stone or gravel, with a maximum aggregate size of 1/2" to 3/4" and no more than 5% passing the No. 50 sleve and conforming to ASTM D 448. Gradation of the unit fill shall be approved by the Geotechnical Engineer. Pea gravel shall not be used. MSHA No. 57 stone may be used. or equivalent units. D. Backfill shall be placed from immediately behind the wall towards the excavation face/retained soils and compacted to the specifications presented herein with appropriate compaction equipment. Tracked construction equipment shall not be operated directly on the geogrid. A minimum backfill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles shall no parameters as indicated under design parameters. The backfill material shall contain no particles greater than 2.5 inches in diameter. Other backfill materials my be approved by the Geotechnical Engineer. be permitted overtop the geogrid. F. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 10 mph). Avoid sudden braking and sharp turning. G. The suitability of the fill material must be confirmed by a Geotechnical Engineer. Material may be imported or site excavated soils exhibiting a USCS designation of a lean clay (CL) or clayey sand (SC). The material shall contain no less than 40 percent by weight passing the US Standard No. 200 H. The upper 8 inches of wall backfill shall consist of impervious soil, compacted to at least 95% of the maximum dry density as determined by ASTM D 698. The in-place moisture content shall be in the range of at the optimum moisture content to 2 percentage points higher than the optimum moisture content, as determined in accordance with ASTM D 698. sieve and exhibit a plasticity index no less than 4 and no greater than 20. Other materials may be approved A. Provide permanent mechanical connection to wall units with KEYSTONE KapSealTM or equivalent construction adhesive. Apply adhesive to top surface of lower unit and place cap unit atop adhesive. 1. The contractor shall submit samples and material specifications of the proposed backfill soils (unit fill, pad material, reinforced backfill) to the Geotechnical Engineer for approval. Soil must meet or exceed the friction angle specified in design parameters Place Cap Units over projecting pins from the units below. Pull forward to setback position. Backfill and compact to finished grade. Direct shear testing is required for all soil samples used for Reinforced Backfill. 2.06 Structural Geogrid A. The geogrid identified for the retaining wall consists of the following: B. Other geogrid may be utilized provided the materials meet or exceed the minimum strength with similar or better strain characteristics of the Tensar geogrid and are approved by the Geotechnical Engineer for use with soil backfill. DESIGN PARAMETERS The material shall be protected from sunlight and weather while stored on site in accordance with the Characteristics: Soil Parameters: Battered face wall (4.4%) Soil Type Maximum Grade Differential & Minimum Allowable Bearing Pressure: 20'-8" / 3,500 psf Reinforced fill A. A non-woven geotextile shall be utilized as shown on the plans to provide a filter between the unit fill/drainage aggregate and the reinforced backfill. The geotextile shall consist of a Mirafi 140N, or an approved equivalent. B. Where geograds are located, the geotextile shall be placed as illustrated on the plans. At junctions and ends, the geotextile shall be overlapped at least 12 inches. The geotextile shall be placed so that intimate contact is made between the geotextile and the backfill material. C. The material shall be protected from sunlight and weather while stored on site in accordance with the manufacturer's recommendation. Ripped or otherwise damaged material shall not be used. Retained soils Backslope Angle: Varies (2H:1V max) Foundation soils Toe Slope Angle: Varies (2H:1V max) Wall Embedment: Varies (8 inch min) Place Additional Pieces of Geogrid -When Angle Exceeds 20° Standard II Elevation 3" of Soil Fill is Required Between Overlapping Geogrid for Proper Anchorage (Typ.) Additional Drainage Fill -Extend Wall Height / 2 Standard II Plan STANDARD II UNIT SCALE: NTS Corner Unit Elevation Cap Unit Elevation **GEOGRID INSTALLATION ON CURVES** SCALE: NTS

18"

Cap Unit Plan

3-PLANE SPLIT

**CAP UNIT OPTION** SCALE: NTS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION IN

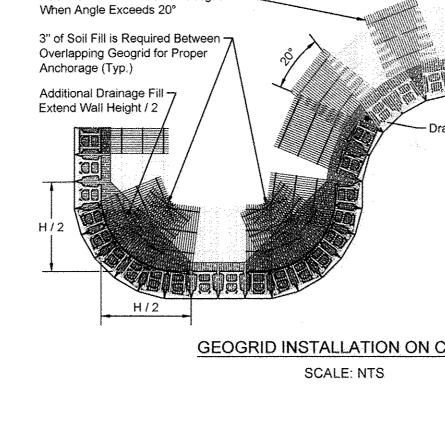
CHIEF, DIVISION OF LAND DEVELOPMENT

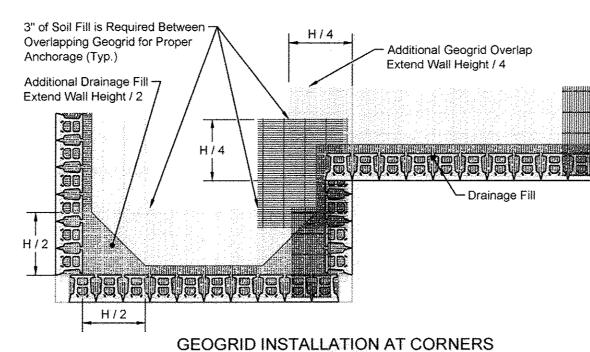
Corner Unit Plan

CORNER UNIT SCALE: NTS

425.16

4-25-66





SCALE: NTS

Professional Certification. 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. 42374, Expiration Date: 06/06/16

- GUARDRAIL (DESIGNED BY OTHERS)

250 psf (MAX) SURCHARGE LOAD

- 8" OF IMPERVIOUS SOILS

24" MIN. TO FIRST AGGREGATE DRAINAGE LAYER

NON-WOVEN GEOTEXTILE

DRAINAGE AGGREGATE

4" DIA, PERFORATED DRAIN COLLECTOR PIPE AT 10 FT. O.C.

CRUSHED STONE LEVELING PAD

(AASHTO #57, 12" MIN)

GEOGRID LENGTH VARIES, SEE PROFILE

(SEE PROFILE)

- GEOGRID SPACING VARIES

BACKSLOPE VARIES (2H:1V MAX)-

FOUNDATION SOILS q = 1,500 psf (MIN)

TYPICAL RETAINING WALL DETAIL

4.4% BATTERED FACE

SCALE: NTS

LEVELING PAD AND STEP DETAILS SCALE: NTS

TOP OF WALL STEPS

SCALE: NTS

(2) - 4" Cap Units or

(1) - 8" Cap Unit ¬

FENCE POST (DESIGNED BY OTHERS) -

TOP OF WALL, ELEVATION

VARIES, SEE PROFILE

KEYSTONE STANDARD II UNIT

TOE SLOPE VARIES (2H:1V MAX)

SEE PROFILE

EMBEDMENT VARIES.

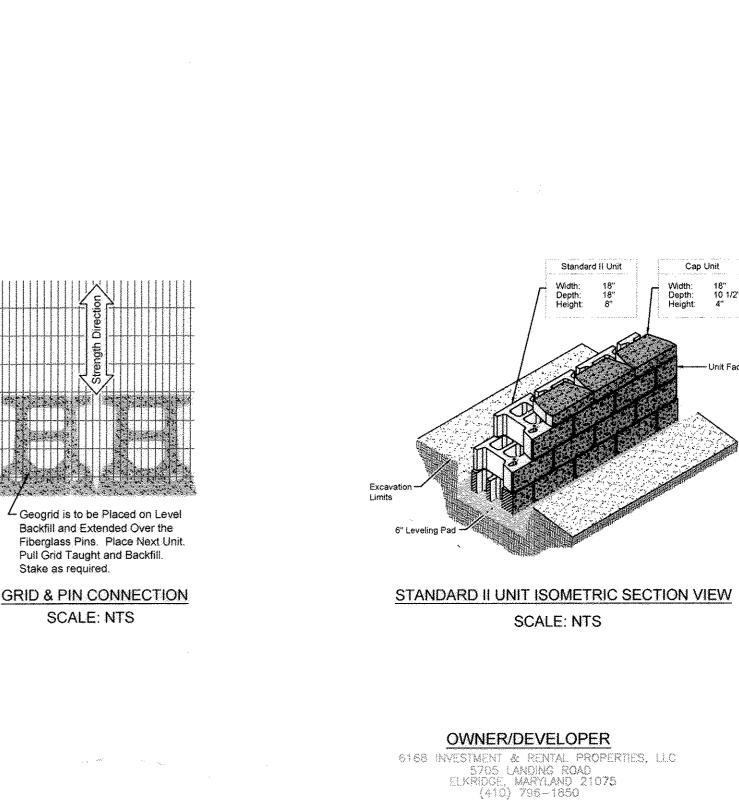
(8" MINIMUM)

BOTTOM OF WALL,

ELEVATION VARIES.

4" DIA. DRAIN OUTLET PIPE (TYP.)

THROUGH WALL AT 10 FT. O.C.



ECS MID-ATLANTIC, LLC 56 GRUMBACHER ROAD, SUITE D

YORK, PENNSYLVANIA 17406 OFFICE (717) 767-4788 FAX (717) 767-5658

09/11/13



# 8 of /3

DATE

NO AS-BUILT INFORMATION ON THIS SHEET

RETAINING WALL DETAILS & SPECIFICATIONS

SHADY LANE CROSSING

LOTS 1 THROUGH 24

HOWARD COUNTY

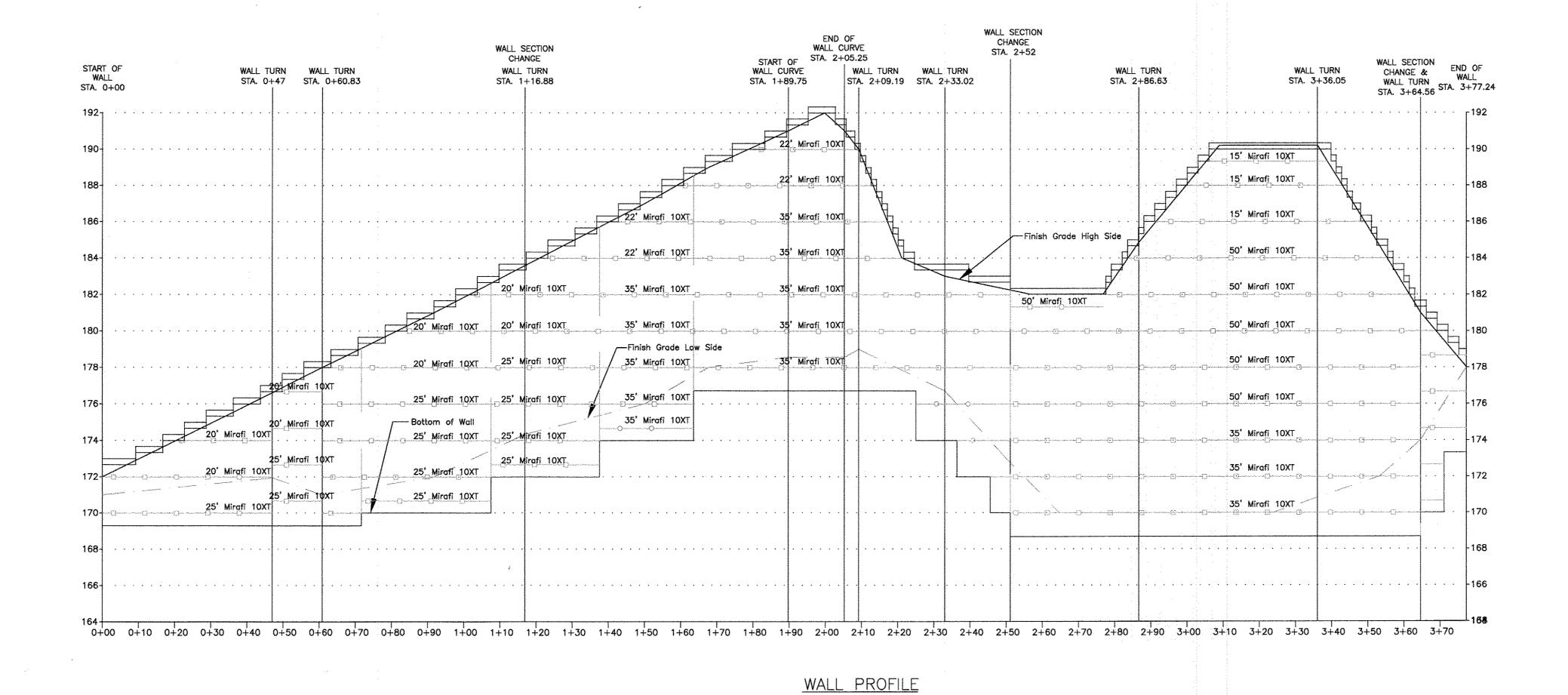
MAIN ST. BUILDERS

REVISIONS

AS-BUILT 4/11/17

"Setting The Standard For Service"

F-06-097



SCALE
VERTICAL SCALE 1"=4'
HORIZONTAL SCALE 1"=20'

LEGEND

MIRAFI 10XT GEOGRID

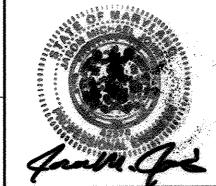
OWNER/DEVELOPER
6168 INVESTMENT & RENTAL PROPERTIES, LLC
5705 LANDING ROAD
ELKRIDGE, MARYLAND 21075
(410) 796—1850

NO AS-BUILT INFORMATION ON THIS SHEET

NO. REVISIONS					DATE				
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MAIN ST. BUILDERS									
MDG	JMJ	09/11/13	3134	12	OF <b>/</b> 3				

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING OLL CALL 4.28.16 CHIEF, DEVELOPMENT ENGINEERING DIVISION **Y-25-U**DATE

Professional Certification. 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. 42374, Expiration Date: 06/06/16



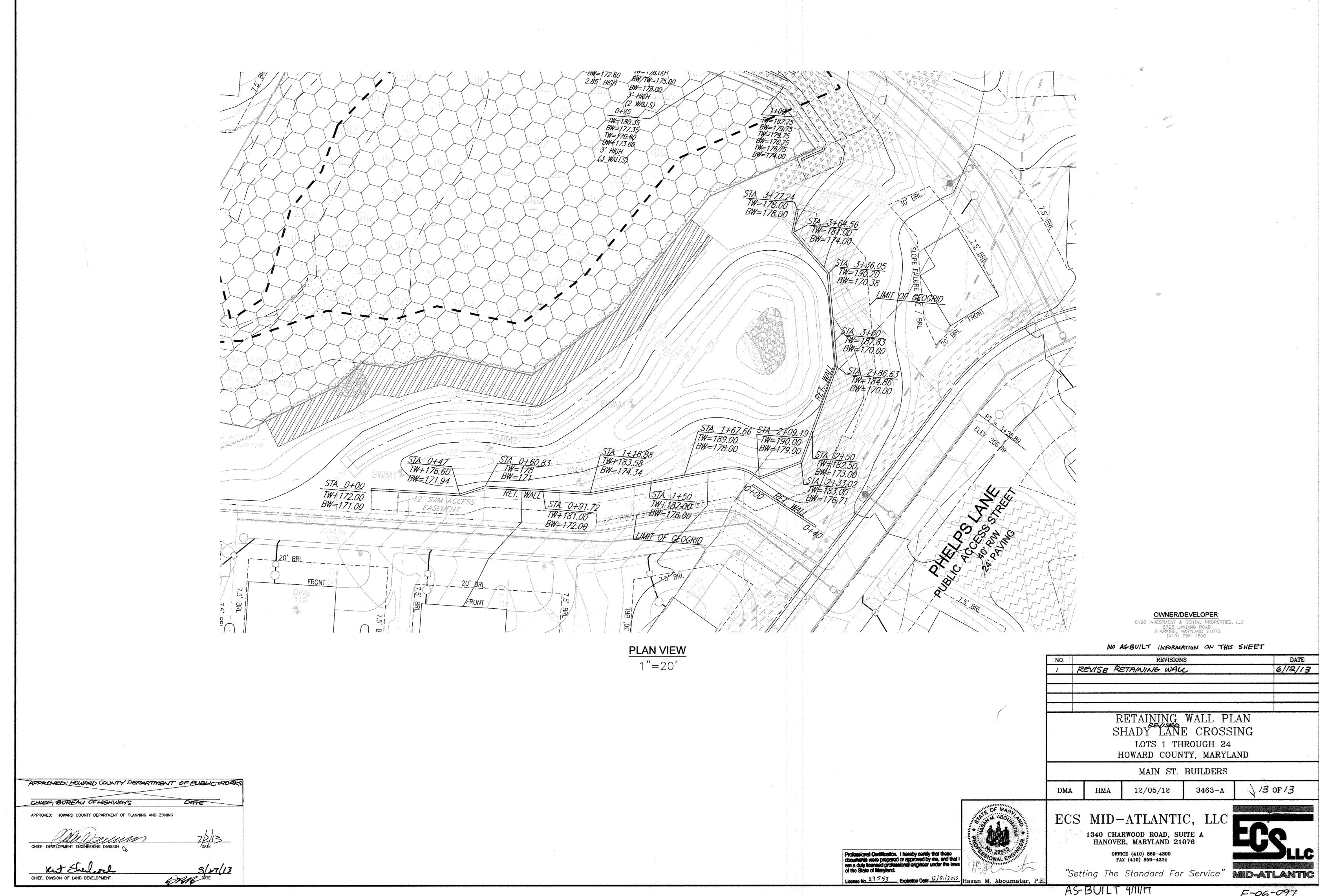
# ECS MID-ATLANTIC, LLC

56 GRUMBACHER ROAD, SUITE D YORK, PENNSYLVANIA 17406

OFFICE (717) 767-4788 FAX (717) 767-5658



AS-BUILT 4/11/17



F-06-097