

LOT NUMBER	ADDRESS	STORMWATER MANAGEMENT PRACTICES															
		GREEN ROOFS	PERMEABLE PAVEMENTS	REINFORCED TURF	DISCONNECTION OF ROOFTOP RUNOFF	DISCONNECTION OF NON-ROOFTOP RUNOFF	SHRUB/TREE TO CONSERVE AREAS	RAINWATER HARVESTING	SUBMERGED GRAVE WETLANDS	LANDSCAPE INFILTRATION	INFILTRATION BEDS	DRY WELLS	MICRO-BIOTREATMENT	RAIN GARDENS	SWALES	ENHANCED FILTERS	
1	1814 ALLNUTT LANE	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
2	1814 ALLNUTT LANE	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
3	1814 ALLNUTT LANE	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
4	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
5	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
6	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
7	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
8	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
9	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
10	1814 ALLNUTT LANE	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
11	1814 ALLNUTT LANE	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
12	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
13	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
14	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
15	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
16	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
17	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
18	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
19	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
20	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
21	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
22	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
23	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
24	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
25	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
26	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
27	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
28	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
29	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	
30	1820 NOBLE WAY	NO	NO	NO	0	0	NO	0	0	0	0	0	0	0	0	0	

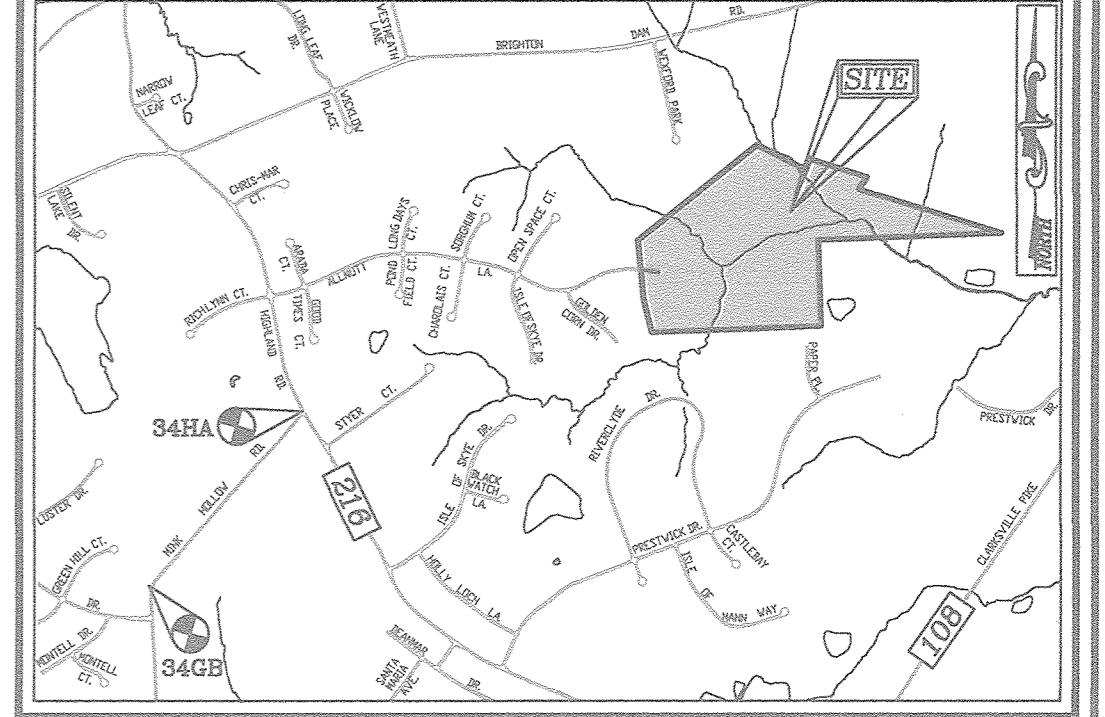
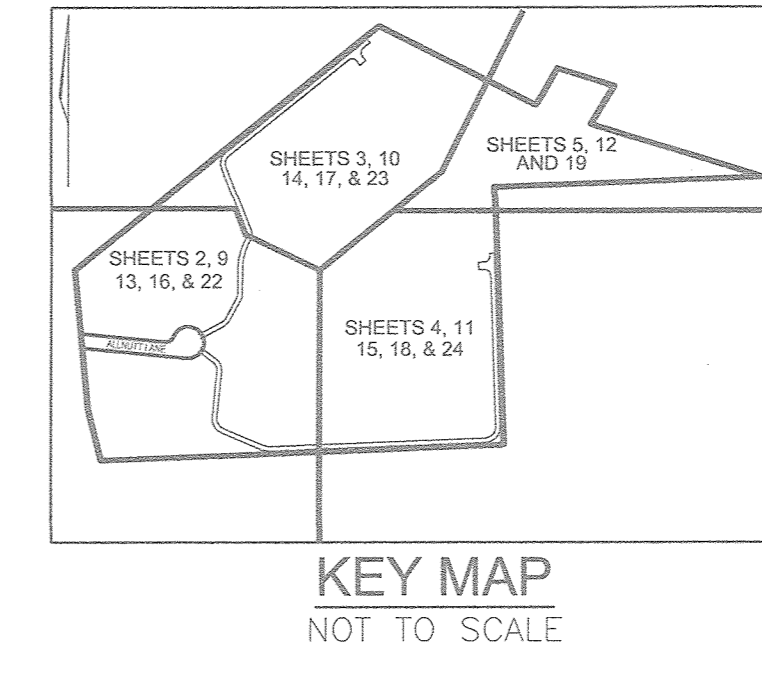
# FINAL ROAD CONSTRUCTION PLAN

## THE ESTATES AT RIVER HILL

### LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'

#### A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

13550 ALLNUTT LANE  
HIGHLAND, MD 20777



**LEGEND:**

[Symbol]	PROPERTY LINE
[Symbol]	RIGHT-OF-WAY LINE
[Symbol]	ADJACENT PROPERTY LINE
[Symbol]	EXISTING EDGE OF PAVING
[Symbol]	EXISTING STREAM BUFFER
[Symbol]	EXISTING STREAM
[Symbol]	EXISTING WETLANDS
[Symbol]	EXISTING WETLAND BUFFER
[Symbol]	EX. PUBLIC 100-YEAR FLOOD PLAN
[Symbol]	PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
[Symbol]	PROP. VARIABLE WIDTH PRIVATE SWIM, DRAINAGE & UTILITY EASEMENT
[Symbol]	EX. 25' EASEMENT FOR INGRESS AND EGRESS TO LOT 17 AND LOT 1 GREEN PROP. (PRIVATE) (PLAT 7671)
[Symbol]	EX. 24' WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
[Symbol]	EX. FOREST CONSERVATION EASEMENT 'A' (PLAT 12949)
[Symbol]	EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 4622)
[Symbol]	PROP. PUBLIC SWIM, DRAINAGE & UTILITY EASEMENT
[Symbol]	PROP. 35' PRIVATE MONUMENT EASEMENT

**SITE DATA**

LOCATION: TAX MAP 34, BLOCK 23  
PARCEL: 389  
5TH ELECTION DISTRICT  
PRESENT ZONING: RR-DEO  
GROSS AREA OF PROJECT: 42.60 AC.  
AREA OF RIGHT-OF-WAY DEDICATION: 0.59 AC.  
PROPOSED USE OF SITE: RESIDENTIAL (RD)  
NUMBER OF RESIDENTIAL LOTS PROPOSED: 16 LOTS  
AREA OF RESIDENTIAL LOTS PROPOSED: 20.83 AC.  
AREA OF STREAM/BUFFER: 12.75 AC.  
AREA OF WETLANDS/BUFFER: 9.22 AC.  
AREA OF MODERATE SLOPES (15% - 24.99%): 0.00 AC.  
AREA OF STEEP SLOPES (25% OR GREATER): 0.00 AC.  
AREA OF FLOOD PLAIN: 7.50 AC.  
NET PROJECT AREA: 35.10 AC.  
AREA OF EXISTING FOREST COVER: 12.60 AC.  
LIMIT OF DISTURBANCE: 6.40 AC.  
AREA MANAGED BY ESDV (THIS PLAN): 6.40 AC.  
"GREEN" AREA: 4.75 AC.  
"MURKIN" AREA: 1.65 AC.  
"GREEN" AREA: 4.75 AC.  
"MURKIN" AREA: 1.65 AC.  
SP-17-007

**COORDINATE TABLE**

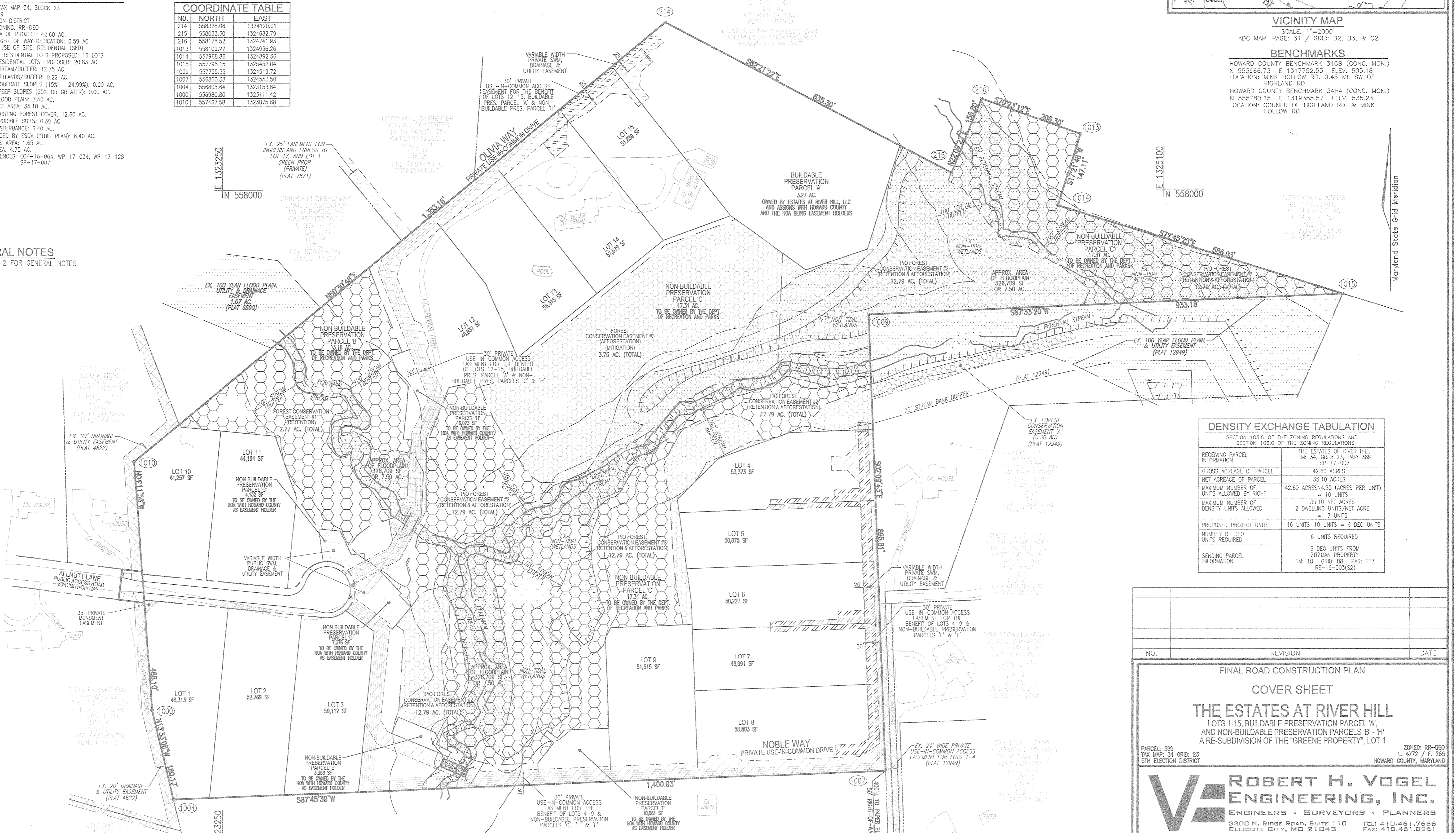
NO.	NORTH	EAST
214	558328.06	1324120.01
215	558033.30	1324682.79
216	558178.52	1324741.93
1013	558109.27	1324836.26
1014	557968.86	1324892.35
1015	557795.15	1325452.04
1009	557755.35	1324519.72
1007	556860.38	1324553.30
1004	556805.64	1323153.64
1000	556880.80	1323111.42
1010	557467.58	1323075.68

**LOT AREA TABULATION**

LOT	GROSS AREA	PIPESTEM AREA	NET AREA
1	48,313 SF	N/A	48,313 SF
2	52,769 SF	N/A	52,769 SF
3	50,112 SF	N/A	50,112 SF
4	53,373 SF	7,788 SF	45,585 SF
5	50,875 SF	7,256 SF	43,619 SF
6	50,227 SF	6,725 SF	43,502 SF
7	48,991 SF	6,193 SF	42,798 SF
8	58,803 SF	4,131 SF	54,672 SF
9	51,515 SF	3,430 SF	48,085 SF
10	41,257 SF	N/A	41,257 SF
11	44,194 SF	N/A	44,194 SF
12	48,837 SF	2,055 SF	46,782 SF
13	56,315 SF	4,012 SF	52,303 SF
14	57,879 SF	4,773 SF	53,106 SF
15	51,839 SF	5,574 SF	46,265 SF
B.P.P. 'A'	3.27 AC.	0.15 AC.	3.12 AC.

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**DENSITY EXCHANGE TABULATION**

SECTION 105.G OF THE ZONING REGULATIONS AND SECTION 106.G OF THE ZONING REGULATIONS

RECEIVING PARCEL INFORMATION	THE ESTATES AT RIVER HILL
TAX MAP: 34, GRID: 23, PAR: 389	SP-17-007
GROSS ACREAGE OF PARCEL	42.60 ACRES
NET ACREAGE OF PARCEL	35.10 ACRES
MAXIMUM NUMBER OF UNITS ALLOWED BY RIGHT	42.60 ACRES x 2.25 (ACRES PER UNIT) = 95 UNITS
MAXIMUM NUMBER OF DENSITY UNITS ALLOWED	10 UNITS
PROPOSED PROJECT UNITS	16 UNITS - 10 UNITS = 6 DED UNITS
NUMBER OF DED UNITS REQUIRED	6 UNITS REQUIRED
SENDING PARCEL INFORMATION	6 DED UNITS FROM JITAMA PROPERTY (PLAT 12949)

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

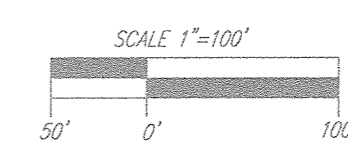
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-18

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS  
 COUNTY HEALTH OFFICER  
 DATE: 1-10-19

**PARKING TABULATION:**

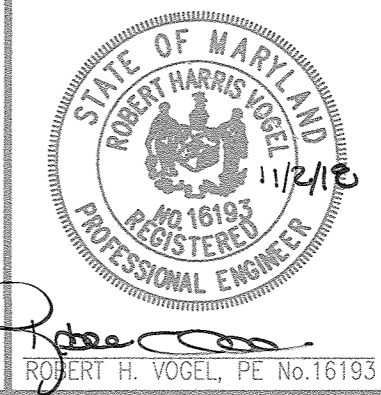
TOTAL NUMBER OF DWELLING UNITS PROPOSED: 16  
 PARKING SPACES REQUIRED:  
 OFF-STREET PARKING AND OVERFLOW/GUEST PARKING SPACES  
 2.0 SPACES PER UNIT = 32 SPACES  
 PARKING SPACES PROVIDED:  
 SFD = 2 GARAGE/2 DRIVEWAY  
 2 SPACES IN GARAGE = 32 SPACES (FOR 16 UNITS)  
 2 SPACES ON DRIVEWAY = 32 SPACES (FOR 16 UNITS)  
 -TOTAL REQUIRED = 32 SPACES  
 -TOTAL PROVIDED = 64 SPACES

COVER SHEET  
 SCALE: 1"=100'



**OWNER**  
 THE ESTATES AT RIVER HILL, LLC  
 MICHAEL PFALZ, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023



**PROFESSIONAL CERTIFICATE**

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: 08-27-2020

DESIGN BY: RHW  
 DRAWN BY: JMR  
 CHECKED BY: RHW  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

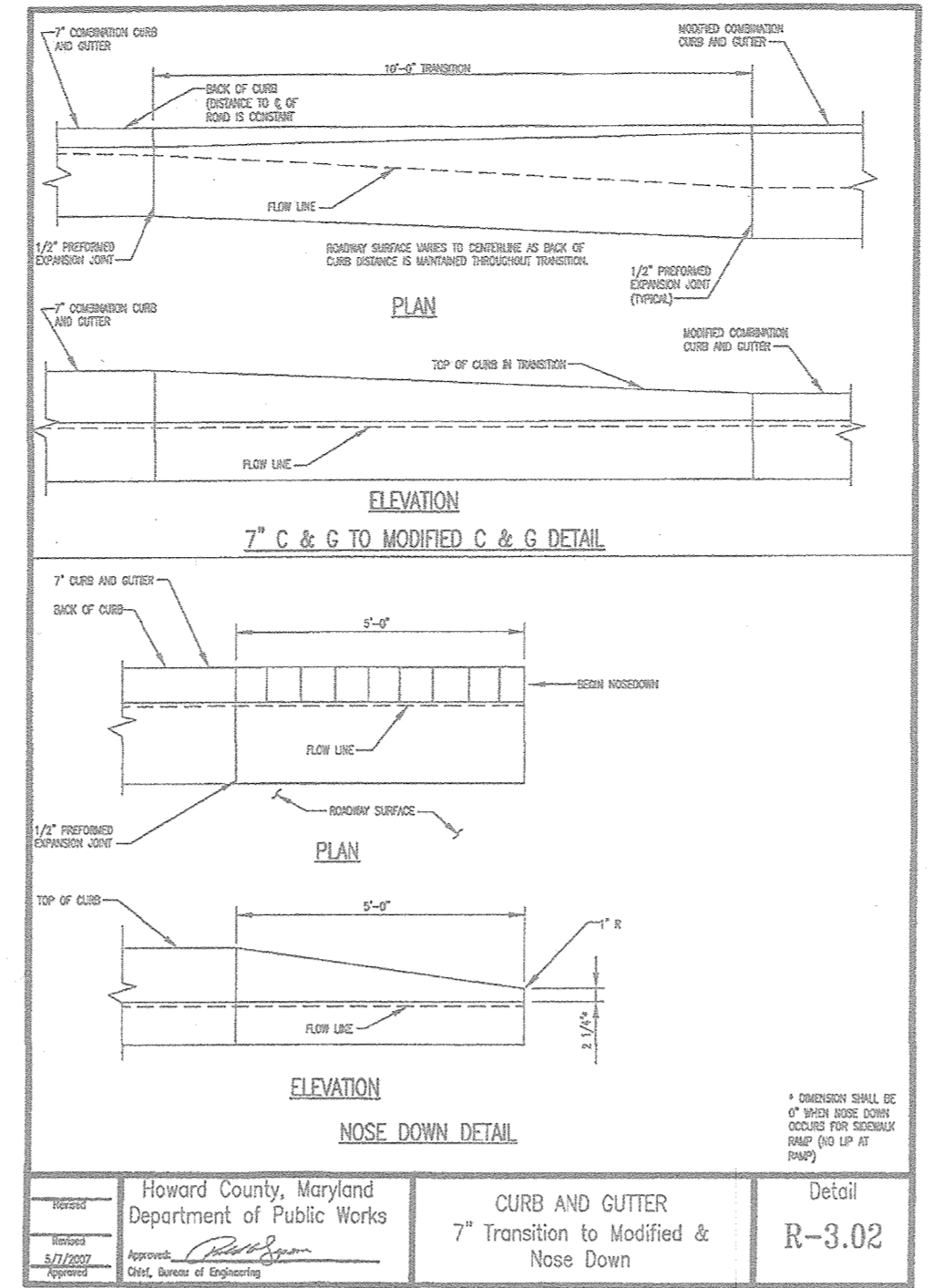
1 SHEET OF 30

**GENERAL NOTES**

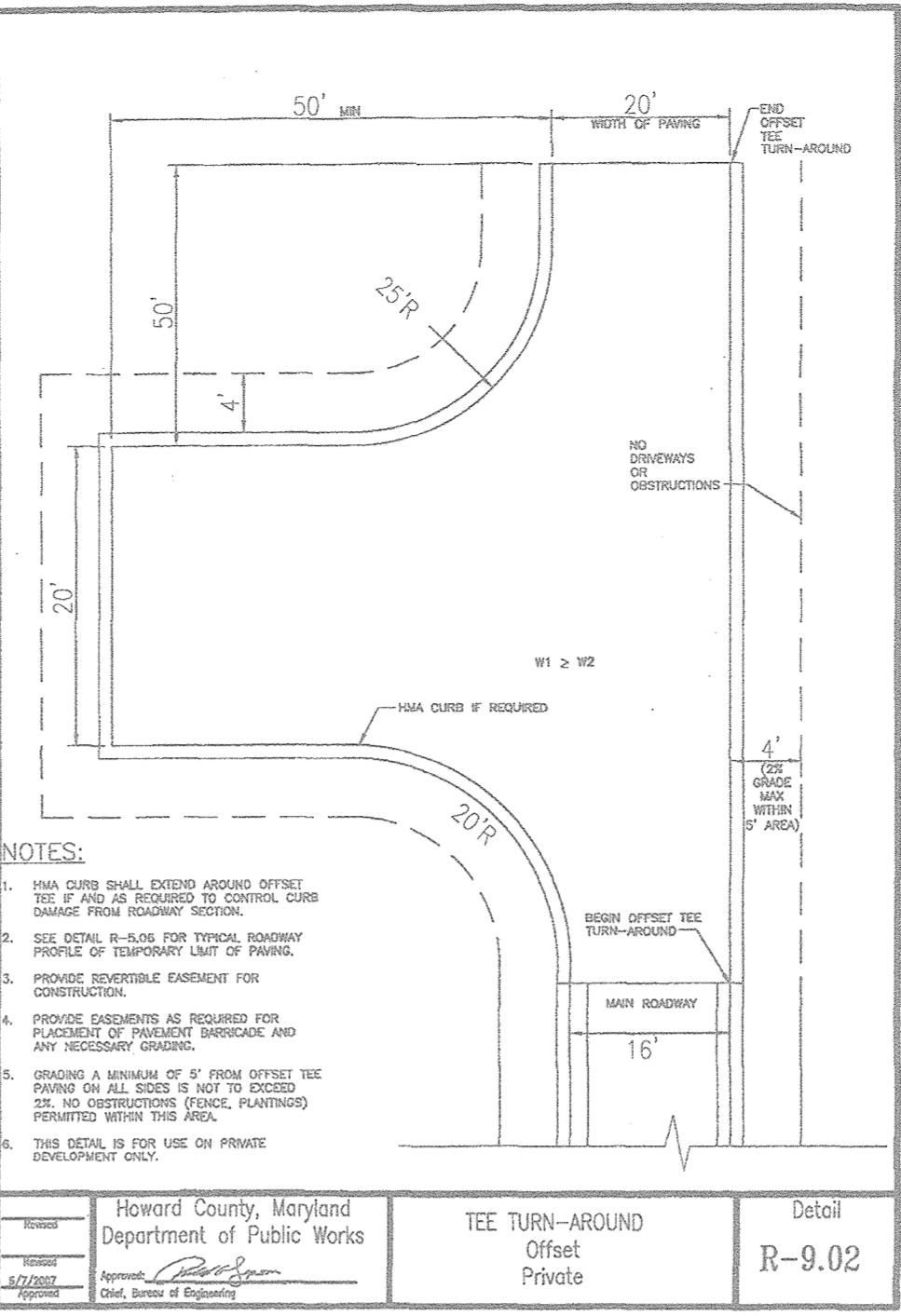
- THE PROJECT BOUNDARY IS BASED ON A FIELD RUN BOUNDARY SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED JULY 2016.
- THE EXISTING TOPOGRAPHY SHOWN HEREIN IS TAKEN FROM HOWARD COUNTY GIS AND SUPPLEMENTED WITH FIELD RUN SURVEYS PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED MARCH AND MAY OF 2016.
- THE COORDINATES SHOWN HEREIN ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 344A AND 340B WERE USED FOR THIS PROJECT.
- THE SUBJECT PROPERTY IS ZONED "RR-DEO" IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
- THIS SITE IS NOT LOCATED IN A HISTORIC DISTRICT OR IN THE METROPOLITAN DISTRICT.
- TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS, CEMETIERES, OR HISTORIC STRUCTURES LOCATED ON THIS PROPERTY.
- AN ENVIRONMENTAL CONCEPT PLAN (ECP-16-054) WAS APPROVED ON DECEMBER 21, 2016.
- A PRE-SUBMISSION COMMUNITY MEETING WAS HELD ON MARCH 29, 2016 AT 6:00 PM AT THE BOARD ROOM AT CLARET HALL. A SECOND COMMUNITY MEETING WAS HELD ON FEBRUARY 21, 2017, AT THE SAME TIME AND LOCATION AS THE FIRST. THIS PROJECT IS IN COMPLIANCE WITH THE LATEST HOWARD COUNTY STANDARDS, UNLESS ALTERNATIVE COMPLIANCE REQUESTS HAVE BEEN APPROVED.
- A TOTAL OF 16 RESIDENTIAL LOTS (INCLUDING ONE BULBUILDABLE PRESENTATION PARCEL) AND 7 NON-BULBUILDABLE PRESENTATION PARCELS ARE PROPOSED UNDER THIS PLAN.
- THE PROPOSED LOTS SHALL HAVE AN AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM.
- ALL LANE LANE IS CLASSIFIED AS A PUBLIC ACCESS ROAD. NO IMPROVEMENTS TO THE EXISTING ROAD ARE PROPOSED. THE PROPOSED EXTENSION OF ALLIANT LANE SHALL CONFORM WITH GUIDELINES WITHIN THE DESIGN MANUAL.
- DRIVEWAY(S) SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO ENSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
  - WIDTH - 12 FEET (16 FEET SERVING MORE THAN ONE RESIDENCE).
  - SURFACE - 6 INCHES OF COMPACTED CRUSHER RUN BASE WITH TAR AND CHIP COATING. (1"-1.5" MIN.)
  - GEOMETRY - MAX. 15% GRADE, MAX. 10% GRADE CHANGE AND MIN. OF 45-FOOT TURNING RADII.
  - STRUCTURES (CULVERTS/BRIDGES) - CAPABLE OF SUPPORTING 25 GROSS TONS (H25 LOADING).
  - DRAINAGE ELEMENTS - SAFELY PASSING 100-YEAR FLOOD WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY SURFACE.
  - STRUCTURE CLEARANCES - MINIMUM 12 FEET.
  - MAINTENANCE - SUFFICIENT TO ENSURE ALL WEATHER USE.
- AN APPO TRAFFIC STUDY WAS PREPARED BY THE TRAFFIC GROUP AND APPROVED SEPTEMBER 21, 2017.
- NO NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
- IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL - VOLUME 3, CHAPTER 2 - SECTION 2.0.8, AND THE HOWARD COUNTY ZONING REGULATIONS SECTION 133.0.2.2, PARKING IS REQUIRED AT 2.0 SPACES PER UNIT. OFF STREET PARKING TO INCLUDE GARAGE SPACES, DRIVEWAY, PARKING PADS AND COURTS. GARAGES COUNT AS TWO SPACES. SEE PARKING REGULATION ON SHEET 1.
- STREET LIGHTING IS NOT REQUIRED FOR THIS SITE IN ACCORDANCE WITH SECTION 16.135 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.
- ALL LOTS/RESIDENTIAL UNITS IN THIS SUBDIVISION ARE SUBJECT TO THE MRU FEE-IN-LIEU REQUIREMENT THAT IS TO BE CALCULATED AND PAID TO THE DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS AT THE TIME OF BUILDING PERMIT ISSUANCE BY THE PERMIT APPLICANT.
- IN ACCORDANCE WITH SECTION 16.121(A)(2) OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, OPEN SPACE IS NOT REQUIRED FOR PROJECTS ZONED RR-DEO.
- IN ACCORDANCE WITH SECTIONS 105.0.6, AND 106.0 OF THE ZONING REGULATIONS, THIS PROJECT IS BEING DEVELOPED UTILIZING THE CLUSTER SUBDIVISION REGULATIONS AND DENSITY EXCHANGE OPTION. THIS SUBDIVISION REGULATIONS 6 DWELLING UNITS FROM AN ELIGIBLE SENDING PARCEL.
- FLAG AND PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM ROAD RIGHT-OF-WAY LINE AND NOT ONTO THE PIPESTEM LOT DRIVEWAY.
- LOTS 4-9, 12-15, BULBUILDABLE PRESERVATION PARCEL 'A', AND NON-BULBUILDABLE PRESERVATION PARCELS 'C', 'E', 'I', 'Y', AND 'W' WILL UTILIZE A USE-IN-COMMON DRIVEWAY AND A USE-IN-COMMON MAINTENANCE AGREEMENT FOR THE SHARED DRIVEWAYS. SHALL BE RECORDED SIMULTANEOUSLY WITH THE FINAL PLAN.
- A PRIVATE DRIVEWAY SIGN ASSEMBLY SHALL BE FABRICATED BY HOWARD COUNTY BUREAU OF HIGHWAYS AT THE DRIVEWAY ACCESS POINT ONTO ALLIANT LANE AT THE DEVELOPERS/OWNERS EXPENSE. CONTACT HOWARD COUNTY TRAFFIC DIVISION AT 410-313-5252 FOR DETAILS AND COST ESTIMATES.
- LOCATION OF EXISTING WELL AND SEPTIC SYSTEM FEATURES ON GREENE PROPERTY, LOT 1, TAKEN FROM PUBLIC RECORDS AND FIELD SURVEYS.
- THE WELL AND SEPTIC SYSTEM DISTRIBUTION BOX AND TRENCHES SERVING THE EXISTING HOUSE MUST BE PROPERLY ABANDONED, WITH DOCUMENTATION SUBMITTED TO THE HEALTH DEPARTMENT, PRIOR TO HEALTH DEPARTMENT SIGNATURE OF THE FINAL RECORD PLAN.
- THIS PROPERTY IS LOCATED IN GROWTH TIER III, PER SB-236. MAJOR SUBDIVISIONS OF 5 LOTS OR MORE ARE PERMITTED UTILIZING ON-SITE SEPTIC SYSTEMS, COMMON SEPTIC SYSTEMS OR A SHARED FACILITY IN HOWARD COUNTY SUBJECT TO PLANNING BOARD REVIEW AND APPROVAL RECOMMENDATION.
- WATER AND SEWER SERVICE TO BE PROVIDED BY PRIVATE WELLS AND SEPTIC SYSTEMS.
- NO RARE, THREATENED OR ENDANGERED SPECIES OR THEIR HABITATS WERE OBSERVED ON THE PROPERTY.
- THERE IS APPROXIMATELY 7.50 ACRES OF 100-YR FLOODPLAIN LOCATED WITHIN THE LIMITS OF THIS SITE.
- APPROXIMATE FLOODPLAIN DELINEATION GENERATED FROM PRELIMINARY HIGH WIND ANALYSIS, PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED NOVEMBER 13, 2016, AND REVISED MAY 31, 2017. FLOODPLAIN STUDY ADDENDUM PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED APRIL 03, 2018 AND UPDATED JULY 20, 2018.
- WETLANDS SHOWN ON-SITE ARE BASED ON A FIELD INVESTIGATION PERFORMED BY JOHN CANKLES OF ECO-SCIENCE PROFESSIONALS, INC. DATED JUNE 10, 2016. THERE WILL BE LIMITED DISTURBANCES TO THE PERENNIAL STREAM SYSTEM, STREAM BUFFERS, WETLANDS OR WETLAND BUFFERS.
- A FOREST STAND DELINEATION AND ENVIRONMENTAL RESOURCES ASSESSMENT WAS PERFORMED BY JOHN CANKLES OF ECO-SCIENCE PROFESSIONALS, INC. DATED JUNE 10, 2016, UPDATED JANUARY 18, 2017.
- NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING OR NEW STRUCTURES SHALL BE PERMITTED WITHIN THE WETLANDS, STREAM(S), OR THEIR REQUIRED BUFFERS, FOREST CONSERVATION ESCAPEMENT AREAS AND 100-YEAR FLOODPLAIN UNLESS WALKER C-5 IS GRANTED.
- WETLANDS AND THEIR BUFFERS WILL NOT BE IMPACTED BY THE CONSTRUCTION OF THE SITE.
- AN ALTERNATIVE COMPLIANCE PETITION (WP-17-034) WAS FILED FOR A STREAM CROSSING/STREAM BUFFER DISTURBANCE. A SEPARATE ALTERNATIVE COMPLIANCE PETITION (WP-17-128) WAS FILED FOR THE REMOVAL OF SPECIMEN TREES.
- FOREST CONSERVATION REQUIREMENTS AS SET FORTH IN SECTION 16.1202 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION MANUAL, NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION ESCAPEMENT, HOWEVER, FOREST MAINTENANCE PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.
- THE FOREST CONSERVATION OBLIGATION TO BE FULFILLED BY THE PLACEMENT OF 7.44 ACRES OF CREDITED RETENTION INTO CONSERVATION EASEMENTS AND BY THE PLACEMENT OF 3.80 ACRES INTO AN AFFORESTATION EASEMENT. 3.75 ACRES OF AFFORESTATION HAVE BEEN PROVIDED FOR THE PURPOSE OF A FOREST BANK.
  - PROVIDE THE SUBDIVISIONS AFFORESTATION SURETY BASED ON A TOTAL OF 3.80 ACRES (OR 165,528 SF). THE AFFORESTATION SURETY IS BASED ON \$0.50 PER SF. THEREFORE, THE SUBDIVISION FOREST CONSERVATION SURETY AMOUNT IS \$82,764.00.
  - THE SURETY FOR THE FOREST MITIGATION BANK IS BASED ON A TOTAL OF 3.75 ACRES (OR 163,350 SF) OF AFFORESTATION. THE AFFORESTATION SURETY IS BASED ON \$0.50 PER SF. THEREFORE, THE SURETY FOR THE MITIGATION BANK IS \$82,764.00.
- THE SUBDIVISIONS AFFORESTATION REQUIREMENT AND THE FOREST MITIGATION BANK WILL HAVE SEPARATE FOREST CONSERVATION AGREEMENTS.
- THERE IS NO SURETY REQUIRED FOR FOREST RETENTION.
- FINANCIAL SURETY FOR THE REQUIRED AFFORESTATION AND FOREST MITIGATION BANK SHALL BE POSTED WITH THE FINAL PLAN DEVELOPER'S AGREEMENT.
- PERIMETER LANDSCAPING AND TRASH PAD SCREENING FOR THIS DEVELOPMENT SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE LANDSCAPE MANUAL.
- LANDSCAPING IS PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. A FINANCIAL SURETY IN THE AMOUNT OF \$25,200.00 FOR THE REQUIRED 84 SHADE TREES SHALL BE POSTED AS PART OF THE DPW DEVELOPER'S AGREEMENT.
- A SURETY IN THE AMOUNT OF \$6,000.00 FOR THE 19 PUBLIC STREET TREES AND THE 10 SHRUBS FOR THE TWO TRASH PADS WILL BE SATISFIED UNDER THE DEED COST ESTIMATE.
- CERTIFIED TEST PITS HAVE BEEN PROVIDED TO VERIFY THAT GROUNDWATER AND ROCK ARE NOT PRESENT AT RAIN GARDEN AND MICRO-BIODIVERSITY LOCATIONS. INFORMATION REGARDING THE FINDINGS IS LOCATED IN THE SWM REPORT.
- STORM WATER MANAGEMENT TO BE PROVIDED FOR THIS DEVELOPMENT BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO-BIODIVERSITY FACILITIES (M-5), A BIO-SWALE (M-5), ROOFTOP DISCONNECTS (N-1), NON-ROOFTOP DISCONNECTS (N-2), SHEETFLOW TO BUFFER (N-3), AND DRY WELLS (M-5). ALL FEATURES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION OR THE PRIVATE LOT OWNER, WITH THE EXCEPTION OF MBR-1A AND MBR-1B, WHICH ARE TO BE OWNED BY THE HOMEOWNERS ASSOCIATION AND JOINTLY MAINTAINED BY HOWARD COUNTY AND THE HOMEOWNERS ASSOCIATION. REFERENCE 2010 MDC STORMWATER DESIGN MANUAL (CHAPTER 5).
- THIS PROJECT IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE ZONING REGULATIONS EFFECTIVE OCTOBER 6, 2013.
- PER SECTION 105.0.1.4, NON-BULBUILDABLE PRESERVATION PARCELS 'B' AND 'C' WILL BE DEDICATED TO THE HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS. BULBUILDABLE PRESERVATION PARCEL 'A' IS OWNED BY ESTATES AT RIVER HILL, LLC, AND ASSIGNS, WITH HOWARD COUNTY AND THE HOA BEING EASEMENT HOLDERS. NON-BULBUILDABLE PRESERVATION PARCELS D, E, F, G AND H ARE TO BE OWNED BY THE HOA WITH HOWARD COUNTY AS THE EASEMENT HOLDER.
- PROTECTIVE DEVICES THAT DETER HEAVY EQUIPMENT MUST BE INSTALLED AROUND WELLS PRIOR TO COMMENCEMENT OF GRADING OPERATIONS. TO ENHANCE VISIBILITY OF THE WELLS LOCATIONS, PLASTIC ORANGE FENCING SHOULD BE INCLUDED.
- ANY CHANGES TO A PRIVATE SEWAGE DISPOSAL AREA SHALL REQUIRE A REVISED PERCOLATION CERTIFICATION PLAN.
- ALL WELLS AND SEPTIC SYSTEMS LOCATED WITHIN 100' OF THE PROPERTY BOUNDARIES AND 200' DOWN GRADIENT OF ANY WELLS AND/OR SEPTIC SYSTEMS HAVE BEEN SHOWN.
- THE LOTS SHOWN HEREIN CONFORM WITH THE MINIMUM OWNERSHIP WIDTH AND LOT AREA AS REQUIRED BY THE MARYLAND DEPARTMENT OF ENVIRONMENT.
- TRAFFIC CONTROL DEVICES:
  - THE TRAFFIC CONTROL DEVICES LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND MUST BE FIELD APPROVED BY HOWARD COUNTY TRAFFIC DIVISION (410-313-2430) PRIOR TO THE INSTALLATION OF ANY OF THE TRAFFIC CONTROL DEVICES.
  - ALL TRAFFIC CONTROL DEVICES, AND THEIR LOCATIONS, SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES ("MUTCD").
  - ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED ("QUICK PUNCH"), SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (12 GAUGE) - 3' LONG. THE ANCHOR SHALL NOT EXCEED MORE THAN TWO ("QUICK PUNCH") HOLES THROUGH GROUND LEVEL. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.

**GENERAL NOTES (CONT'D)**

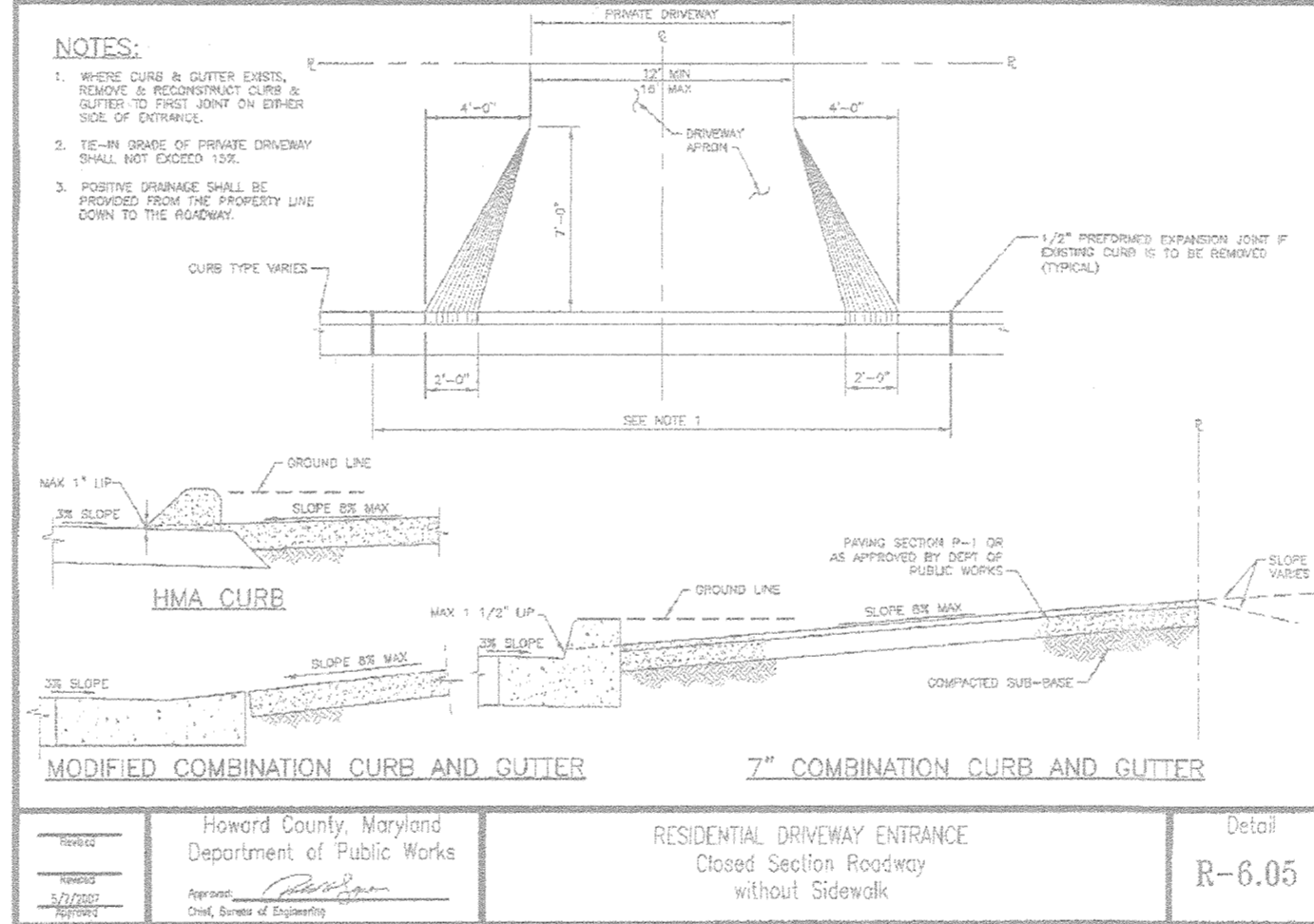
- A PROPOSED 18' WIDE BRIDGE SHALL BE CONSTRUCTED ACROSS THE STREAM FOR THE PURPOSE OF PROVIDING ACCESS TO FUTURE LOTS 4-9.
- A PERCOLATION CERTIFICATION PLAN WAS PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED MARCH 05, 2016 AND SIGNED BY THE HEALTH OFFICER ON MARCH 16, 2016. ALL SEWAGE DISPOSAL AREAS SHOWN HEREIN MATCH THE SIGNED PERCOLATION CERTIFICATION PLAN.
- IN ACCORDANCE WITH SB-236, THIS SUBDIVISION WAS APPROVED BY THE HOWARD COUNTY PLANNING BOARD AS A PUBLIC HEARING ON DECEMBER 14, 2017 AND THE DECISION AND ORDER WAS SIGNED BY THE PLANNING BOARD ON JANUARY 25, 2019. **PLAN PROJECT 434**
- THE ARTICLES OF INCORPORATION FOR THE HOMEOWNERS ASSOCIATION WERE FILED WITH THE STATE DEPARTMENT OF ASSESSMENTS AND TAXATION ON 09/23/2018, FILING NO. 100036201495944.
- THE PURPOSE OF NON-BULBUILDABLE BULK PARCELS 'B' AND 'C' IS TO ISOLATE AND PROTECT EXISTING ENVIRONMENTAL FEATURES LOCATED ON THE SUBJECT PROPERTY. NON-BULBUILDABLE BULK PARCELS D-H WERE CREATED FOR THE PURPOSE OF STORMWATER MANAGEMENT.
- AN ALTERNATIVE COMPLIANCE PETITION TO SECTION 16.1205(Y)(7), FILED AS WP-17-128, TO REMOVE 10 SPECIMEN TREES WAS APPROVED ON FEBRUARY 02, 2018. APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
  - THE REMOVAL OF THE TEN (10) SPECIMEN TREES WILL REQUIRE MITIGATION WITH THE PLANTING OF 2:1 REPLACEMENT TREES (20 TOTAL) WITH A MINIMUM 3" CALIPER NATIVE PLANT SPECIES AS PART OF THIS SUBDIVISION'S LANDSCAPE PLAN. SURETY FOR THE 20 TREES WILL BE INCORPORATED INTO THE LANDSCAPE SURETY WITH THE FINAL PLAN.
  - PROVIDE A NOTE ON ALL SUBDIVISION PLANS REGARDING THIS ALTERNATIVE COMPLIANCE PETITION APPROVAL. THIS NOTE SHALL INCLUDE THE REGULATION SECTIONS PETITIONED, THE DATE OF THE ALTERNATIVE COMPLIANCE APPROVAL, AND THE CONDITIONS OF THE APPROVAL.
- REFERENCE DESIGN MANUAL, HANDBOOK APPROVED MAY 22, 2017, TO HAVE SECTION 2.8.8 WHICH REQUIRES THE CONSTRUCTION OF A PUBLIC ROADWAY WHERE SHARED ACCESS DRIVEWAYS CROSS A 100-YEAR FLOODPLAIN. THIS APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
  - BOTH DRAINAGE STRUCTURES SHALL MEET COUNTY STANDARDS AND SHALL PASS THE 100-YEAR STORM WITH A FREEBOARD OF 1-FOOT BETWEEN THE 100-YEAR WSEL AND THE LOWEST CHORD OF THE BRIDGE OR THE OUTSIDE EDGE OF THE PAVEMENT.
  - THE IMPACTS TO STREAM BANKS, CHANNELS, AND ASSOCIATED VEGETATION SHALL BE LIMITED. THE PLANS SHALL NOT BE APPROVED UNLESS SUFFICIENT EFFORTS ARE MADE.
  - SPECIFY WHO WILL BE RESPONSIBLE FOR THE MAINTENANCE OF THE BRIDGE ON THE SITE PLANS.
  - A DETAILED O&M FOR THE BRIDGE MUST BE PROVIDED ON THE PLANS.
- AN ALTERNATIVE COMPLIANCE PETITION TO SECTION 16.115(c)(2), "PROHIBITIONS ON USE OF FLOODPLAIN LAND", SECTION 16.116(d)(2), "STREAMS AND WETLANDS", AND SECTION 16.120(b)(6)(i)(a), "LENGTH OF PIPESTEM LOT", FILED AS WP-17-034, WAS APPROVED ON JANUARY 19, 2018. APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
  - COMPLIANCE WITH ALL SRC AGENCY COMMENTS WITH THE REVIEW OF THE SUBMITTED ENVIRONMENTAL CONCEPT PLAN (ECP-16-054).
  - APPLICATION FOR ALL PERMITS AS MAY BE REQUIRED BY THE MARYLAND DEPARTMENT OF ENVIRONMENT FOR THE DISTURBANCE TO THE FLOODPLAIN AND STREAM CROSSING FOR CONSTRUCTION OF A NEW BRIDGE STRUCTURE AND DRIVEWAY UPDATES TO THE EXISTING DRIVEWAY AND STREAM CROSSING.
  - ALL GRADING AND WORK WITHIN THE STREAM, STREAM BUFFER, FLOODPLAIN AREAS, AND WETLAND BUFFER AREAS SHALL BE MAINTAINED TO THE EXTENT REQUIRED TO DEVELOP THE PROPOSED HOUSE AND SHARED DRIVEWAY. ANY DISTURBANCES TO THE STREAM AND BUFFERS MUST BE STABILIZED AND RESTORED.
  - COMPLIANCE WITH ALL ATTACHED COMMENTS FROM THE ENVIRONMENTAL ENGINEERING DIVISION DATED 10/26/2016.
  - INCLUDE THE ALTERNATIVE COMPLIANCE REQUEST NUMBER, DESCRIPTION, AND DECISION ON ALL ASSOCIATED AND FUTURE PLANS.
- A TOTAL OF 0.59 ACRES OF LAND SHALL BE DEDICATED TO HOWARD COUNTY, MD FOR THE PURPOSE OF EXTENDING ALLIANT LANE (A PUBLIC ROAD).
- THERE IS AN EXISTING DWELLING LOCATED ON LOT 14 TO REMAIN. NO NEW BUILDINGS, EXTENSIONS, OR ADDITIONS TO THE EXISTING DWELLING ARE TO BE CONSTRUCTED AT A DISTANCE LESS THAN THE ZONING REGULATION REQUIREMENTS. THE EXISTING BARN AND GARAGE SHALL BE RAZED PRIOR TO THE REORDENATION OF THE PLAT.
- THE TWO PROPOSED USE-IN-COMMON DRIVEWAYS WILL INCLUDE PULL OVER AREAS DESIGNED TO ALLOW VEHICLES TO PASS ON-COMING VEHICLES.
- PER SECTION 16.120(c)(5) OF THE REGULATIONS, DPW HAS DECIDED THAT DIRECT PUBLIC ROAD FRONTAGE FOR NON-BULBUILDABLE PRESERVATION PARCELS C, D, E, F AND H IS NOT REQUIRED. THIS DECISION WAS MADE DUE TO DESIGN CONSTRAINTS, THE FACT THAT THE PARCELS ARE ONLY FOR SWM FACILITIES, AND BECAUSE THE PARCELS WILL HAVE ADEQUATE PUBLIC ROAD ACCESS VIA THE USE-IN-COMMON DRIVEWAYS FOR ANY REQUIRED MAINTENANCE OF THE SWM FACILITIES.
- FOR ANY PROPOSED PUBLIC ROADWAY, LESS THAN 26' WIDE, DPW-TRAFFIC MAY RESTRICT PARKING ALONG ONE SIDE OF THE ROADWAY TO ALLOW FIRE AND EMERGENCY RESPONSE VEHICLES TO SAFELY MANUEVER THROUGH THIS ROADWAY.



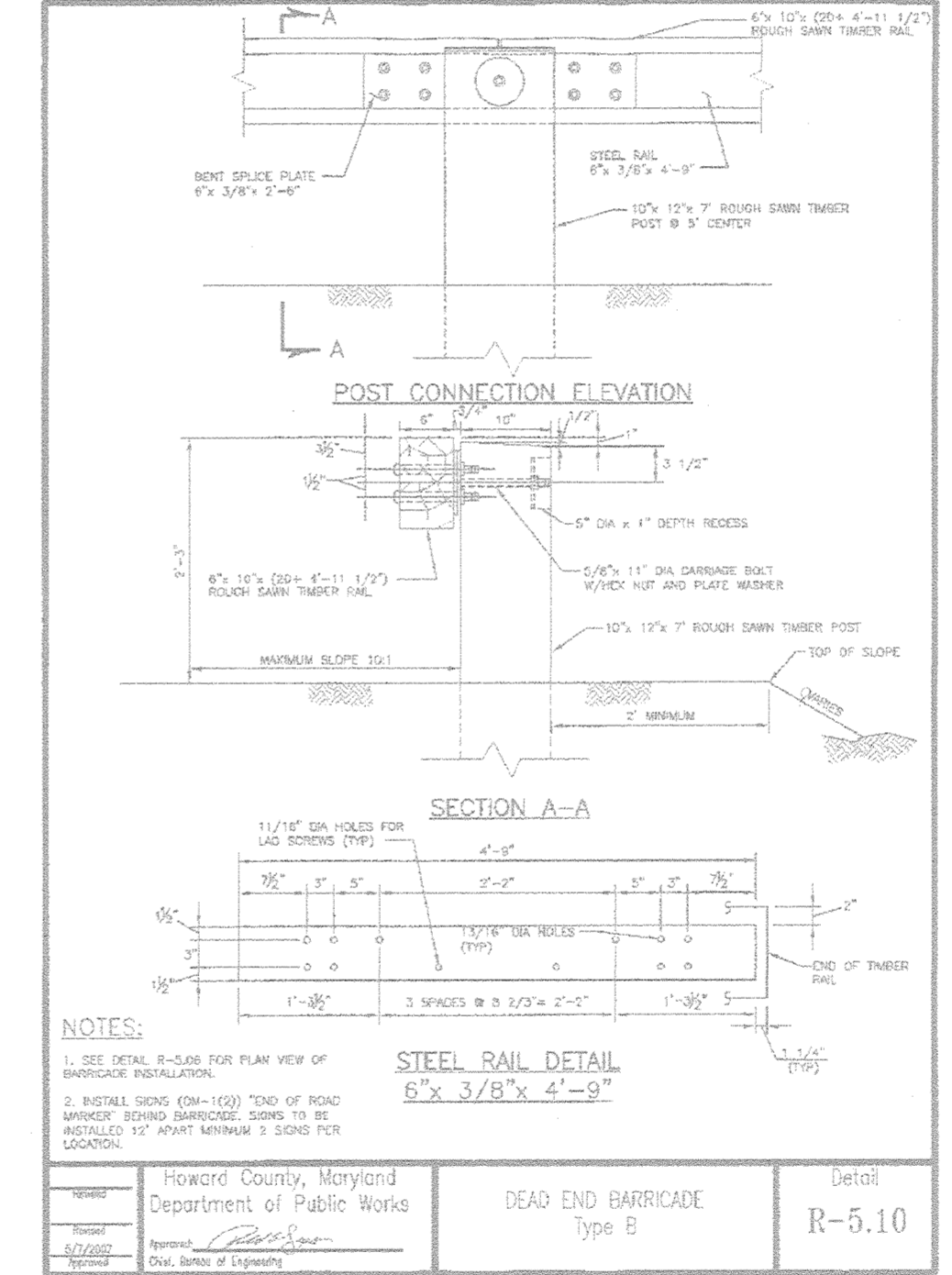
SECTION	Howard County, Maryland Department of Public Works	CURB AND GUTTER	Detail
NO.	Approved: [Signature]	7" Transition to Modified & Nose Down	R-3.02
DATE	Doc. Date of Issuance		



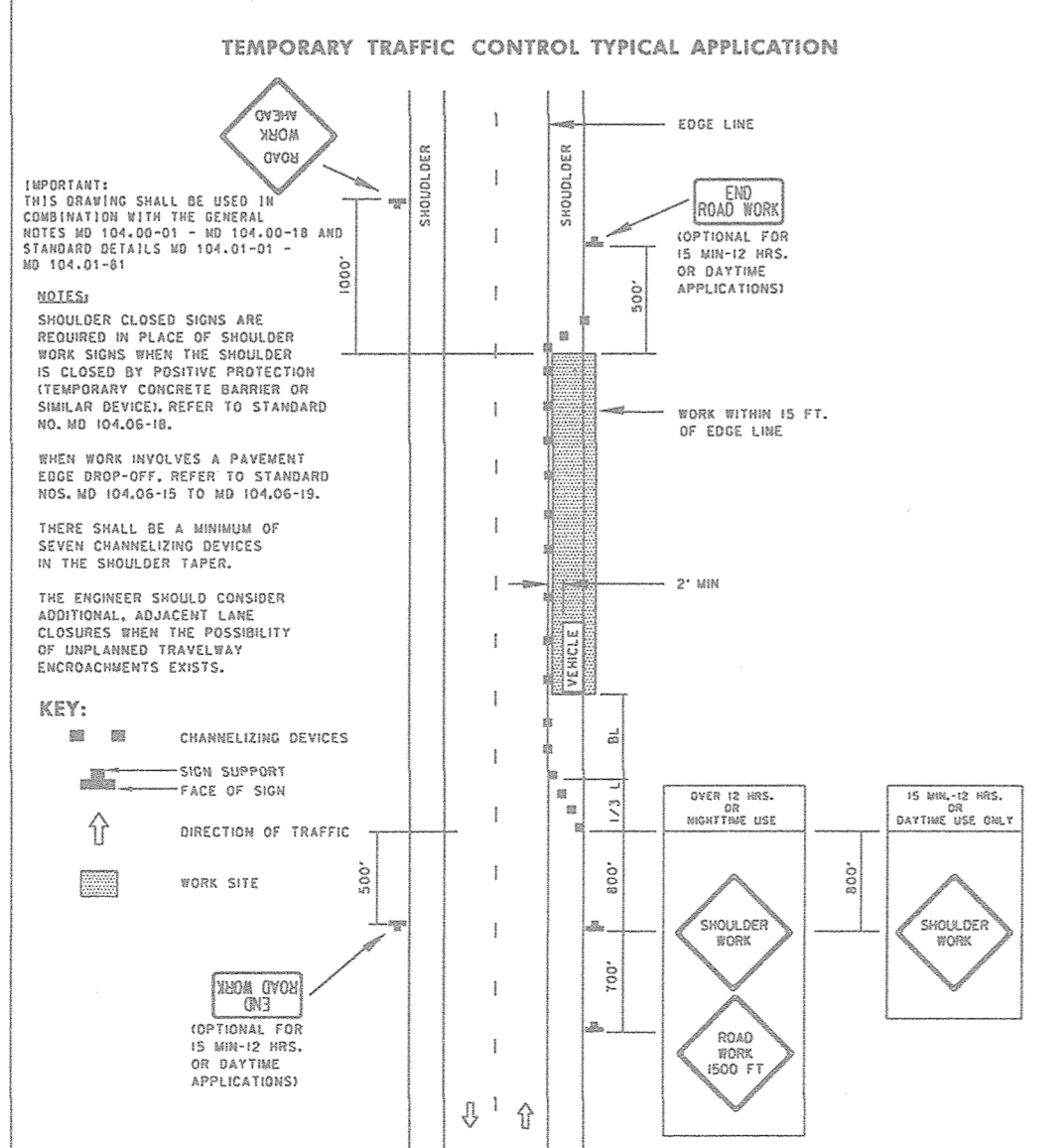
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NO.	Approved: [Signature]		R-9.02
DATE	Doc. Date of Issuance		



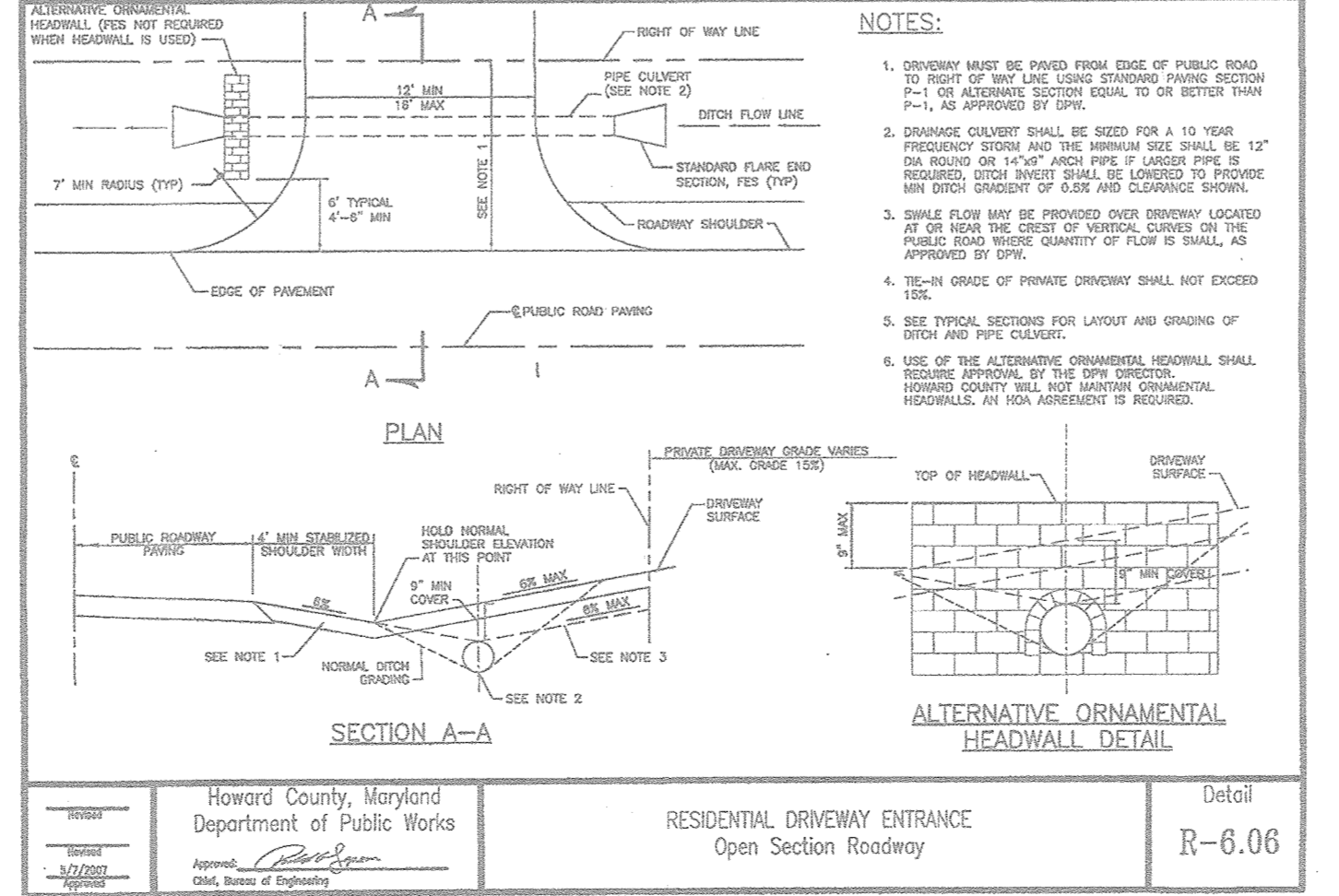
SECTION	Howard County, Maryland Department of Public Works	RESIDENTIAL DRIVEWAY ENTRANCE Closed Section Roadway without Sidewalk	Detail
NO.	Approved: [Signature]		R-6.05
DATE	Doc. Date of Issuance		



SECTION	Howard County, Maryland Department of Public Works	DEAD END BARRICADE Type B	Detail
NO.	Approved: [Signature]		R-5.10
DATE	Doc. Date of Issuance		



SECTION	Howard County, Maryland Department of Public Works	RESIDENTIAL DRIVEWAY ENTRANCE Open Section Roadway	Detail
NO.	Approved: [Signature]		R-6.06
DATE	Doc. Date of Issuance		

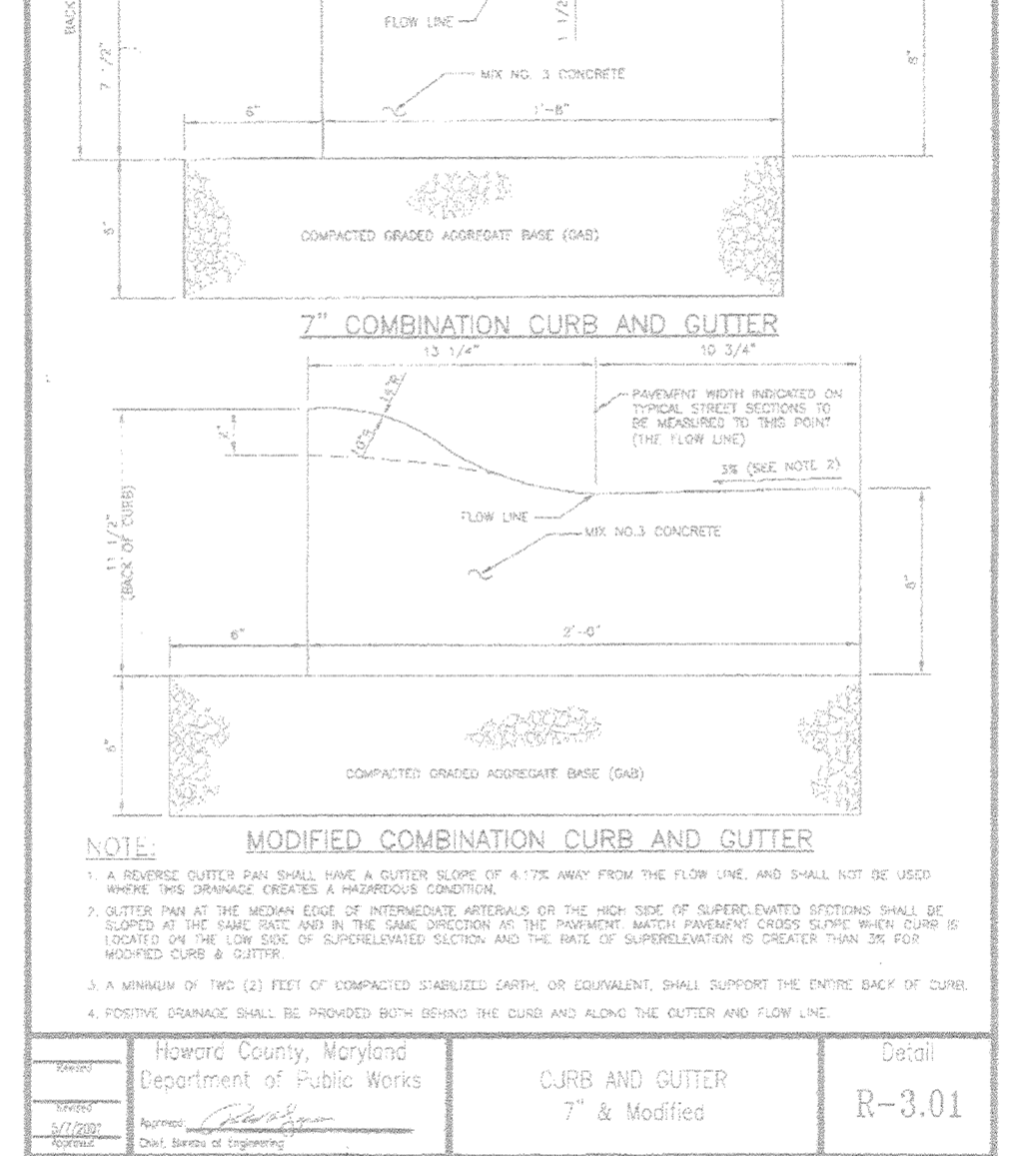


SECTION	Howard County, Maryland Department of Public Works	RESIDENTIAL DRIVEWAY ENTRANCE Open Section Roadway	Detail
NO.	Approved: [Signature]		R-6.06
DATE	Doc. Date of Issuance		

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BIDDING BASIS (CBB)					
		3 TO 4	5 TO 7	7	3 TO 4	5 TO 7	7
P-1	PAVING AND HIGH-RESIDENTIAL DRIVEWAY WITH NO MORE THAN 5 HEAVY TRUCKS PER DAY	PAVEMENT MATERIAL (CBB#)	1.5	1.5	1.5	1.5	1.5
		MIN. HMA WITH GAD	1.5	1.5	1.5	1.5	1.5
P-2	LOCAL ROADWAY CLASSIFICATION: ALL-SEASONS DRIVEWAY	PAVEMENT MATERIAL (CBB#)	2.0	2.0	2.0	2.0	2.0
		MIN. HMA WITH GAD	2.0	2.0	2.0	2.0	2.0
P-3	LOCAL ROADWAY CLASSIFICATION: ALL-SEASONS DRIVEWAY	PAVEMENT MATERIAL (CBB#)	2.0	2.0	2.0	2.0	2.0
		MIN. HMA WITH GAD	2.0	2.0	2.0	2.0	2.0
P-4	LOCAL ROADWAY CLASSIFICATION: ALL-SEASONS DRIVEWAY	PAVEMENT MATERIAL (CBB#)	2.0	2.0	2.0	2.0	2.0
		MIN. HMA WITH GAD	2.0	2.0	2.0	2.0	2.0

**Notes:**  
 1. HEAVY TRUCKS ARE DEFINED AS THOSE WITH SIX (6) WHEELS OR MORE INCLUDING GARAGE TRUCKS.  
 2. HMA SUPERPAVE LAYERS SHALL BE PLACED IN APPROXIMATE COMPACTED LIFT THICKNESS OF 2.0" (2.0" MIN. TO 4.0" MAX).  
 3. HMA SUPERPAVE LIFT MAX TO 2.0" MAX. AND 4.0" SUPERPAVE LIFT MAX TO 2.0" MAX.  
 4. INTERMEDIATE SURFACE COURSE LAYERS MUST BE PLACED WITHIN 4 FEET OF PLACEMENT OF BASE COURSE, AND IS REQUIRED TO BE PLACED WITHIN 4 FEET OF PLACEMENT OF INTERMEDIATE SURFACE COURSE LAYERS.  
 5. IN USE OF PLACING THE INTERMEDIATE SURFACE COURSE LAYERS FOR COMBINATION DRIVEWAY ENTRANCE WITHIN THE CHANNELS OF EXISTING DRIVEWAYS, THE INTERMEDIATE SURFACE COURSE LAYERS MUST BE PLACED WITHIN 4 FEET OF PLACEMENT OF INTERMEDIATE SURFACE COURSE LAYERS.  
 6. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR THE ROADWAY ROAD CLASSIFICATION AND CBB VALUE FOR EACH ROADWAY.

SECTION	Howard County, Maryland Department of Public Works	PAVING SECTIONS P-1 to P-4	Detail
NO.	Approved: [Signature]		R-2.01
DATE	Doc. Date of Issuance		



SECTION	Howard County, Maryland Department of Public Works	CURB AND GUTTER 7" Modified	Detail
NO.	Approved: [Signature]		R-3.01
DATE	Doc. Date of Issuance		

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**

**GENERAL NOTES AND SITE DETAILS**

**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BULBUILDABLE PRESERVATION PARCEL 'A', AND NON-BULBUILDABLE PRESERVATION PARCELS 'B', 'H' ARE SUBDIVISIONS OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389  
 TAX MAP: 34 GRD: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L 4772 / F. 285  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

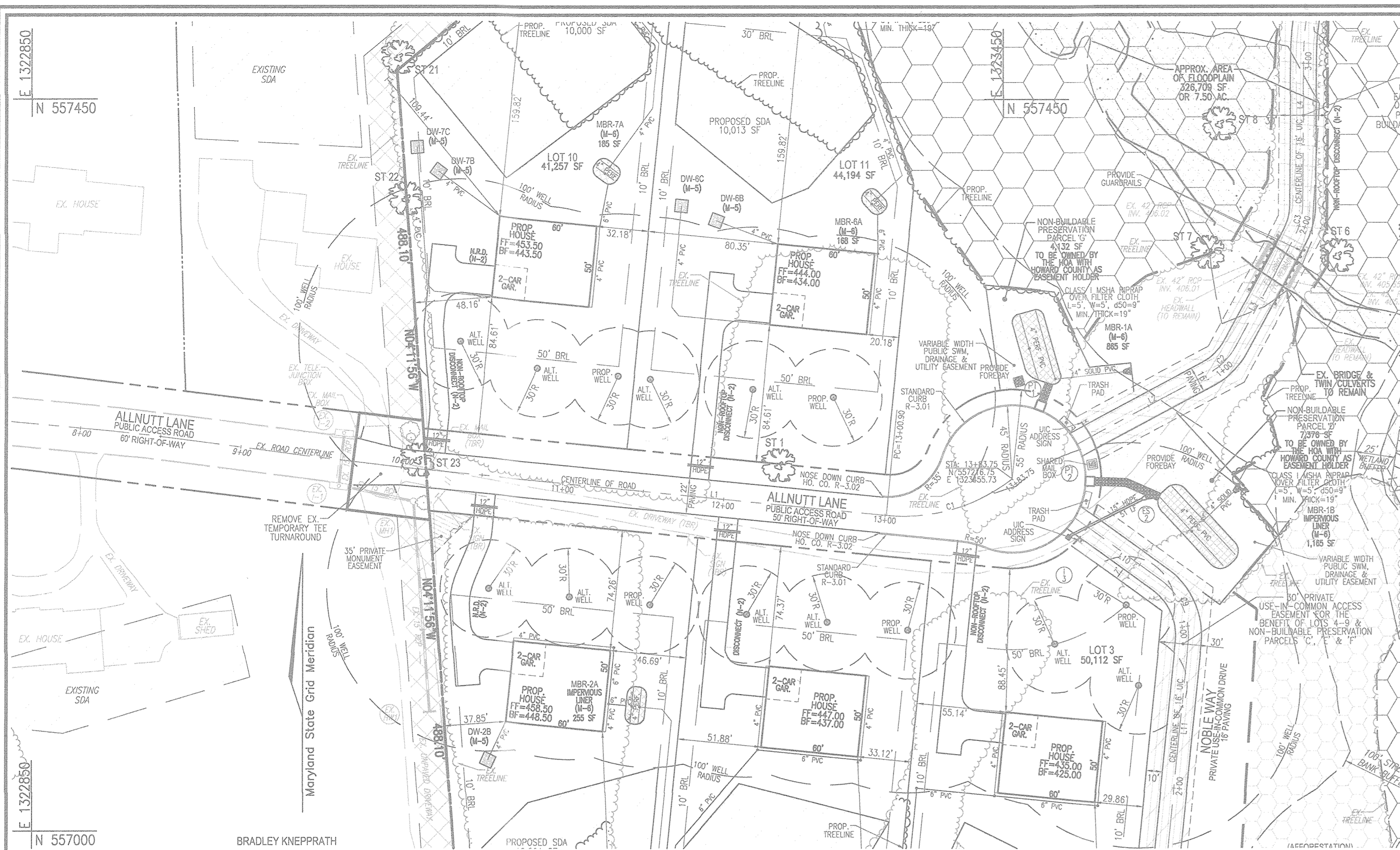
DESIGN BY:	RHV	PROFESSIONAL CERTIFICATE
DRAWN BY:	JMR	I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16493 EXPIRATION DATE: 09-29-2020
CHECKED BY:	RHV	
DATE:	NOVEMBER 2018	
SCALE:	AS SHOWN	
W.O. NO.:	15-39	
2 SHEET OF 30		

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/29/2018  
 CHIEF, BUREAU OF HIGHWAYS

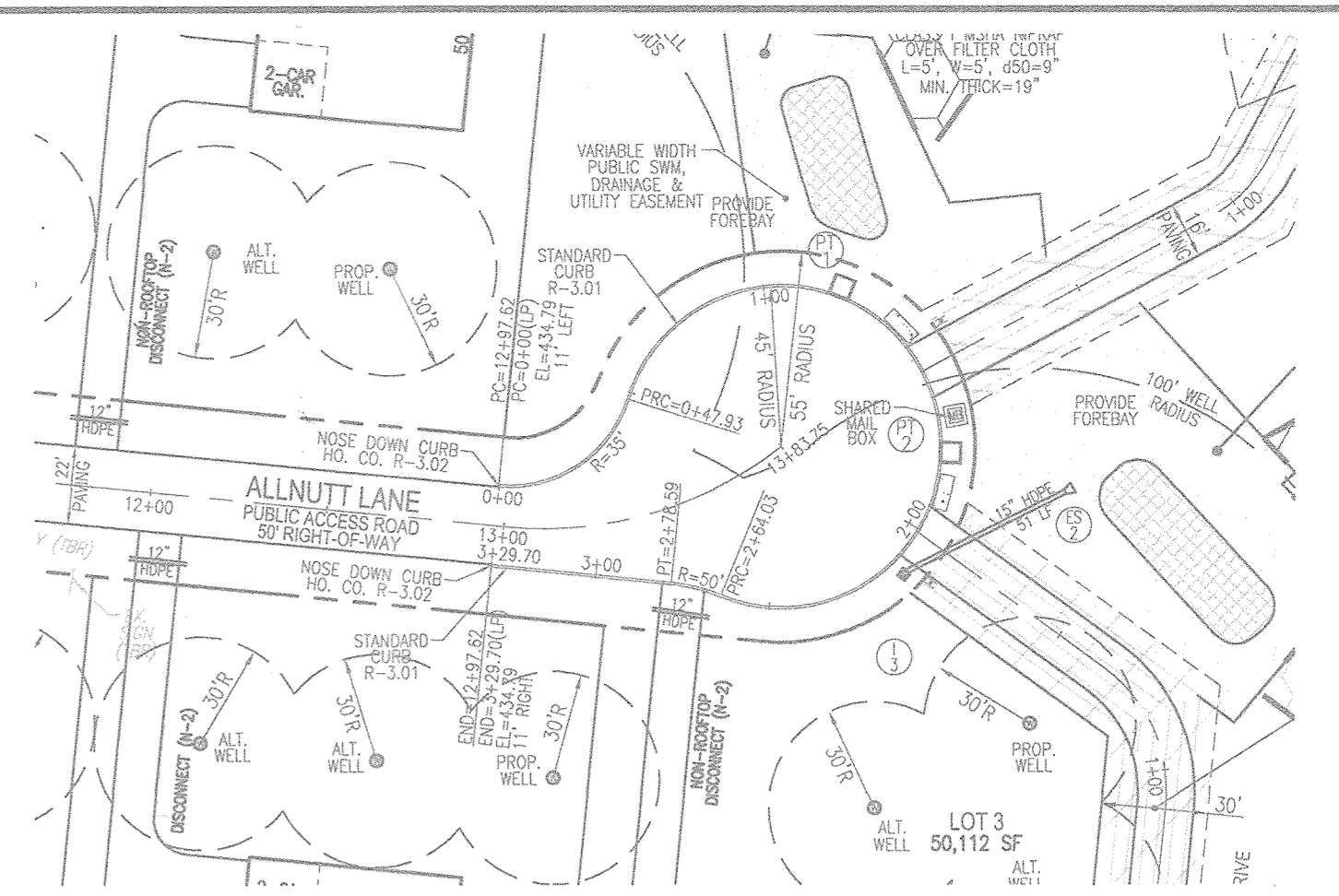
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

**NOTE:**  
 PROVIDE P-1 PAVING FOR THE PROPOSED USE-IN-COMMON DRIVEWAYS AND P-2 PAVING FOR THE ALLIANT LANE PUBLIC ROAD EXTENSION.



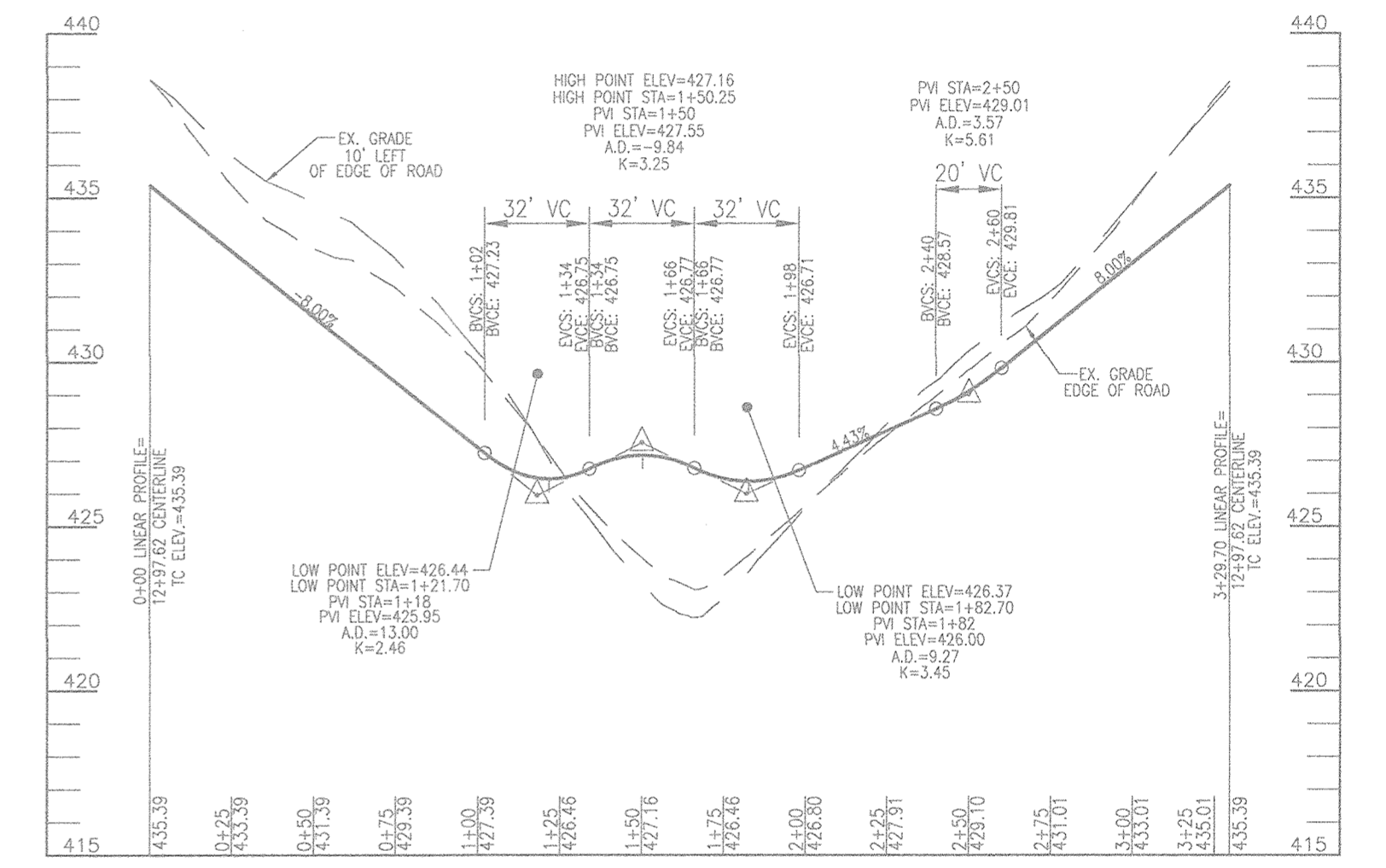
- LEGEND:**
- PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - ADJACENT PROPERTY LINE
  - EXISTING EDGE OF PAVING
  - EXISTING STREAM BUFFER
  - EXISTING STREAM
  - EXISTING TREELINE
  - PROPOSED TREELINE
  - EXISTING METALINIS
  - EXISTING WETLAND BUFFER
  - EXISTING SPECIMIN TREES
  - EXISTING WOOD FENCE
  - EXISTING METAL FENCE
  - EX. PUBLIC 100-YEAR FLOOD PLAIN
  - EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949)
  - PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
  - PROP. PUBLIC SWM, DRAINAGE & UTILITY EASEMENT
  - PROP. 35' PRIVATE MONUMENT EASEMENT
  - PROP. SEWAGE DISPOSAL AREA
  - PROP. WELL AREA



**CUL-DE-SAC EXHIBIT**  
SCALE: 1"=50'

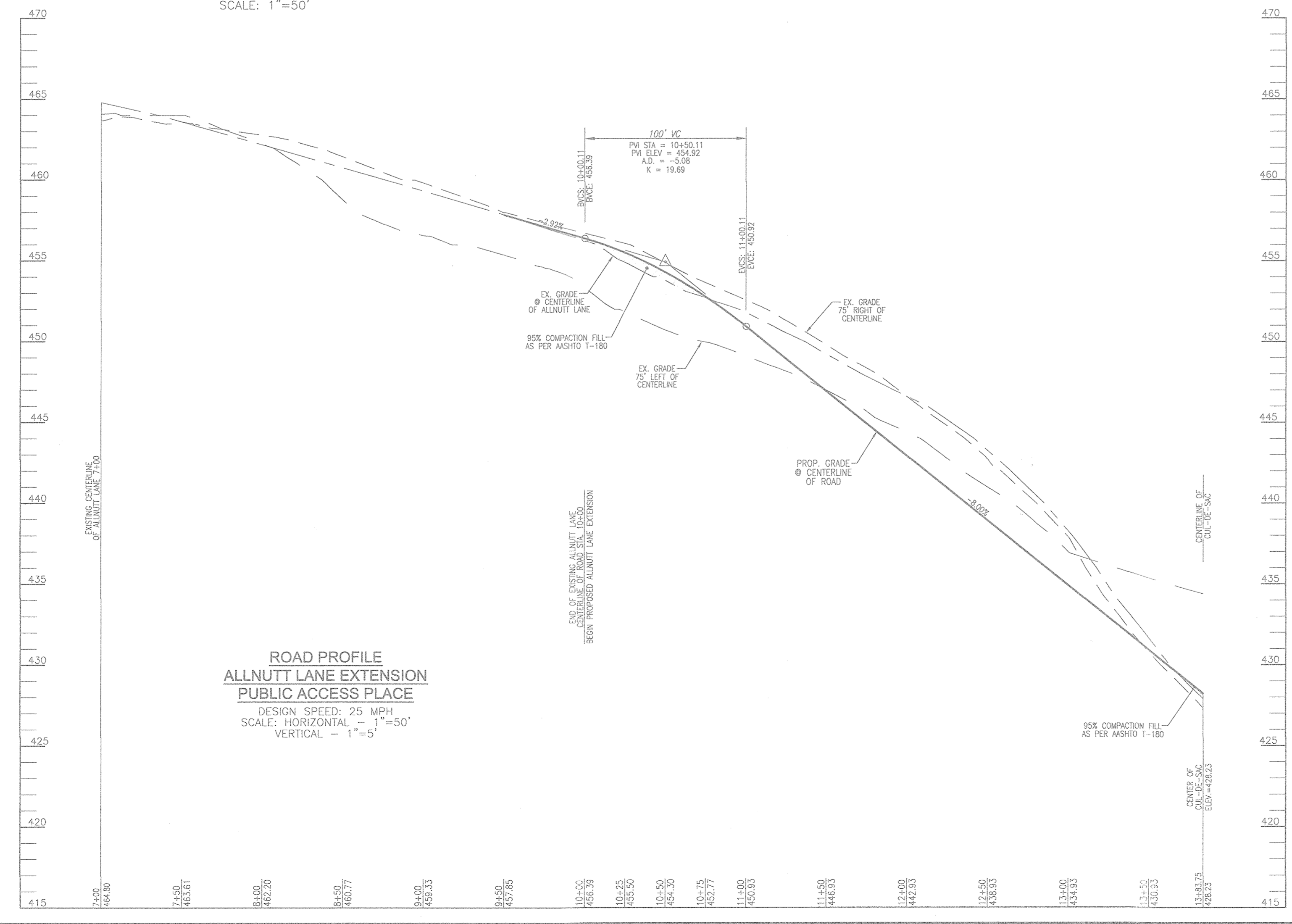
**NOTE:**  
USE-IN-COMMON DRIVEWAY #1 & #2 SHALL UTILIZE HOWARD COUNTY DRIVEWAY DETAIL R-6.05. SEE DETAIL LOCATED ON SHEET 2.

**NOTE:**  
MBR-1A AND MBR-1B ARE LOCATED IN A PUBLIC SWM EASEMENT. FACILITIES ARE TO BE PRIVATELY OWNED BY THE HOMEOWNERS ASSOCIATION AND JOINTLY MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND HOWARD COUNTY.



**LINEAR PROFILE ALLNUTT LANE PUBLIC ACCESS PLACE**  
DESIGN SPEED: 25 MPH  
SCALE - HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**ALLNUTT LANE EXTENSION**  
SCALE: 1"=50'



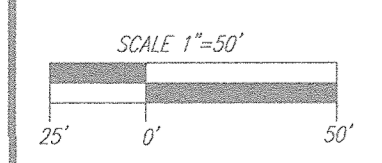
**ROAD PROFILE ALLNUTT LANE EXTENSION PUBLIC ACCESS PLACE**  
DESIGN SPEED: 25 MPH  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**ALLNUTT LANE LINE TABLE**

LINE	BEARING	DISTANCE
L1	S84°24'03"E	300.90'

**ALLNUTT LANE CURVE TABLE**

CURVE	RADIUS	LENGTH	DELTA	TAN	CHORD
C-1	109.00'	82.85'	43°33'01"	43.54'	N73°49'27"E 80.87'



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-18

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**PUBLIC ROAD PLAN, PROFILES AND DETAILS**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L. 4772 / F. 265  
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 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**  
 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. 161819.  
 EXPIRATION DATE: 08-27-2020

DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

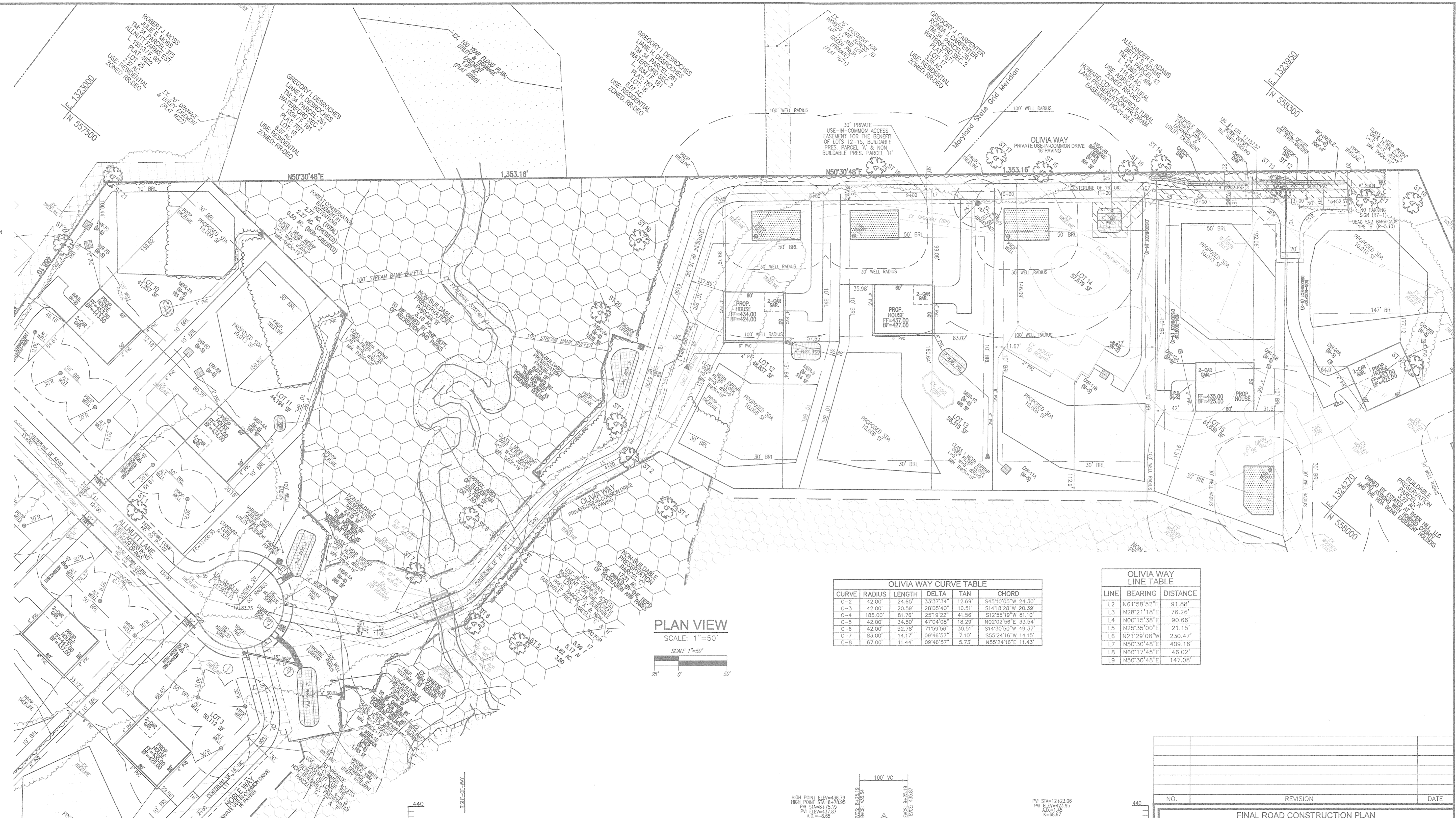
3 SHEET OF 30

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3679 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**LEGEND:**

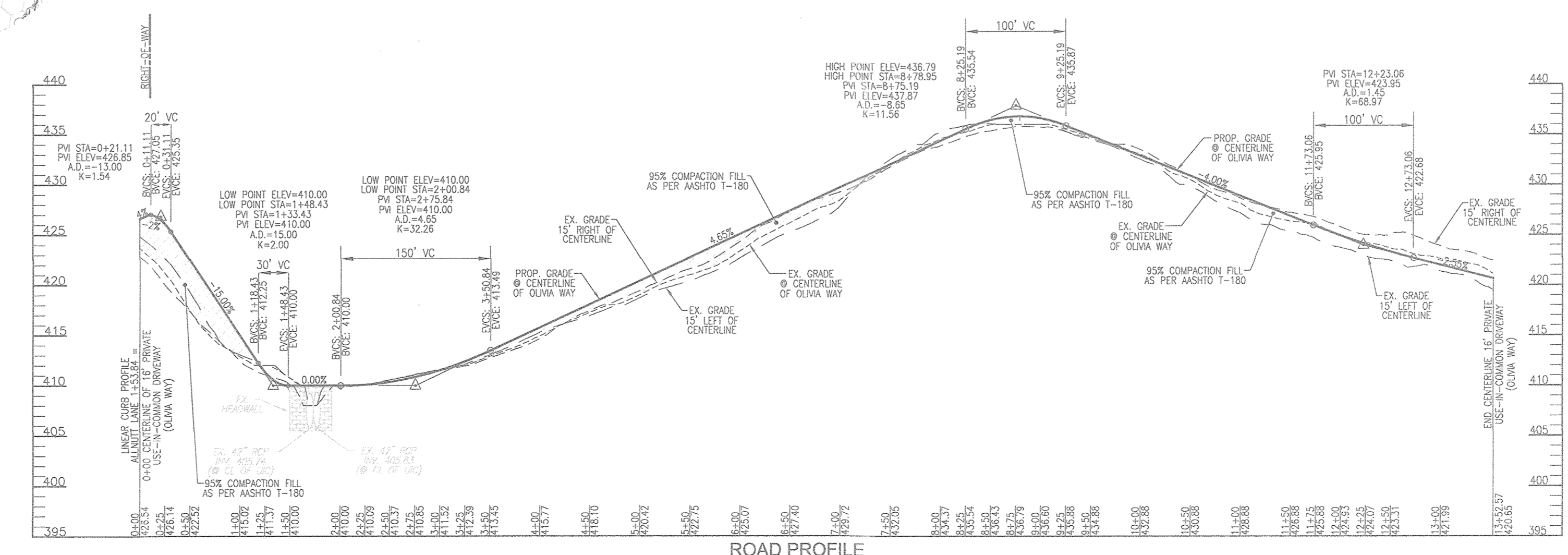
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING TREETRINE
- PROPOSED TREETRINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAIN
- EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949)
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. PUBLIC SWIM, DRAINAGE & UTILITY EASEMENT
- PROP. 35' PRIVATE MONUMENT EASEMENT
- PROP. SEWAGE DISPOSAL AREA
- PROP. WELL AREA



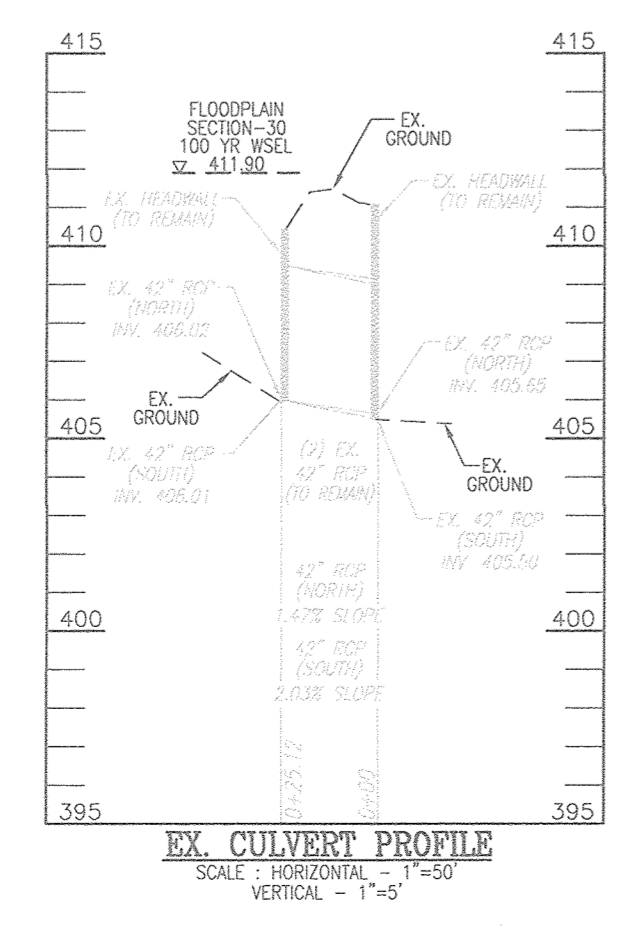
**PLAN VIEW**  
SCALE: 1"=50'

OLIVIA WAY CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	TAN	CHORD
C-2	42.00'	24.65'	33°37'34"	12.69'	S45°10'05"W 24.30'
C-3	42.00'	20.59'	28°05'40"	10.51'	S14°18'28"W 20.39'
C-4	185.00'	81.76'	25°19'22"	41.56'	S12°55'19"W 81.10'
C-5	42.00'	34.50'	47°04'08"	18.29'	N02°02'56"E 33.54'
C-6	42.00'	52.78'	71°59'56"	30.51'	S14°30'50"W 49.37'
C-7	83.00'	14.17'	09°46'57"	7.10'	S55°24'16"W 14.15'
C-8	67.00'	11.44'	09°46'57"	5.73'	N55°24'16"E 11.43'

OLIVIA WAY LINE TABLE		
LINE	BEARING	DISTANCE
L2	N61°58'52"E	91.88'
L3	N28°21'18"E	76.26'
L4	N00°15'38"E	90.66'
L5	N25°35'00"E	21.15'
L6	N21°29'08"W	230.47'
L7	N50°30'48"E	409.16'
L8	N60°17'45"E	46.02'
L9	N50°30'48"E	147.08'



**ROAD PROFILE**  
OLIVIA WAY (PRIVATE 16' USE-IN-COMMON)  
SCALE: HORIZONTAL - 1"=100'  
SCALE: VERTICAL - 1"=10'



**EX. CULVERT PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
SCALE: VERTICAL - 1"=5'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS *James* 11/27/2018 DATE  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION *Chad* 12-2-18 DATE  
 CHIEF, DIVISION OF LAND DEVELOPMENT *Kristen* 1-10-19 DATE

NO.	REVISION	DATE

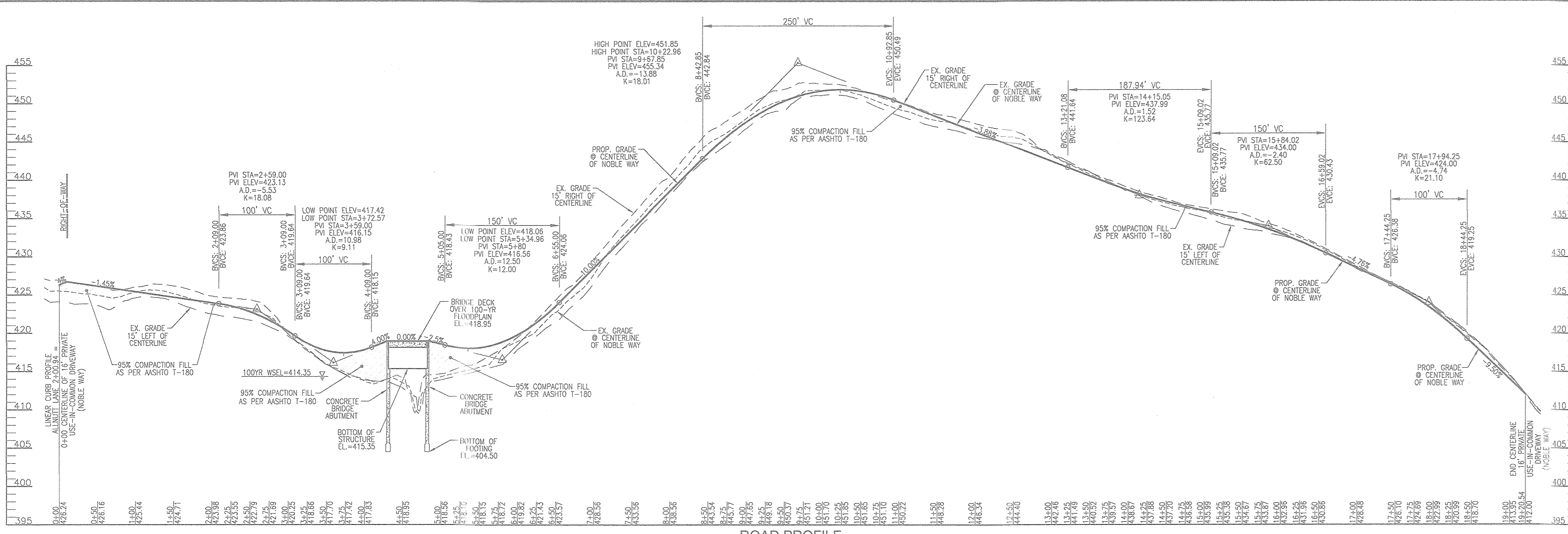
**FINAL ROAD CONSTRUCTION PLAN**  
**OLIVIA WAY (PRIVATE USE-IN-COMMON)**  
**PROFILE AND DETAILS**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389      TAX MAP: 54 GRID: 23      ZONED: RR-DEO  
 5TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

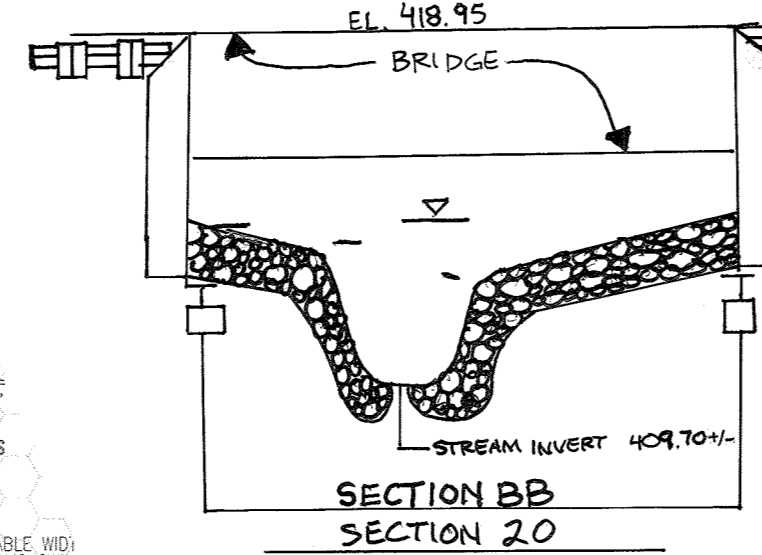
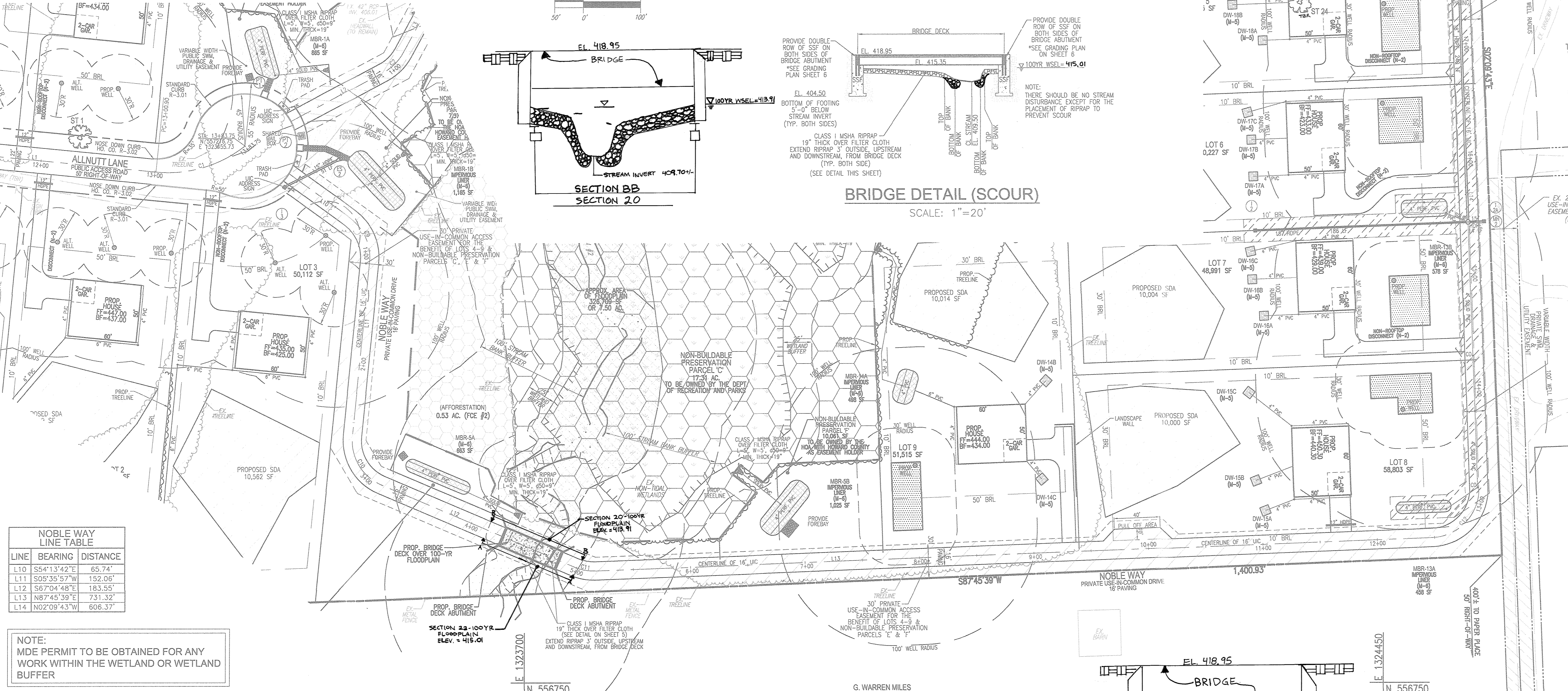
**ROBERT H. VOGEL**  
**ENGINEERS • SURVEYORS • PLANNERS**  
 3300 N. RIDGE ROAD, SUITE 110      TEL: 410-461-7666  
 ELLICOTT CITY, MD 21043      FAX: 410-461-8961

PROFESSIONAL CERTIFICATE	
DESIGN BY: <u>  RHV  </u> DRAWN BY: <u>  JMR  </u> CHECKED BY: <u>  JMR  </u> DATE: <u>  NOVEMBER 2018  </u> SCALE: <u>  AS SHOWN  </u> W.O. NO.: <u>  15-39  </u>	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: 06-27-2022

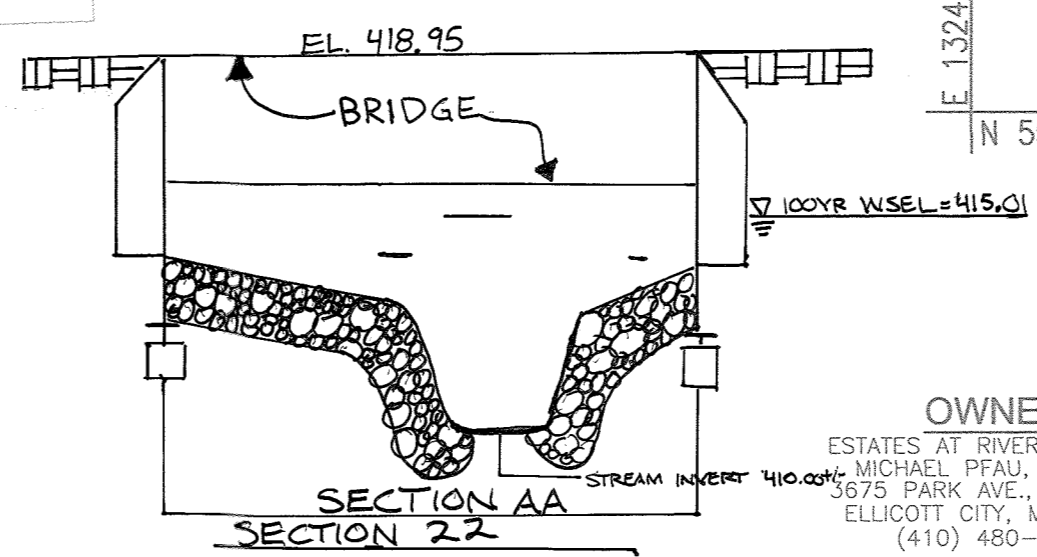
4 SHEET OF 30



**ROAD PROFILE**  
NOBLE WAY (PRIVATE 16' USE-IN-COMMON)  
SCALE: HORIZONTAL = 1"=100'  
VERTICAL = 1"=10'



**BRIDGE DETAIL (SCOUR)**  
SCALE: 1"=20'



**PLAN VIEW**  
SCALE: 1"=50'

**NOBLE WAY LINE TABLE**

LINE	BEARING	DISTANCE
L10	S54°13'42"E	65.74'
L11	S05°35'57"W	152.06'
L12	S67°04'48"E	183.55'
L13	N87°45'39"E	731.32'
L14	N02°09'43"W	606.37'

**NOBLE WAY CURVE TABLE**

CURVE	RADIUS	LENGTH	DELTA	TAN	CHORD
C-9	42.00'	43.88'	89°49'30"	24.16'	S341°18'57"E 41.89'
C-10	42.00'	53.28'	72°40'45"	30.90'	S304°42'25"E 48.78'
C-11	42.00'	18.44'	25°09'33"	9.37'	S79°39'35"E 18.29'
C-12	42.00'	65.92'	89°55'22"	41.94'	N42°47'58"E 59.36'

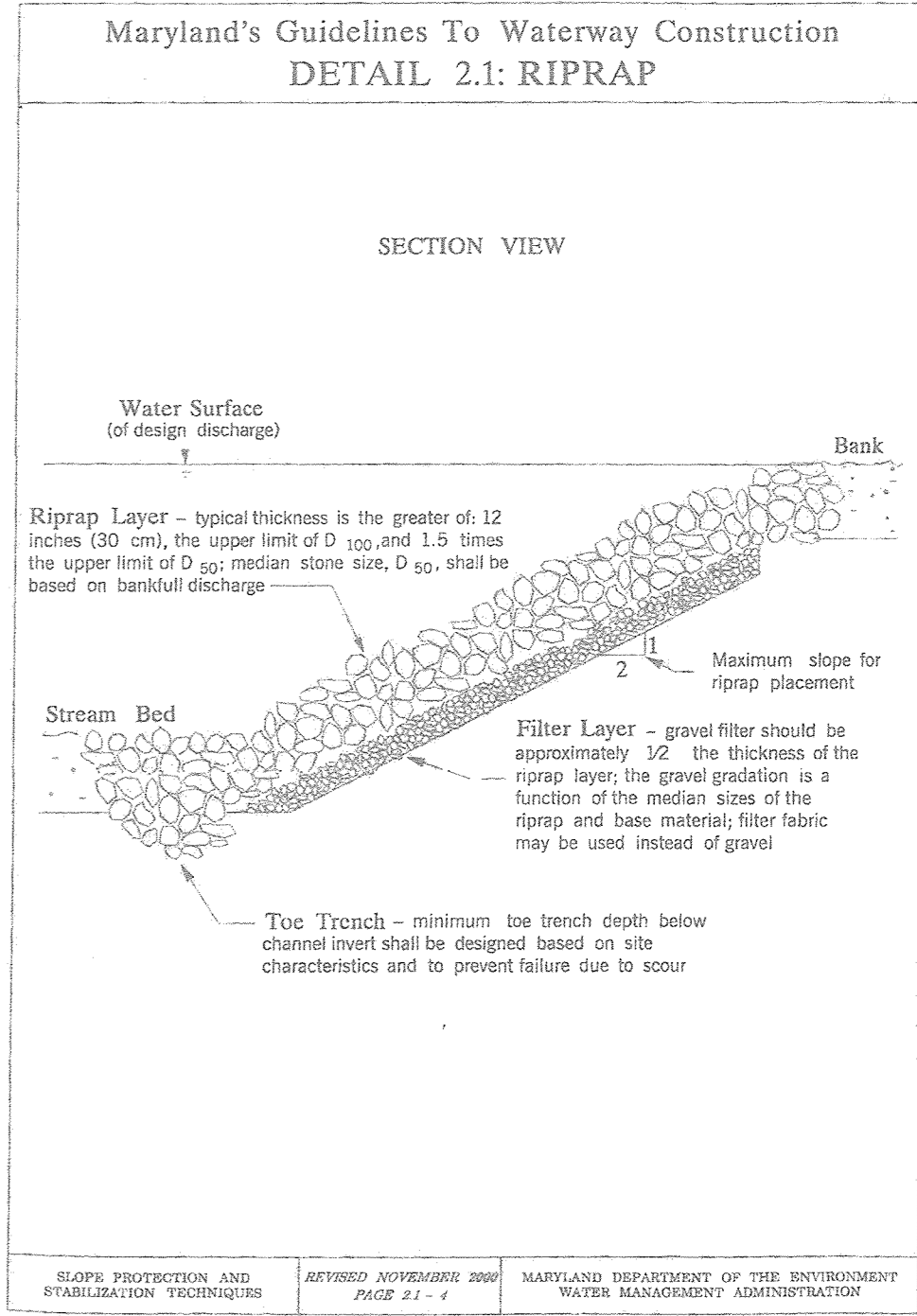
**NOTE:**  
MDE PERMIT TO BE OBTAINED FOR ANY WORK WITHIN THE WETLAND OR WETLAND BUFFER

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

G. WARREN MILES  
 MARIE I. MILES  
 TM: 34 PARCELS: 252  
 L 1285 / F 393  
 11.00 AC  
 USE: AGRICULTURAL ZONED: RR-DEO

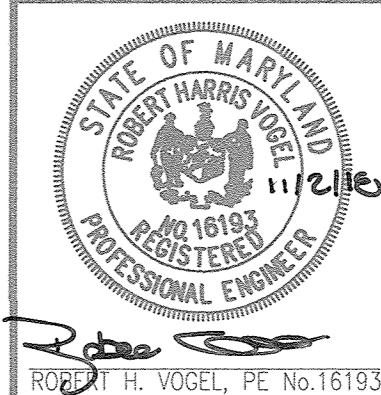


- LEGEND:**
- PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - ADVANCING PROPERTY LINE
  - EXISTING EDGE OF PAVING
  - EXISTING STREAM BUFFER
  - EXISTING STREAM
  - EXISTING TREELINE
  - EXISTING WETLANDS
  - EXISTING WETLAND BUFFER
  - EXISTING SPECIMEN TREES
  - EXISTING WOOD FENCE
  - EXISTING METAL FENCE
  - EX. PUBLIC 100-YEAR FLOOD PLAN
  - PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
  - PROP. VARIABLE WIDTH PRIVATE SIM. DRAINAGE & UTILITY EASEMENT
  - EX. 24' WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
  - EX. FOREST CONSERVATION EASEMENT "A" (PLAT 12949)
  - PROP. SEWAGE DISPOSAL AREA
  - PROP. WELL AREA

JINGLI YANG  
 PETER H. LI  
 TM: 34 PARCELS: 36  
 VANT HOFF PROP L 11510 / F 001  
 LOT 4  
 5.71 AC  
 USE: RESIDENTIAL ZONED: RR-DEO

FINAL ROAD CONSTRUCTION PLAN  
**NOBLE WAY (PRIVATE USE-IN-COMMON)**  
**PROFILE AND DETAILS**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

**ROBERT H. VOGEL ENGINEERING, INC.**  
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 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961



**PROFESSIONAL CERTIFICATE**

DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

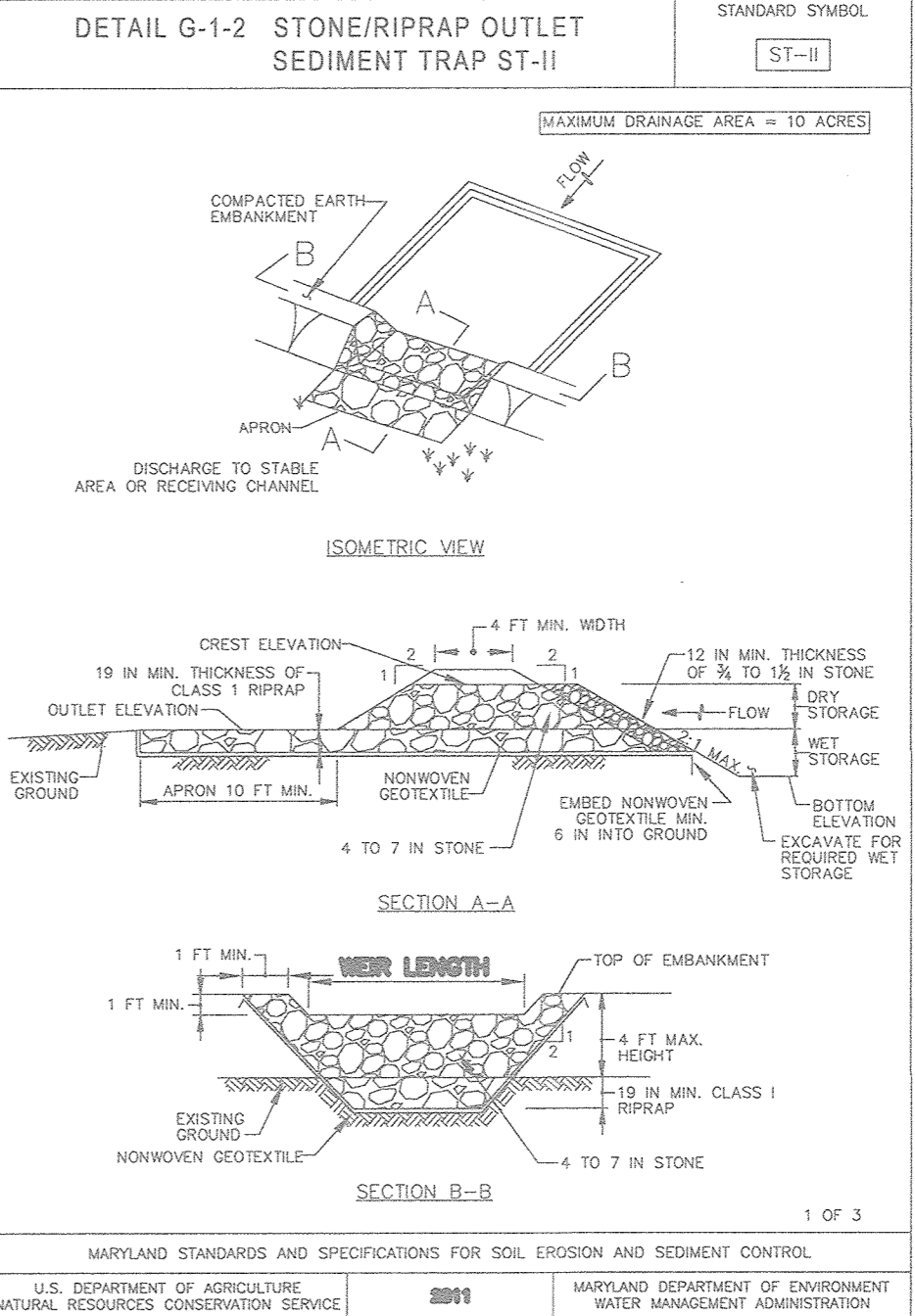
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRES DATE: 09-27-2020

5 SHEET OF 30

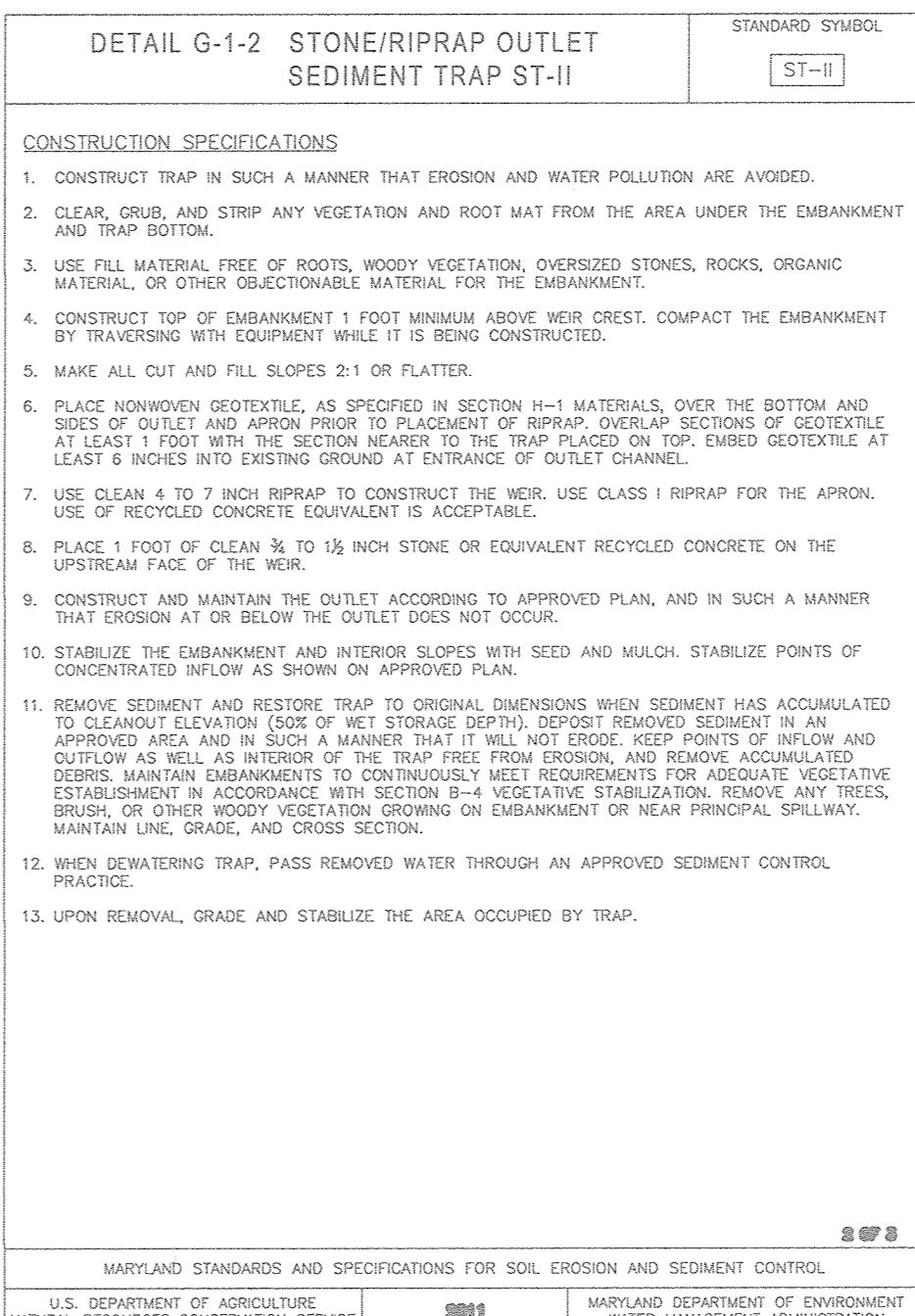
MATCHLINE - SHEET 7

NOTE: NO AREAS OF STEEP SLOPES AS HATCHED HEREON ARE REGULATED PER SECTION 16.116 OF THE HOWARD COUNTY SUB. REG'S.

NOTE: PROVIDE DOUBLE ROW OF SUPER SILT FENCE AT ALL STREAM CROSSINGS.



LEGEND: Table listing symbols for PROPERTY LINE, RIGHT-OF-WAY LINE, ADJACENT PROPERTY LINE, EXISTING EDGE OF PAVING, EXISTING STREAM BUFFER, EXISTING STREAM, EXISTING TREETLINE, PROPOSED TREETLINE, EXISTING WETLANDS, EXISTING WETLAND BUFFER, EXISTING SPECIMEN TREES, EXISTING WOOD FENCE, EXISTING METAL FENCE, EX. PUBLIC 100-YEAR FLOOD PLAN, EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949), PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT, PROP. PUBLIC SWIM, DRAINAGE & UTILITY EASEMENT, PROP. 35' PRIVATE MONUMENT EASEMENT, EXISTING 10' CONTOUR, EXISTING 2' CONTOUR, PROPOSED 10' CONTOUR, PROPOSED 2' CONTOUR, EXISTING SLEEP SLOPES (20% SLOPES OR GREATER), EXISTING MODERATE SLOPES (15% TO 19.9% SLOPES), PROP. SEWAGE DISPOSAL AREA, PROP. WELL AREA.



STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II. Table with columns for TRAP NO., DRAINAGE AREA - INITIAL, DRAINAGE AREA - INTERIM, DRAINAGE AREA - FINAL, TOTAL STORAGE REQUIRED, WET STORAGE PROVIDED, DRY STORAGE PROVIDED, EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION), TRAP BOTTOM ELEVATION, TRAP BOTTOM DIMENSIONS, WEIR LENGTH, WEIR CREST (DRY STORAGE) ELEVATION, CLEANOUT ELEVATION, TOP OF EMBANKMENT ELEVATION, SIDE SLOPE, EMBANKMENT TOP WIDTH, OUTLET PROTECTION - LENGTH, OUTLET PROTECTION - DEPTH.

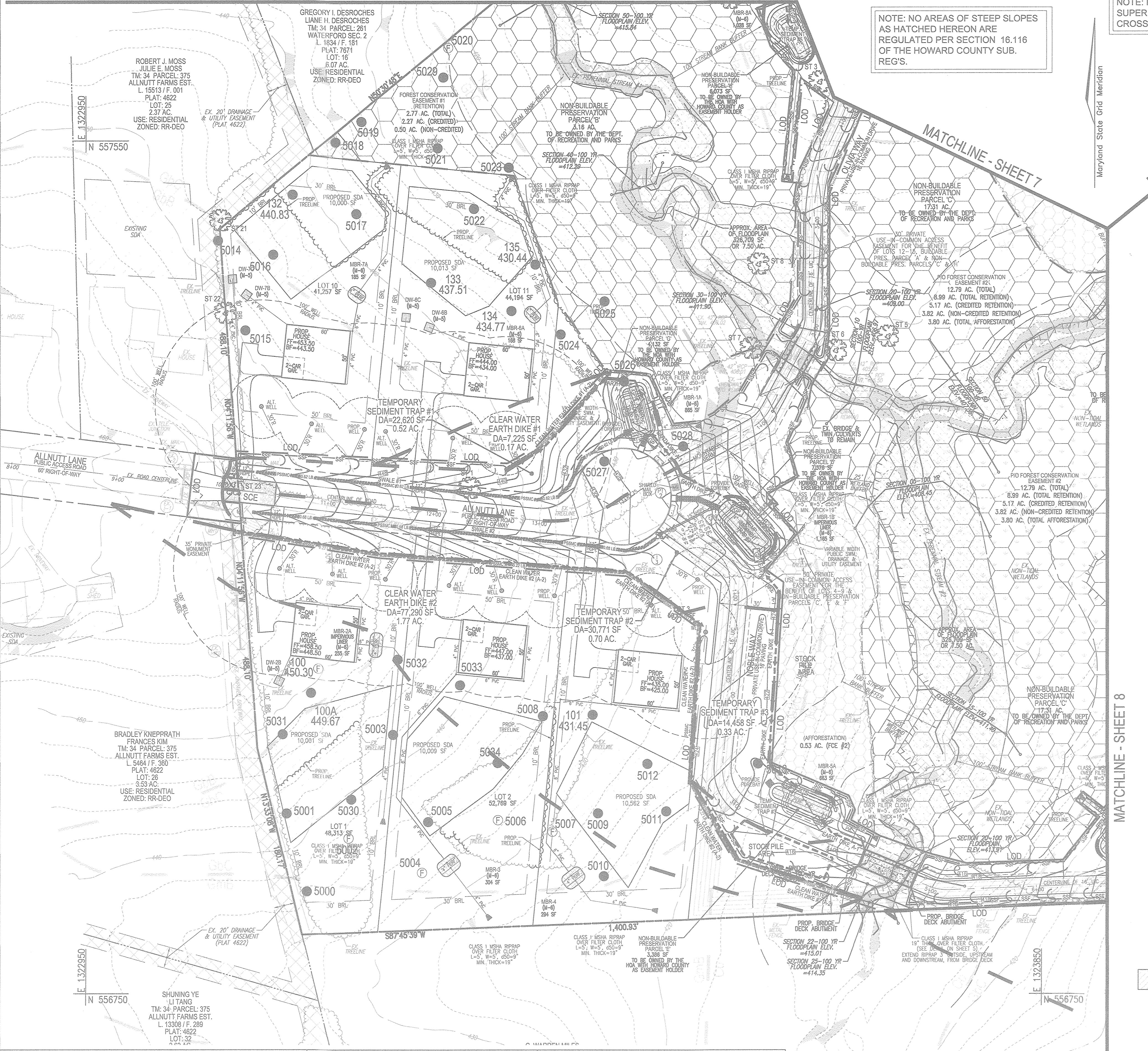
SOILS LEGEND. Table with columns: SYMBOL, NAME/DESCRIPTION, GROUP, K-FACTOR, ERODIBLE. Lists soil types like BbA, Co, GbB, GbC, GbB, GbB, HbB.

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

THIS AREA DESIGNATES A PRIVATE SEWAGE AREA OF AT LEAST 10,000 SQUARE FEET AS REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWAGE DISPOSAL IMPROVEMENTS OF ANY NATURE IN THIS AREA ARE RESTRICTED UNTIL PUBLIC SEWAGE IS AVAILABLE.

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS. COUNTY HEALTH OFFICER HOWARD COUNTY HEALTH DEPARTMENT. DATE: 11/14/18.

OWNER: ESTATES AT RIVER HILL, LLC. DEVELOPER: TRINITY HOMES MARYLAND, LLC. SCALE: 1" = 50'. DATE: 11/14/18.



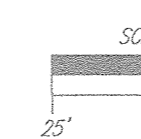
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS. CHIEF, BUREAU OF HIGHWAYS. DATE: 11/27/2018. APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING. CHIEF, DEVELOPMENT ENGINEERING DIVISION. DATE: 12-2-18. CHIEF, DIVISION OF LAND DEVELOPMENT. DATE: 1-10-19.

OWNER/DEVELOPER CERTIFICATION: I/WE CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN... DATE: 11/5/18.

DESIGN CERTIFICATION: I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS... DATE: 11/14/18.

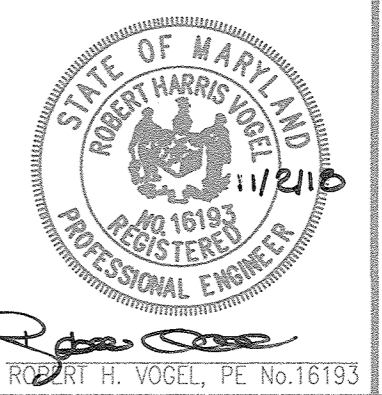
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT. DATE: 11/14/18.

GRADING PLAN. SCALE: 1" = 50'. DATE: 11/14/18.



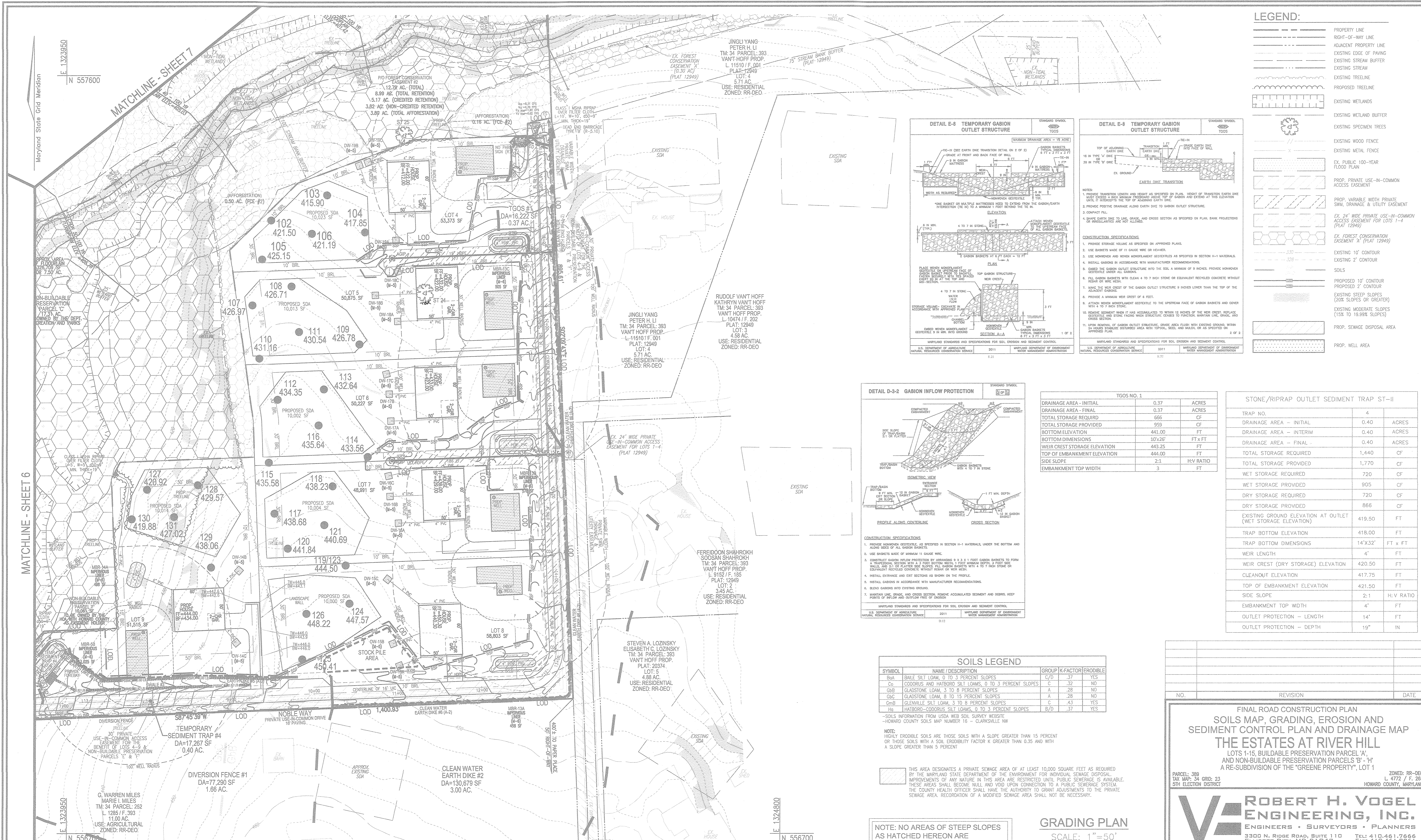
FINAL ROAD CONSTRUCTION PLAN SOILS MAP, GRADING, EROSION AND SEDIMENT CONTROL PLAN AND DRAINAGE MAP THE ESTATES AT RIVER HILL. LOT 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H' A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1.

ROBERT H. VOGEL ENGINEERING, INC. ENGINEERS • SURVEYORS • PLANNERS. 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043. TEL: 410.461.7666 FAX: 410.461.8961.



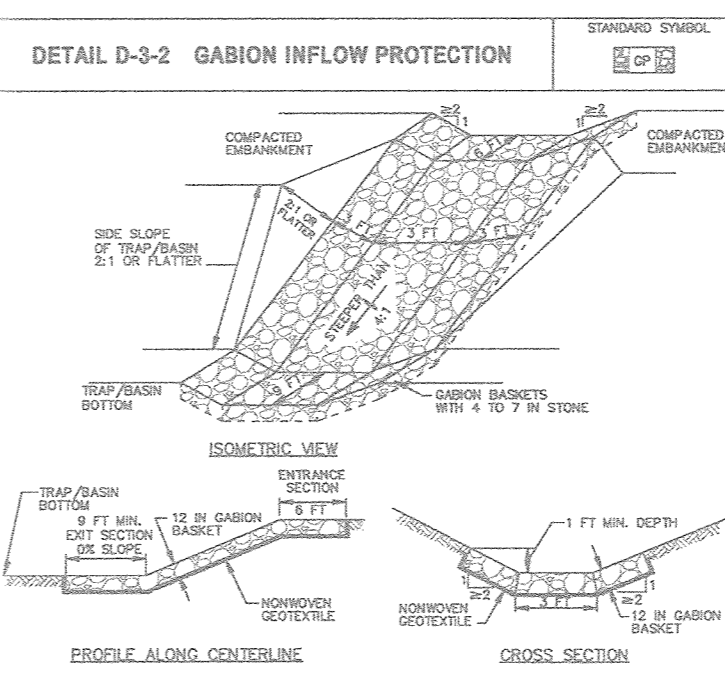
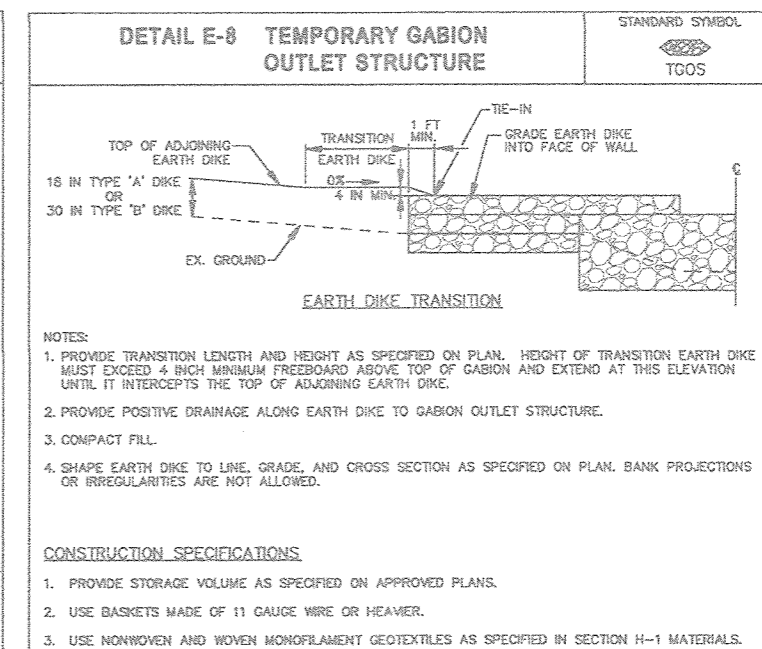
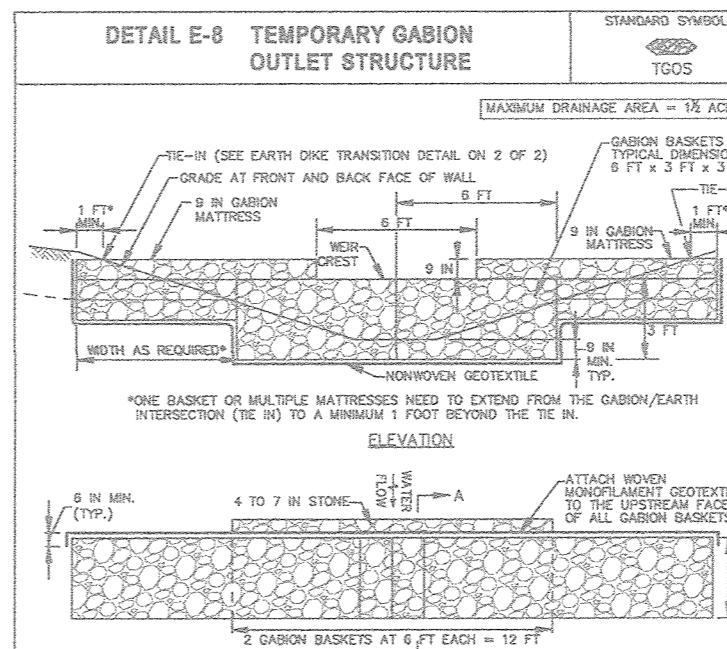
DESIGN BY: RHY. DRAWN BY: JMR. CHECKED BY: RHY. DATE: NOVEMBER 2018. SCALE: AS SHOWN. W.O. NO.: 15-39. PROFESSIONAL CERTIFICATE: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A duly licensed PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND... 6 SHEET OF 30.





**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING STREAM
- EXISTING TREELINE
- PROPOSED TREELINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFERS
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAN
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. VARIABLE WIDTH PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
- EX. 24" WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
- EX. FOREST CONSERVATION EASEMENT 'A' (PLAT 12949)
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
- EXISTING MODERATE SLOPES (15% TO 19.99% SLOPES)
- PROP. SEWAGE DISPOSAL AREA
- PROP. WELL AREA



**TGOS NO. 1**

DRAINAGE AREA - INITIAL	0.37	ACRES
DRAINAGE AREA - FINAL	0.37	ACRES
TOTAL STORAGE REQUIRED	666	CF
TOTAL STORAGE PROVIDED	959	CF
BOTTOM ELEVATION	441.00	FT
BOTTOM DIMENSIONS	10'x26'	FTxFT
WEIR CREST STORAGE ELEVATION	443.25	FT
TOP OF EMBANKMENT ELEVATION	444.00	FT
SIDE SLOPE	2:1	H:V RATIO
EMBANKMENT TOP WIDTH	3	FT

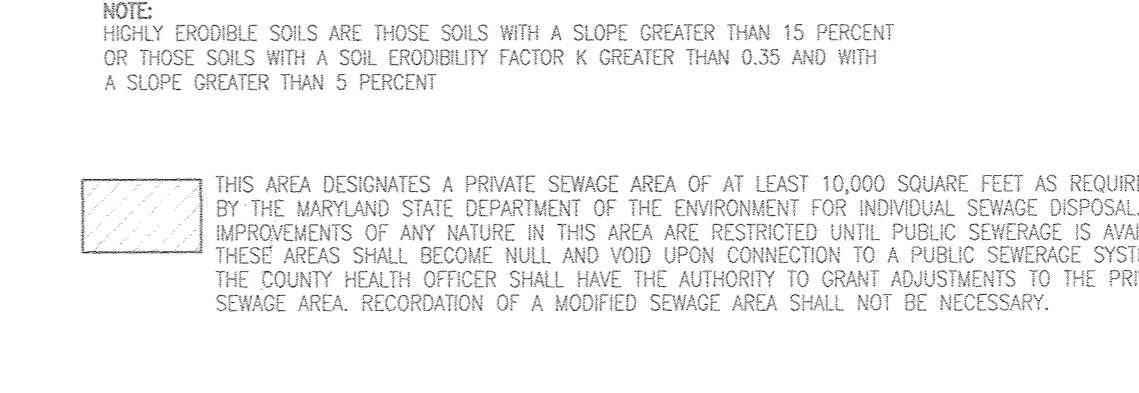
**STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II**

TRAP NO.	4	
DRAINAGE AREA - INITIAL	0.40	ACRES
DRAINAGE AREA - FINAL	0.40	ACRES
DRAINAGE AREA - INTERIM	0.40	ACRES
TOTAL STORAGE REQUIRED	1,440	CF
TOTAL STORAGE PROVIDED	1,770	CF
WET STORAGE REQUIRED	720	CF
WET STORAGE PROVIDED	905	CF
DRY STORAGE REQUIRED	720	CF
DRY STORAGE PROVIDED	866	CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	419.50	FT
TRAP BOTTOM ELEVATION	418.00	FT
TRAP BOTTOM DIMENSIONS	14'x32'	FT x FT
WEIR LENGTH	4'	FT
WEIR CREST (DRY STORAGE) ELEVATION	420.50	FT
CLEANOUT ELEVATION	417.75	FT
TOP OF EMBANKMENT ELEVATION	421.50	FT
SIDE SLOPE	2:1	H:V RATIO
EMBANKMENT TOP WIDTH	4'	FT
OUTLET PROTECTION - LENGTH	14'	FT
OUTLET PROTECTION - DEPTH	19"	IN

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
BsA	BAILE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
Co	CODORUS AND HATBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
CsB	CLAUSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
CsC	CLAUSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
CmB	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
Hs	HATBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

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



NOTE: NO AREAS OF STEEP SLOPES AS HATCHED HEREON ARE REGULATED PER SECTION 16.116 OF THE HOWARD COUNTY SUB. REG'S.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
 [Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

OWNER/DEVELOPER CERTIFICATION:  
 I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND MDE.

[Signature] 11/6/18  
 MICHAEL PEAR, MEMBER  
 PRINTED NAME & TITLE

DESIGN CERTIFICATION:  
 I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND MODERATE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

[Signature] 11/2/18  
 ROBERT H. VOGEL  
 PRINTED NAME  
 MD REGISTRATION NO. 16193  
 R.L.S., OR R.L.A. (circle one)

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

[Signature] 11/14/18  
 HOWARD S.C.D.

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS

[Signature] \_\_\_\_\_ DATE \_\_\_\_\_  
 COUNTY HEALTH OFFICER  
 HOWARD COUNTY HEALTH DEPARTMENT

OWNER  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFEIL, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

DEVELOPER  
 TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

FINAL ROAD CONSTRUCTION PLAN  
 SOILS MAP, GRADING, EROSION AND  
 SEDIMENT CONTROL PLAN AND DRAINAGE MAP  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L 4772 / F 265  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7656  
 FAX: 410.461.8961

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE 09-27-2020

[Signature] 11/2/18  
 ROBERT H. VOGEL, PE No. 16193

8 OF 30





**THE ESTATES AT RIVER HILL**  
Runoff Coefficient Justification

Inlet #	Soil Group	Description	Area acres	Table 3.01 "C"	CA
INLET 1	C	O.S. Grass (Steep)	1.05	0.24	0.2520
	C	Impervious Area	0.22	0.86	0.1892
			1.27		0.4412
C = 0.35 % Imp = 11					
INLET 1A	C	O.S. Grass (Steep)	0.05	0.24	0.0120
	C	Impervious Area	0.00	0.86	0.0000
			0.05		0.0120
C = 0.24 % Imp = 0					
INLET 2	C	O.S. Grass (Steep)	1.00	0.24	0.2400
	C	Impervious Area	0.17	0.86	0.1462
			1.17		0.3862
C = 0.33 % Imp = 9					
INLET 2A	C	O.S. Grass (Steep)	1.94	0.24	0.4656
	C	Impervious Area	0.11	0.86	0.0945
			2.05		0.5602
C = 0.27 % Imp = 3					
INLET 3	C	O.S. Grass (Steep)	0.50	0.24	0.1200
	C	Impervious Area	0.20	0.86	0.1720
			0.70		0.2920
C = 0.42 % Imp = 19					
PT-1	C	O.S. Grass (Steep)	0.00	0.24	0.0000
	C	Impervious Area	0.00	0.86	0.0000
			0.00		0.0000
C = 0.86 % Imp = 100					
PT-2	C	O.S. Grass (Steep)	0.00	0.24	0.0000
	C	Impervious Area	0.09	0.86	0.0774
			0.09		0.0774
C = 0.86 % Imp = 100					

**THE ESTATES AT RIVER HILL**  
Runoff Coefficient Justification

Inlet #	Soil Group	Description	Area acres	Table 3.01 "C"	CA
CLUVERT LOT 1	C	O.S. Grass (Steep)	0.03	0.24	0.0072
	C	Impervious Area	0.01	0.86	0.0086
			0.04		0.0158
C = 0.40 % Imp = 16					
CLUVERT LOT 2	C	O.S. Grass (Steep)	0.25	0.24	0.0600
	C	Impervious Area	0.11	0.86	0.0946
			0.36		0.1546
C = 0.43 % Imp = 20					
CLUVERT LOT 3	C	O.S. Grass (Steep)	0.47	0.24	0.1128
	C	Impervious Area	0.19	0.86	0.1634
			0.66		0.2762
C = 0.42 % Imp = 19					
CLUVERT LOT 10	C	O.S. Grass (Steep)	0.005	0.24	0.0012
	C	Impervious Area	0.005	0.86	0.0040
			0.010		0.0052
C = 0.54 % Imp = 31					
CLUVERT LOT 11	C	O.S. Grass (Steep)	0.07	0.24	0.0168
	C	Impervious Area	0.05	0.86	0.0430
			0.12		0.0598
C = 0.50 % Imp = 27					

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
DRB	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
CG	CODORUS AND HAIRBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
GRB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
GBG	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
GBM	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
HS	HAIRBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

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

**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING EDGE OF PAVING
	EXISTING STREAM BUFFER
	EXISTING STREAM
	EXISTING TREELINE
	PROPOSED TREELINE
	EXISTING WETLANDS
	EXISTING WETLAND BUFFER
	EXISTING SPECIMEN TREES
	EXISTING WOOD FENCE
	EXISTING METAL FENCE
	EX. PUBLIC 100-YEAR FLOOD PLAIN
	EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949)
	PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
	PROP. PUBLIC SWM, DRAINAGE & UTILITY EASEMENT
	PROP. 35' PRIVATE MONUMENT EASEMENT
	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	SOILS
	PROPOSED 10' CONTOUR
	PROPOSED 2' CONTOUR
	EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
	EXISTING MODERATE SLOPES (15% TO 19.99% SLOPES)
	DRAINAGE AREA DIVIDE
	PROPOSED MICRO-BIORETENTION FACILITY (M-B)
	PROPOSED DRY WELL (M-S)
	PROP. SEWAGE DISPOSAL AREA
	PROP. WELL AREA



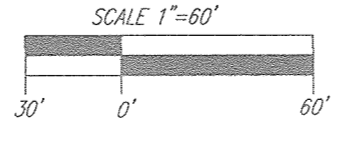
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12.2.18

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19

**SD DRAINAGE AREA MAP**

SCALE: 1" = 60'



NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN DRAINAGE  
 AREA MAP  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L 4772 / F. 285  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3200 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2020

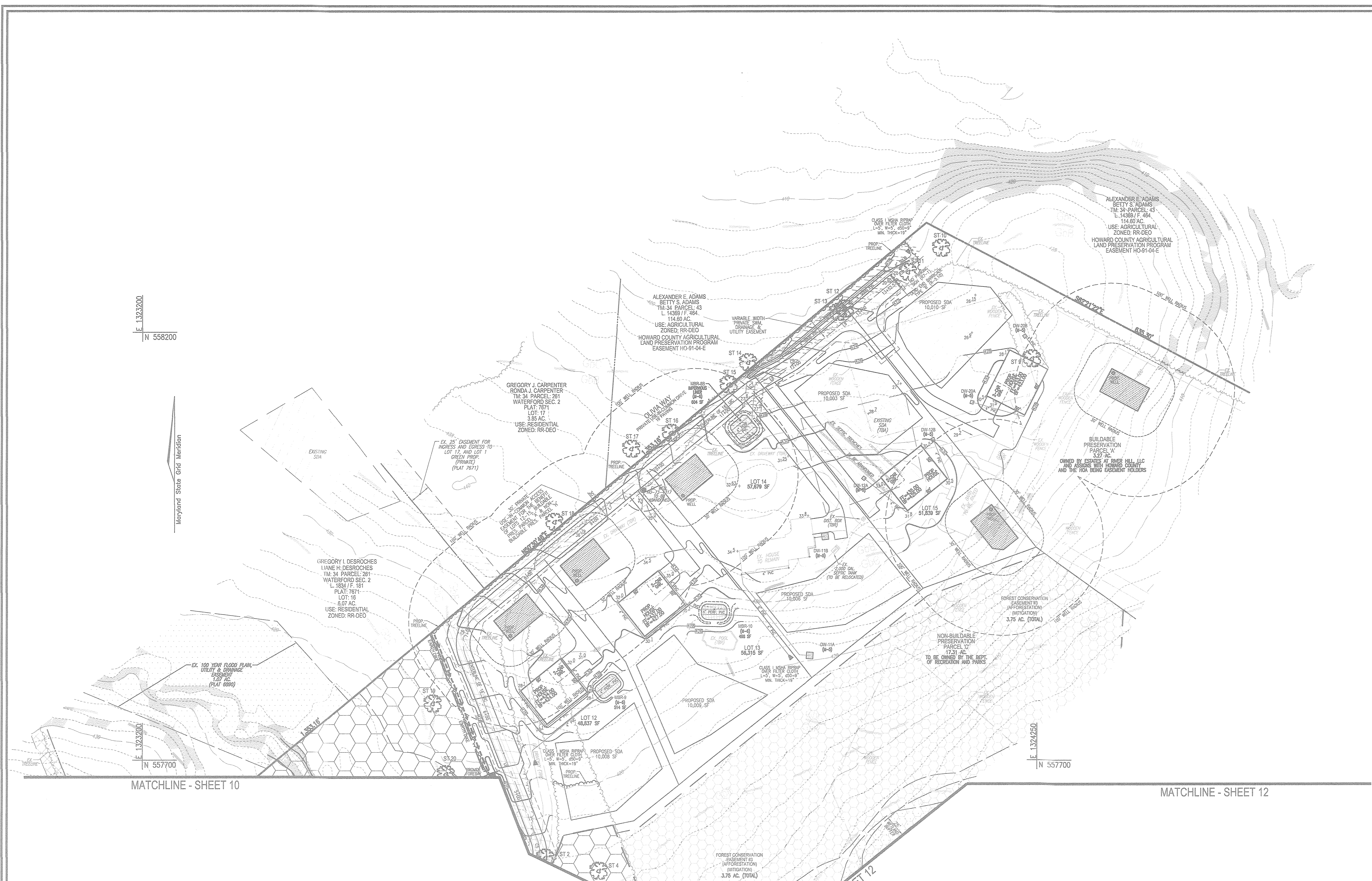
DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

10 SHEET OF 30

OWNER: ESTATES AT RIVER HILL, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

DEVELOPER: TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

- LEGEND:**
- PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - ADJACENT PROPERTY LINE
  - EXISTING EDGE OF PAVING
  - EXISTING STREAM BUFFER
  - EXISTING STREAM
  - EXISTING TREETRINE
  - PROPOSED TREETRINE
  - EXISTING WETLANDS
  - EXISTING WETLAND BUFFER
  - EXISTING SPECIMEN TREES
  - EXISTING WOOD FENCE
  - EXISTING METAL FENCE
  - EX. PUBLIC 100-YEAR FLOOD PLAN
  - PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
  - PROP. VARIABLE WIDTH PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
  - EX. 25' EASEMENT FOR INGRESS AND EGRESS TO LOT 17, AND LOT 1 GREEN PROP. (PRIVATE) (PLAT 7671)
  - EXISTING 10' CONTOUR
  - EXISTING 2' CONTOUR
  - SOILS
  - PROPOSED 10' CONTOUR
  - PROPOSED 2' CONTOUR
  - EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
  - EXISTING MODERATE SLOPES (15% TO 19.99% SLOPES)
  - DRAINAGE AREA DIVIDE
  - MBR
  - PROPOSED MICRO-BIORETENTION FACILITY (M-6)
  - DW
  - PROPOSED DRY WELL (M-5)
  - PROP. SEWAGE DISPOSAL AREA
  - PROP. WELL AREA



E 1323200  
N 558200

MATCHLINE - SHEET 10

MATCHLINE - SHEET 12

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
BsA	BAILE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
Co	CODORUS AND HATBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
GdB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
GdC	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
GmB	GLAINVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
Hs	HATBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

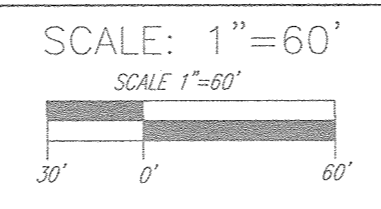
NOTE:  
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 11/27/2018  
 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 12.2.18  
 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT  
 1-10-19  
 DATE

**SD DRAINAGE AREA MAP**



**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN DRAINAGE  
 AREA MAP  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
 A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 369  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L 4772 / F. 285  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

	DESIGN BY: RHV	I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2022
	DRAWN BY: JMR	
	CHECKED BY: RHV	
	DATE: NOVEMBER 2018	
SCALE: AS SHOWN		
W.O. NO.: 15-39		

11 SHEET OF 30



**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING STREAM
- EXISTING TREETLINE
- PROPOSED TREETLINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAIN
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. VARIABLE WIDTH PRIVATE SWIM, DRAINAGE & UTILITY EASEMENT
- EX. 24' WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
- EX. FOREST CONSERVATION EASEMENT 'A' (PLAT 12949)
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
- EXISTING MODERATE SLOPES (15% TO 19.9% SLOPES)
- DRAINAGE AREA DIVIDE
- PROPOSED MICRO-BIORETENTION FACILITY (M-B)
- PROPOSED DRY WELL (M-S)
- PROP. SEWAGE DISPOSAL AREA
- PROP. WELL AREA

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
BBA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
CD	CODORUS AND HATBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
GhB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
GhC	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
GhB	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
Hb	HATBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

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

**SD DRAINAGE AREA MAP**  
SCALE: 1"=60'  
SCALE 1"=60'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-7-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN DRAINAGE AREA MAP  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H' A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 34 GRD: 23 L: 4772 / F: 265  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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 ELLICOTT CITY, MD 21043 FAX: 410-461-8961

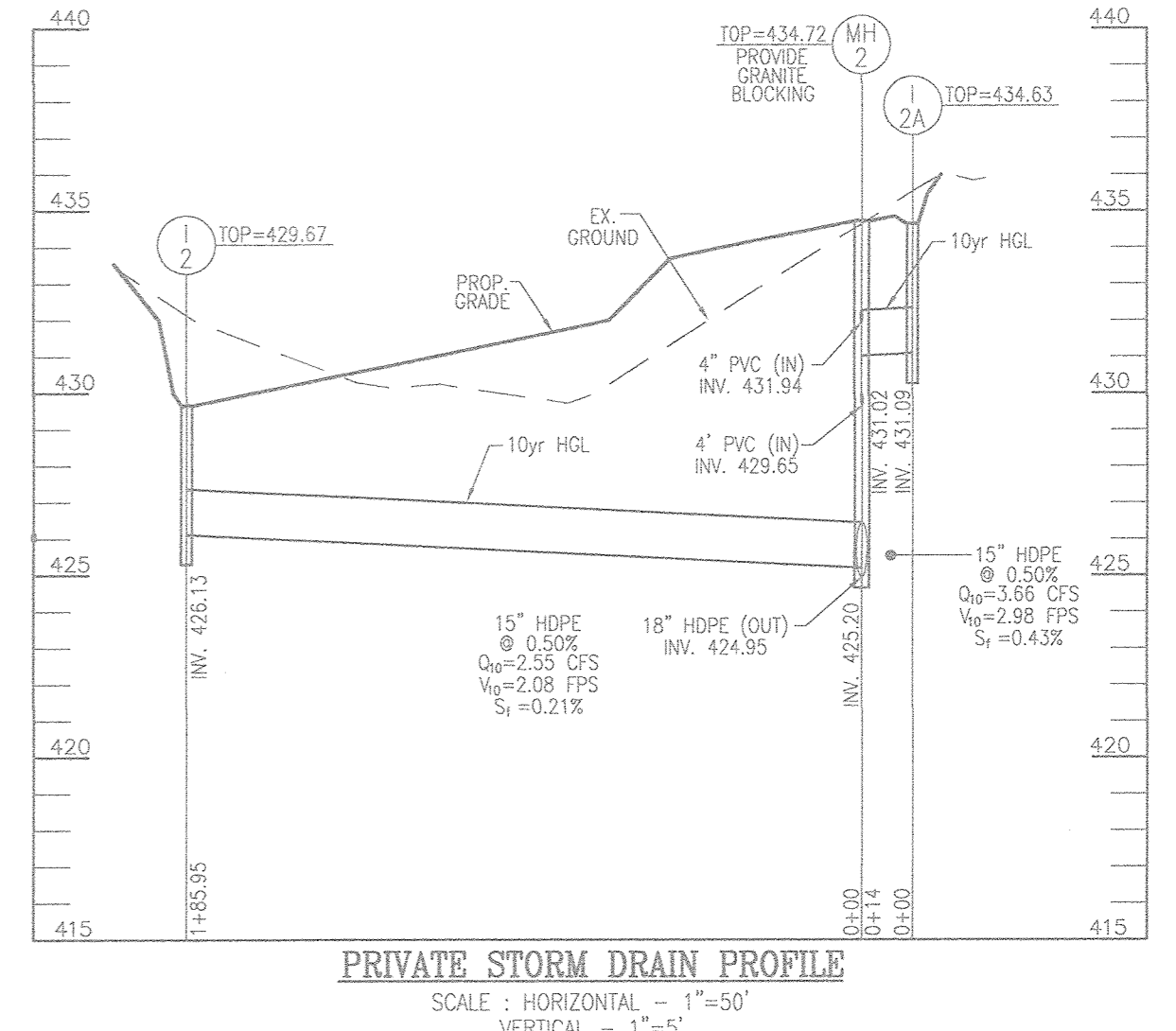
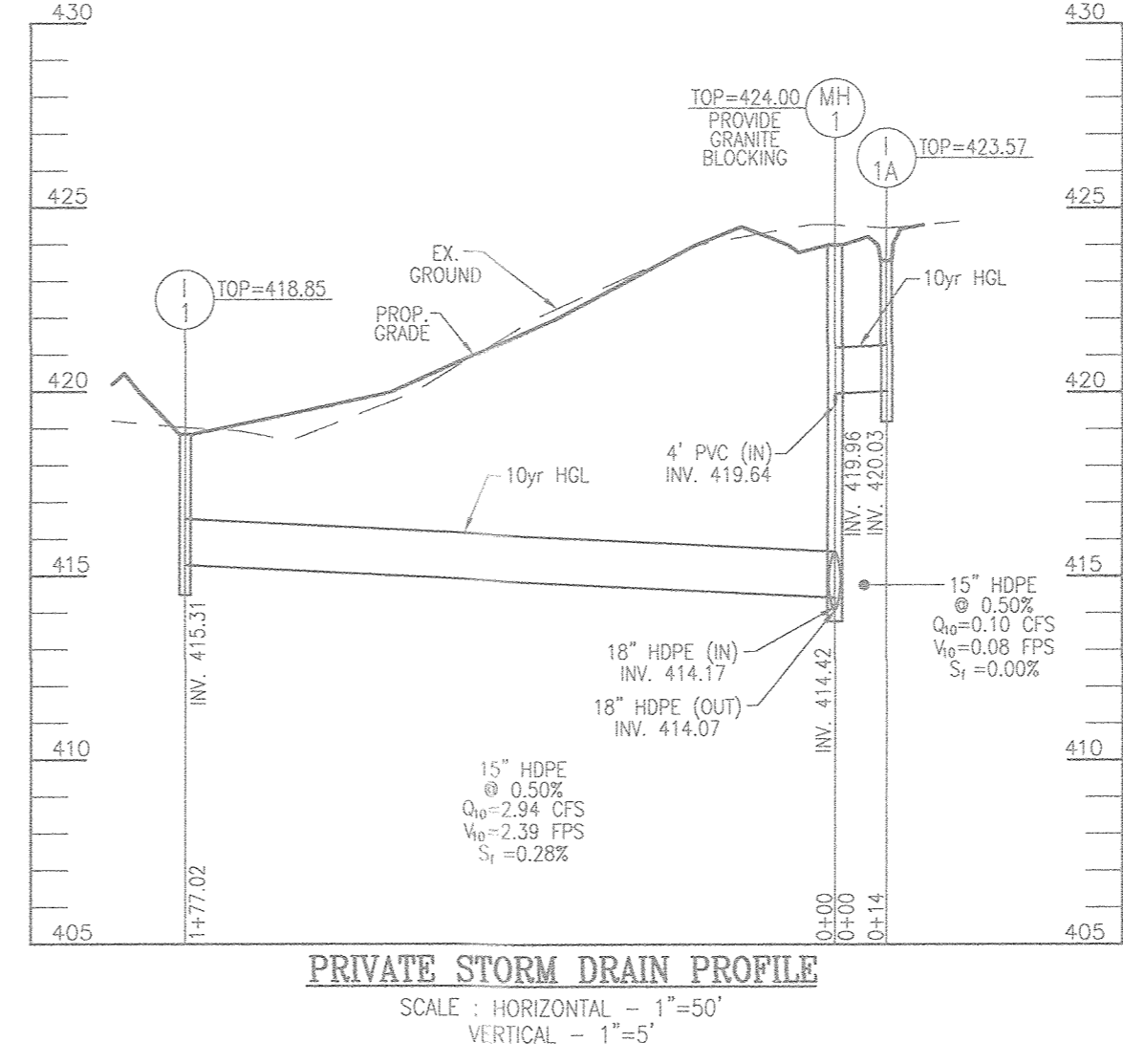
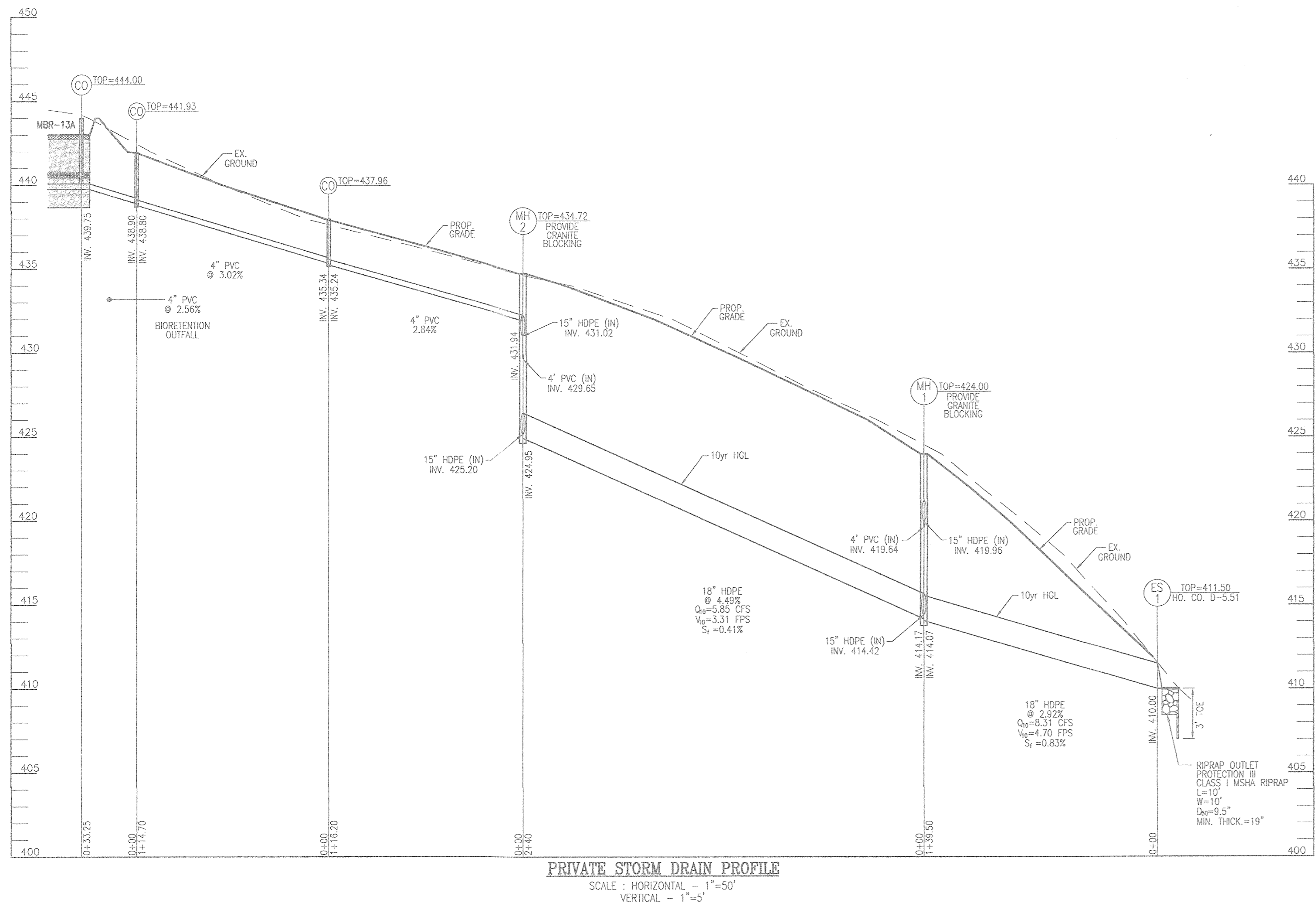
PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 117476 EXPIRATION DATE 08-27-2020

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.D. NO.: 15-39

12 SHEET OF 30

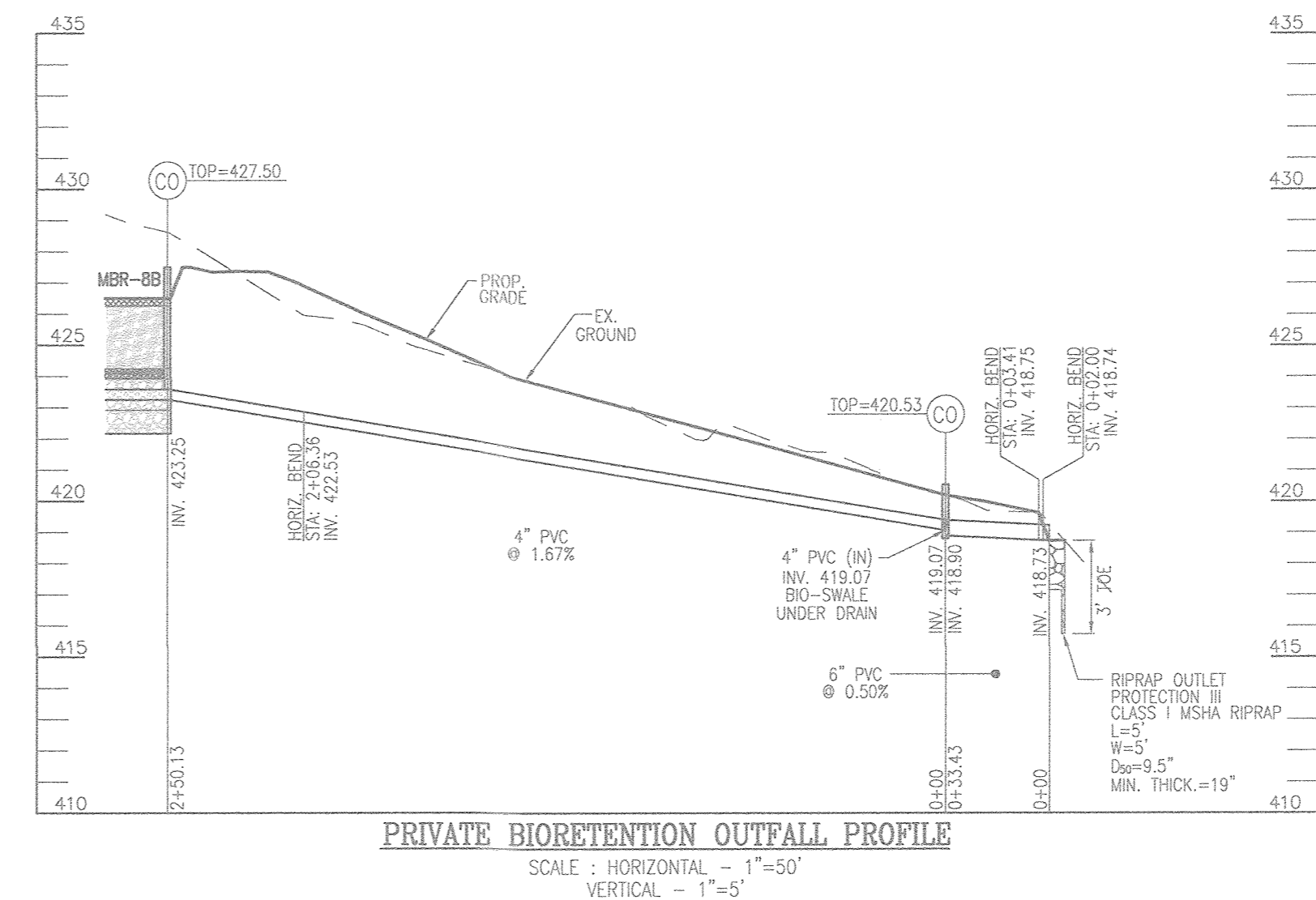
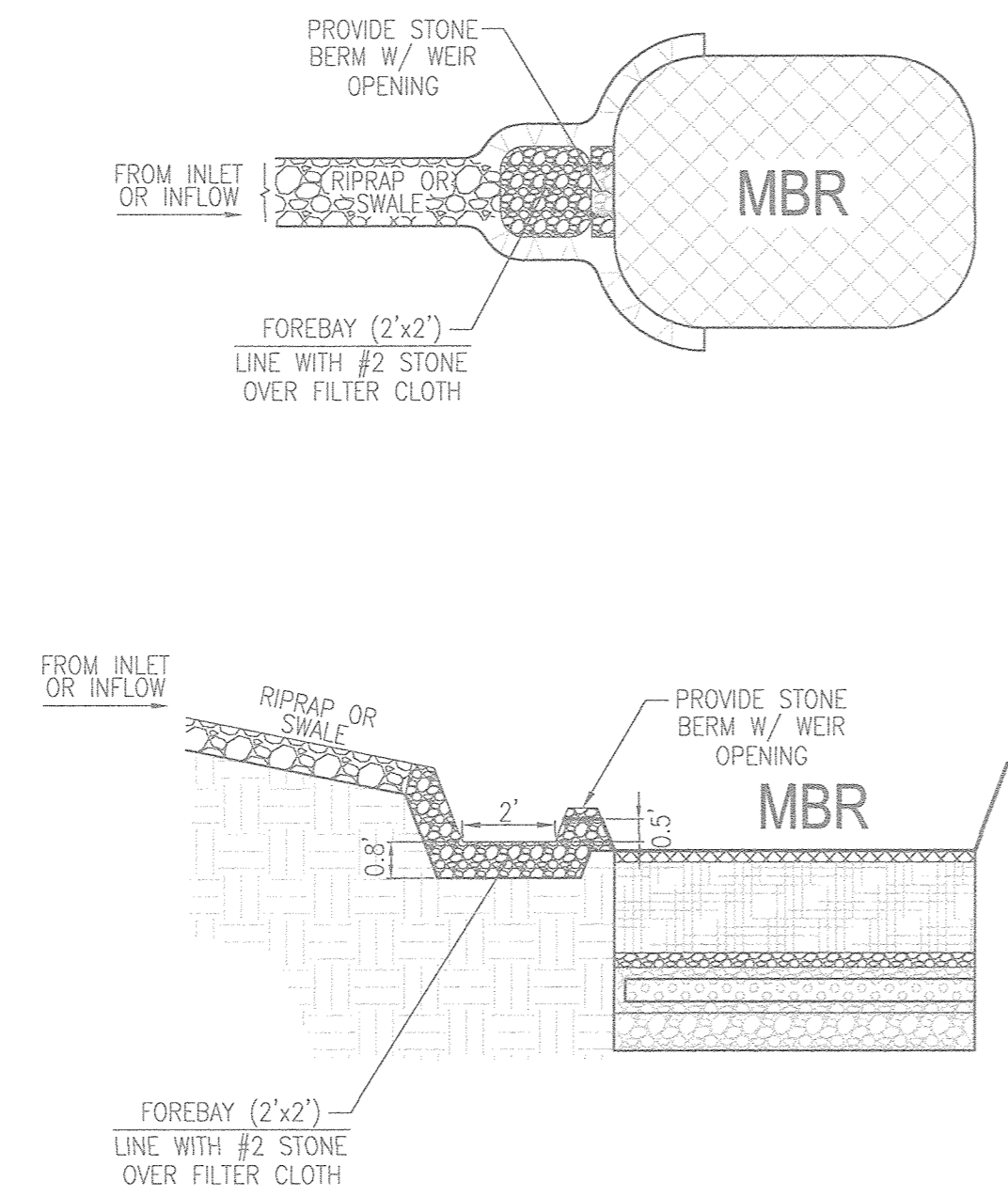
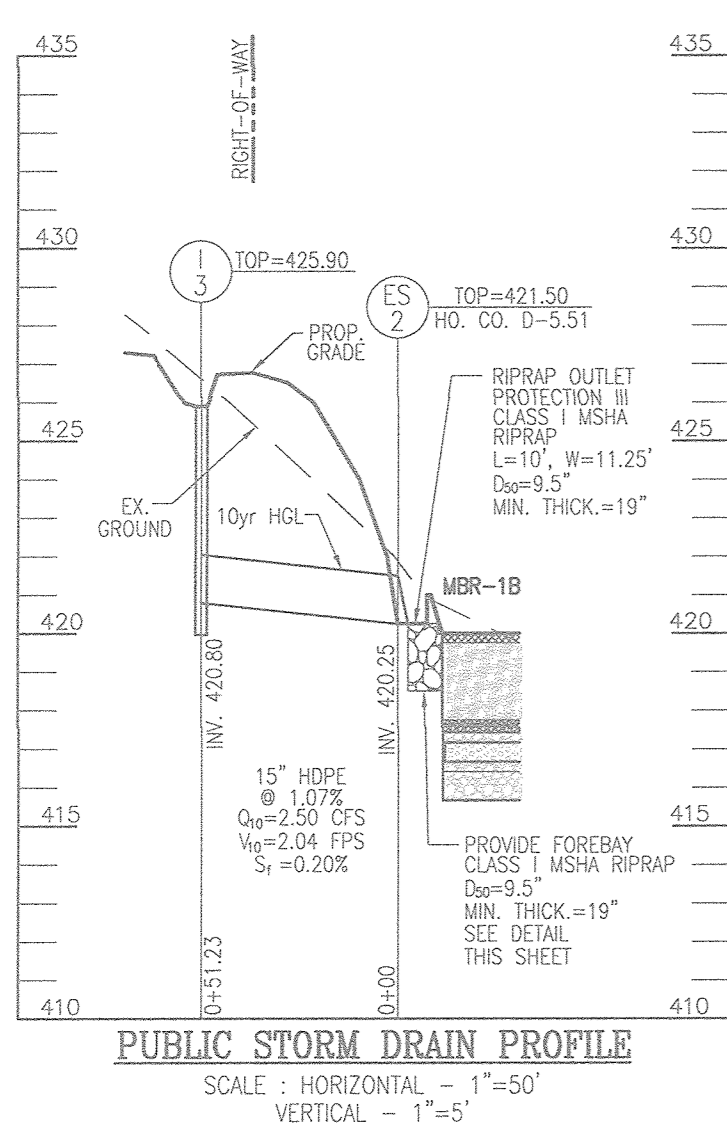
**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023



STRUCTURE SCHEDULE						
NO.	TYPE	LOCATION	TOP EL.	INV. IN	INV. OUT	COMMENTS
I-1	YARD INLET	N 557383.38 E 132437.60	418.85	-	415.31	HO. CO. STD D-4.14
I-1A	YARD INLET	N 557380.61 E 1324528.48	423.57	-	420.03	HO. CO. STD D-4.14
I-2	YARD INLET	N 557143.22 E 132437.73	429.67	-	426.13	HO. CO. STD D-4.14
I-2A	YARD INLET	N 557150.78 E 1324537.54	434.63	-	431.09	HO. CO. STD D-4.14
I-3	YARD INLET	N 557180.80 E 132490.48	425.90	-	422.36	HO. CO. STD D-4.14
MH-1	4' STANDARD PRECAST MANHOLE	N 557390.08 E 1324514.48	424.00	418.96	414.07	HO. CO. STD G-5.12
MH-2	4' STANDARD PRECAST MANHOLE	N 557150.25 E 1324523.55	434.72	424.95	424.95	HO. CO. STD G-5.12
PT-1	PASS THROUGH	N 557261.54 E 132472.98	426.44	-	425.24	MD 374.88 L=6' D=6"
PT-2	PASS THROUGH	N 557215.09 E 1324503.70	426.43	-	425.23	MD 374.88 L=6' D=6"
ES-1	18" RCP END SECTION	N 557559.48 E 1324589.23	411.50	-	410.00	HO. CO. STD D-5.51
ES-2	15" RCP END SECTION	N 557203.98 E 1323535.88	421.50	-	420.23	HO. CO. STD D-5.51

PIPE SCHEDULE		
SIZE	TYPE	LENGTH
4"	SOLID PVC	821 LF
4"	PERFORATED PVC	1,030 LF
6"	SOLID PVC	33 LF
12"	HDPE	80 LF
15"	HDPE	442 LF
18"	HDPE	380 LF



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12.2.18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

PROVIDE FOREBAY FOR MICRO-BIORETENTION INFLOW (MBR-1A, MBR-1B, MBR-5A, MBR-5B & MBR-8A)

OWNER: ESTATES AT RIVER HILL, LLC  
 MICHAEL P. PAUL, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

DEVELOPER: TRINITY HOMES' MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B', 'H' A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L 4772 / F. 285  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3200 N. RIDGE ROAD, SUITE 110 TEL: 410.461.7666  
 ELLICOTT CITY, MD 21043 FAX: 410.461.8961

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

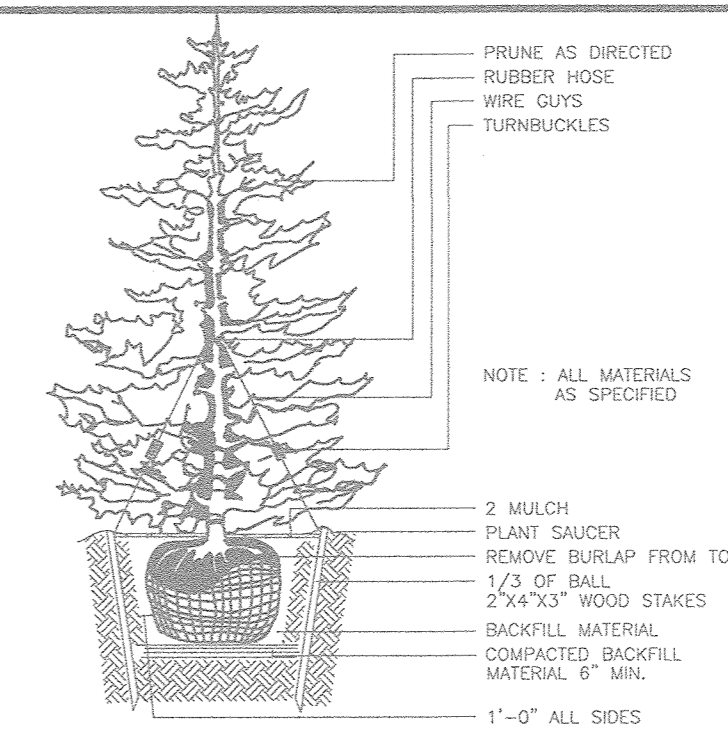
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13 SHEET OF 30

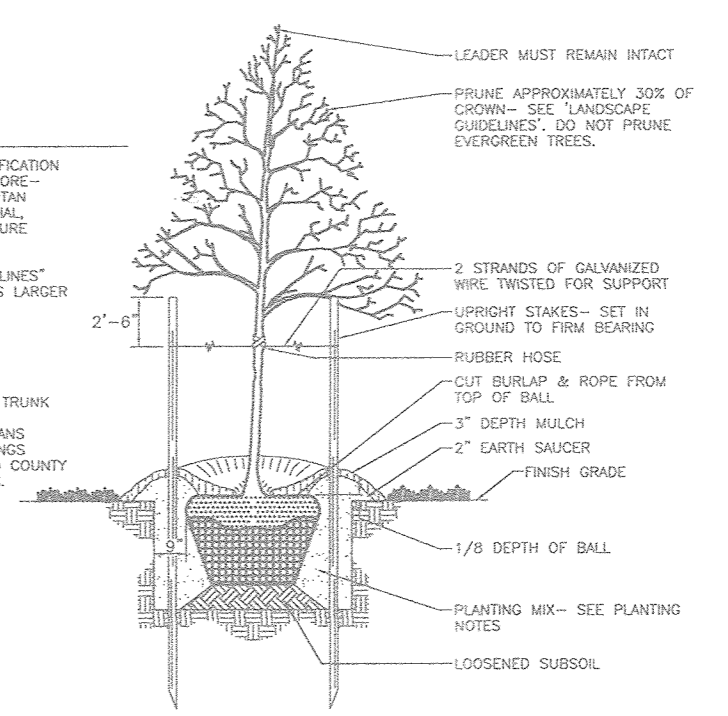
MATCHLINE - SHEET 15



MATCHLINE - SHEET 15  
MATCHLINE - SHEET 16



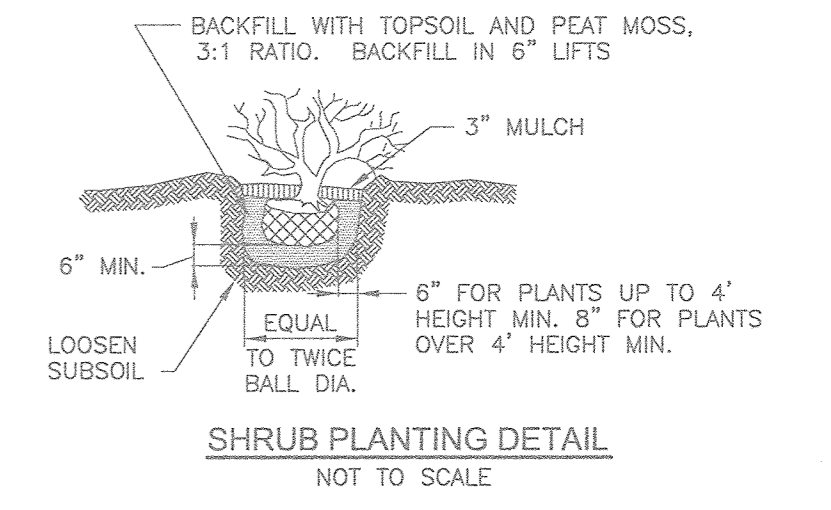
TYPICAL EVERGREEN TREE PLANTING DETAIL NOT TO SCALE



TREE PLANTING AND STAKING NOT TO SCALE

**LEGEND:**

[Symbol]	PROPERTY LINE
[Symbol]	RIGHT-OF-WAY LINE
[Symbol]	ADJACENT PROPERTY LINE
[Symbol]	EXISTING EDGE OF PAVING
[Symbol]	EXISTING STREAM BUFFER
[Symbol]	EXISTING STREAM
[Symbol]	EXISTING TREETRINE
[Symbol]	PROPOSED TREETRINE
[Symbol]	EXISTING WETLANDS
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[Symbol]	EXISTING SPECIMEN TREES
[Symbol]	EXISTING WOOD FENCE
[Symbol]	EXISTING METAL FENCE
[Symbol]	EX. PUBLIC 100-YEAR FLOOD PLAIN
[Symbol]	EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949)
[Symbol]	PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
[Symbol]	PROP. PUBLIC SWIM, DRAINAGE & UTILITY EASEMENT
[Symbol]	PROP. 35' PRIVATE MONUMENT EASEMENT
[Symbol]	EXISTING 10' CONTOUR
[Symbol]	EXISTING 2' CONTOUR
[Symbol]	SOILS
[Symbol]	PROPOSED 10' CONTOUR
[Symbol]	PROPOSED 2' CONTOUR
[Symbol]	PROP. SEWAGE DISPOSAL AREA
[Symbol]	PROP. WELL AREA



SHRUB PLANTING DETAIL NOT TO SCALE

**SPECIMEN TREE CHART**

NO.	SIZE (IN. DBH) (FEET HEIGHT)	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 1	30' 45'		TULIP POPLAR	GOOD CONDITION	TO BE REMOVED
ST 3	35' 52.5'		BLACK OAK	POOR CROWN AND SHAPE	TO BE REMOVED
ST 5	32' 48'		TULIP POPLAR	TRIPLE STEMMED	TO REMAIN
ST 6	57' 85.5'		RED OAK	GOOD, SPLITS TO THREE STEMS ABOVE BH	TO REMAIN
ST 7	44.5' 66.75'		TULIP POPLAR	FAIR, SOME DIEBACK NOTED	TO REMAIN
ST 8	62.5' 93.75'		TULIP POPLAR	FAIR, CROWN DIEBACK, TWO STEMS ABOVE BH	TO REMAIN
ST 21	44' 66'		RED OAK	POOR, SEVERE DIEBACK	TO REMAIN
ST 22	38' 57'		RED OAK	POOR, NOTABLE DIEBACK	TO REMAIN
ST 23	33.5' 50.25'		TULIP POPLAR	POOR, TRUNK ROT	TO BE REMOVED

**NOTE:**  
BECAUSE THE PROPOSED LANDSCAPING WILL BE PLACED DIRECTLY ON THE PROPERTIES OF INDIVIDUAL LOT OWNERS, THE DEVELOPER OF THIS SUBDIVISION SHALL NOT "PASS" THE LANDSCAPING OBLIGATION ON TO A FUTURE HOME BUILDER OR TO FUTURE INDIVIDUAL LOT BUYERS/OWNERS. THIS CAN CREATE AN UNDUE HARDSHIP TO THE LOT BUILDER OR THE INDIVIDUAL HOMEOWNER IN TERMS OF ENFORCEMENT SHOULD THE TREES NOT BE PLANTED OR DO NOT PASS INSPECTION. THE DEVELOPER SHOULD BE RESPONSIBLE FOR PLANTING THE TREES AND MAINTENANCE OF SUCH UNTIL ALL OF THE PLANTED TREES PASS LANDSCAPING INSPECTION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

**DEVELOPER'S/BUILDER'S CERTIFICATE**  
 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.  
 [Signature] 1/16/18  
 SIGNATURE OF DEVELOPER

**LANDSCAPE PLAN**  
 SCALE: 1" = 50'  
 [Scale bar showing 0, 25, 50 feet]

**SPECIMEN TREE MITIGATION:**  
 PROPOSED LANDSCAPE TREES WITH THE DESIGNATION OF "CF" ARE PROVIDED AS PART OF THE 2:1 MITIGATION REQUIRED FOR THE REMOVAL OF TEN SPECIMEN TREES.

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 486-0023

**DEVELOPER**  
 TRINITY HOMES MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 486-0023

FINAL ROAD CONSTRUCTION PLAN  
**LANDSCAPE PLAN**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H' A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L. 4772 / F. 265  
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**PROFESSIONAL CERTIFICATE**  
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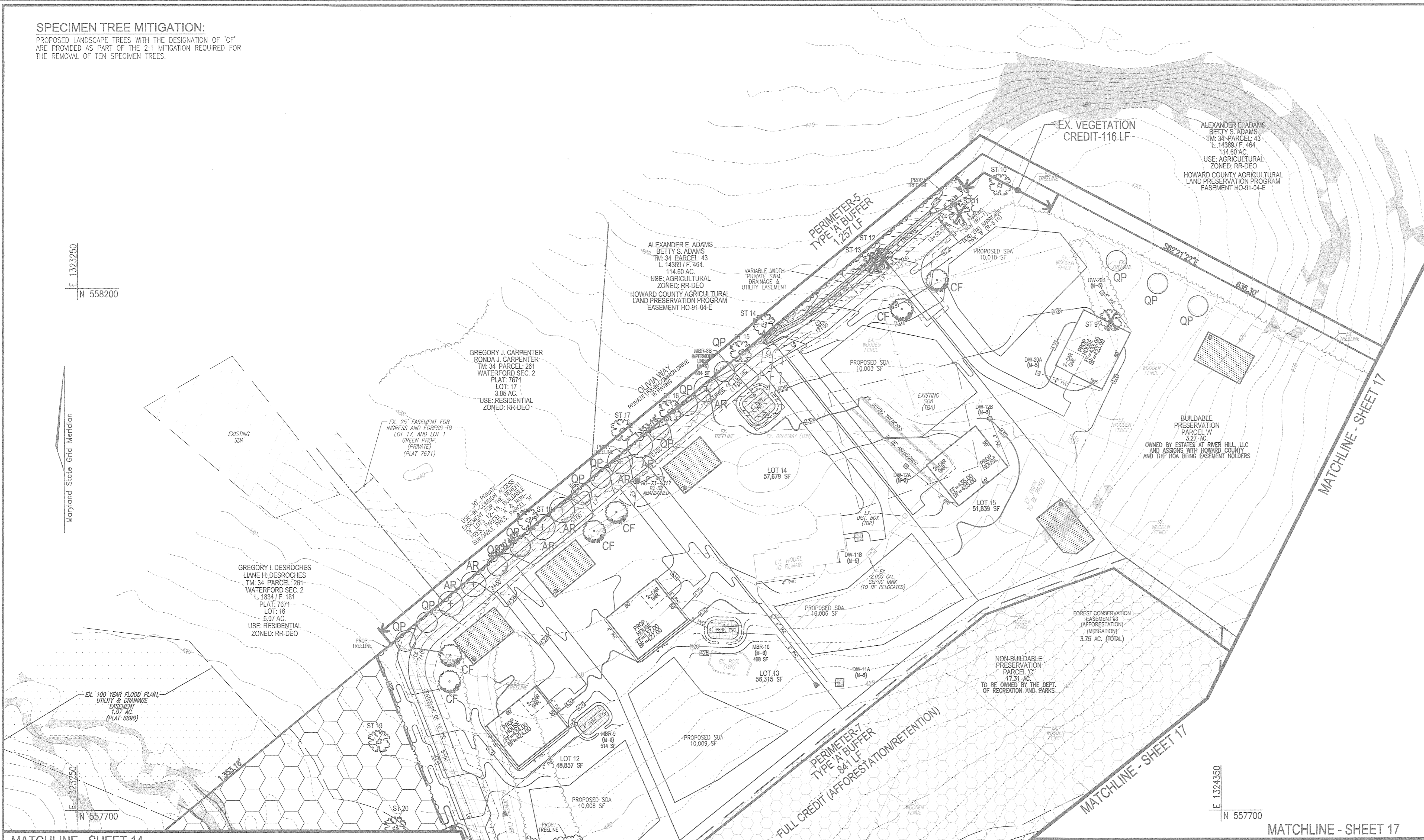
DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

14 SHEET OF 30

**SPECIMEN TREE MITIGATION:**  
 PROPOSED LANDSCAPE TREES WITH THE DESIGNATION OF 'CF' ARE PROVIDED AS PART OF THE 2:1 MITIGATION REQUIRED FOR THE REMOVAL OF TEN SPECIMEN TREES.

**LEGEND:**

[Symbol]	PROPERTY LINE
[Symbol]	RIGHT-OF-WAY LINE
[Symbol]	ADJACENT PROPERTY LINE
[Symbol]	EXISTING EDGE OF PAVING
[Symbol]	EXISTING STREAM BUFFER
[Symbol]	EXISTING STREAM
[Symbol]	EXISTING TREELINE
[Symbol]	PROPOSED TREELINE
[Symbol]	EXISTING WETLANDS
[Symbol]	EXISTING WETLAND BUFFER
[Symbol]	EXISTING SPECIMEN TREES
[Symbol]	EXISTING WOOD FENCE
[Symbol]	EXISTING METAL FENCE
[Symbol]	EX. PUBLIC 100-YEAR FLOOD PLAN
[Symbol]	PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
[Symbol]	PROP. VARIABLE WIDTH PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
[Symbol]	EX. 25' EASEMENT FOR INGRESS AND EGRESS TO LOT 11, AND LOT 1 GREEN FRONT (PRIVATE) (PLAT 7671)
[Symbol]	EXISTING 10' CONTOUR
[Symbol]	EXISTING 2' CONTOUR
[Symbol]	SOILS
[Symbol]	PROPOSED 10' CONTOUR
[Symbol]	PROPOSED 2' CONTOUR
[Symbol]	PROP. SEWAGE DISPOSAL AREA
[Symbol]	PROP. WELL AREA



**SPECIMEN TREE CHART**

NO.	SIZE (IN. DBH / FEET CROWN)	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 2	30.5"	45.75'	TULIP POPLAR	FAIR, SOME DIEBACK NOTED	TO BE REMOVED
ST 4	33"	49.5'	BLACK OAK	POOR, DIEBACK NOTED	TO REMAIN
ST 9	30"	45'	WHITE PINE	GOOD CONDITION	TO BE REMOVED
ST 10	31"	46.5'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 11	42"	63'	WHITE OAK	GOOD CONDITION	TO BE REMOVED
ST 12	39.5"	59.25'	WHITE OAK	GOOD CONDITION	TO BE REMOVED
ST 13	30"	45'	TULIP POPLAR	FAIR, LIMITED CROWN	TO BE REMOVED
ST 14	58.5"	87.75'	TULIP POPLAR	POOR, TRUNK ROT	TO REMAIN
ST 15	33.5"	50.25'	TULIP POPLAR	LIMITED CROWN	TO REMAIN
ST 16	31"	46.5'	SILVER MAPLE	FAIR, LEANING	TO REMAIN
ST 17	47"	70.5'	WHITE OAK	GOOD CONDITION	TO REMAIN
ST 18	34.5"	51.75'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 19	45"	67.5'	BLACK OAK	FAIR, LIMB DIEBACK	TO REMAIN
ST 20	37.5"	56.25'	BLACK OAK	POOR, SEVERE DIEBACK	TO REMAIN

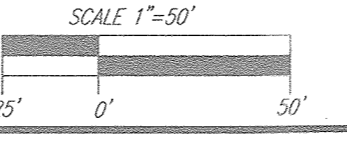
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS *James* 11/27/2018 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION *Chel* 12-2-18 DATE  
 CHIEF, DIVISION OF LAND DEVELOPMENT *Kat* 1-10-19 DATE

**DEVELOPER'S/BUILDER'S CERTIFICATE**

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 18.124 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.

SIGNATURE OF DEVELOPER *Michael* 11/5/18 DATE



**LANDSCAPE PLAN**  
 SCALE: 1"=50'

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**LANDSCAPE PLAN**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H' A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 54 GRID: 23 L: 4772 / F: 285  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERS, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110 TEL: 410.461.7666  
 ELLICOTT CITY, MD 21043 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

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15 SHEET OF 30

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFALZ, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023



**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING TREELINE
- EXISTING STREAM
- PROPOSED TREELINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAN
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. VARIABLE WIDTH PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
- EX. 24' WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
- EX. FOREST CONSERVATION EASEMENT 'A' (PLAT 12949)
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROP. SEWAGE DISPOSAL AREA
- PROP. WELL AREA

MATCHLINE - SHEET 14

MATCHLINE - SHEET 17

E 1323950  
N 557600

E 1323950  
N 556700

E 1324850  
N 556700

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12.2.18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
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 [Signature] 11/5/18  
 SIGNATURE OF DEVELOPER

**LANDSCAPE PLAN**  
 SCALE: 1" = 50'  
 SCALE 1"=50'  
 25' 0' 50'

**SPECIMEN TREE CHART**

NO.	SIZE (IN DBH) (FEET HEIGHT)	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 24	37"	55.5'	TULIP POPLAR	MAJOR TRUNK WOUND	TO BE REMOVED
ST 25	34.5"	51.75'	TULIP POPLAR	POOR, TRUNK CAVITY	TO REMAIN

**SPECIMEN TREE MITIGATION:**  
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 MICHAEL P. PAUL, MEMBER  
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 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
**LANDSCAPE PLAN**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1  
 PARCEL: 389 L 4772 / F. 285 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L 4772 / F. 285  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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 DESIGN BY: RHV  
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 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39  
 16 SHEET OF 30  
 ROBERT H. VOGEL, PE No. 16193



**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING EDGE OF PAVING
	EXISTING STREAM BUFFER
	EXISTING STREAM
	EXISTING TREELINE
	PROPOSED TREELINE
	EXISTING WETLANDS
	EXISTING WETLAND BUFFER
	EXISTING SPECIMEN TREES
	EXISTING WOOD FENCE
	EX. PUBLIC 100-YEAR FLOOD PLAN
	EX. FOREST CONSERVATION EASEMENT (PLAT 12949)
	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	SOILS

**GENERAL NOTES:**

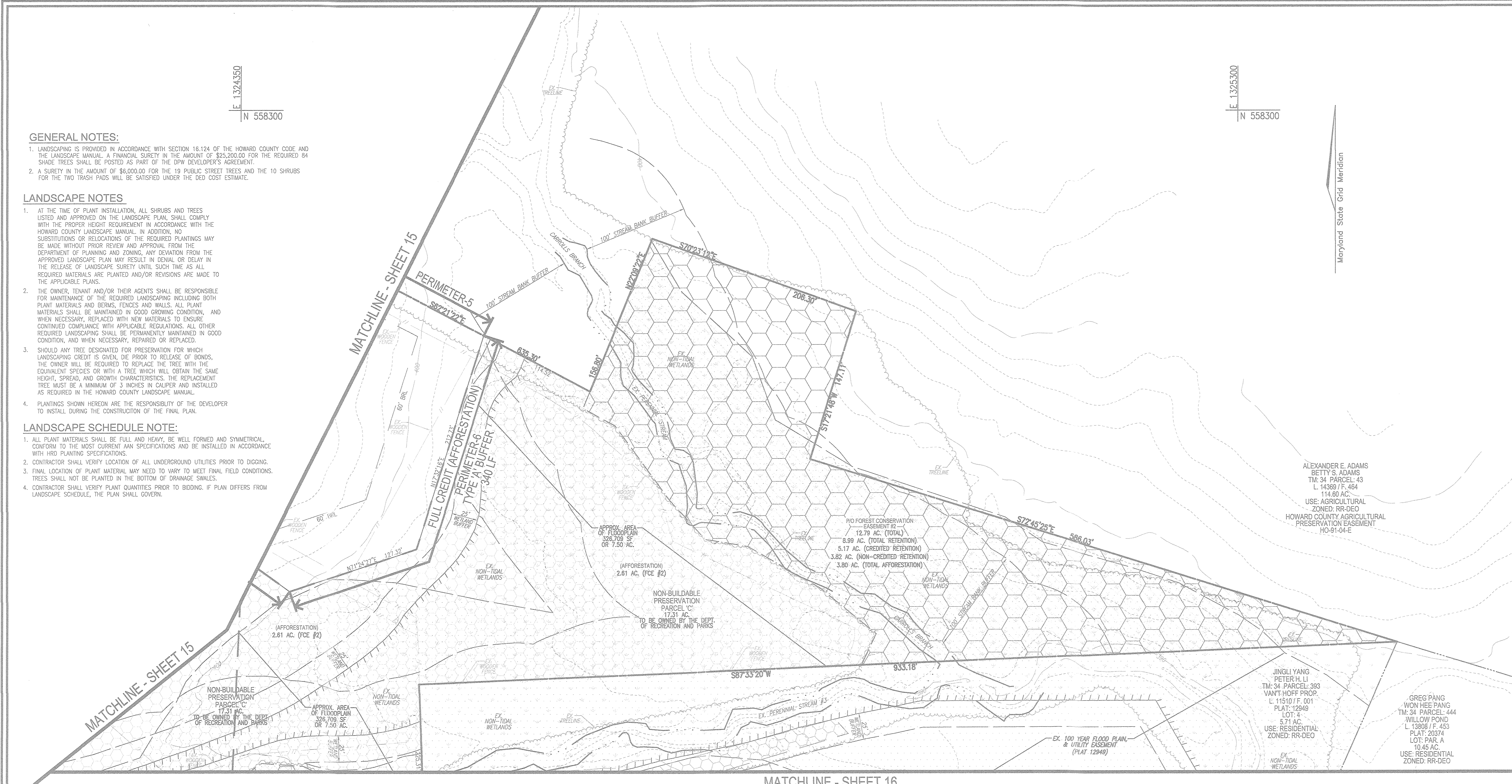
- LANDSCAPING IS PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. A FINANCIAL SURETY IN THE AMOUNT OF \$25,000.00 FOR THE REQUIRED 84 SHADE TREES SHALL BE POSTED AS PART OF THE DPW DEVELOPER'S AGREEMENT.
- A SURETY IN THE AMOUNT OF \$6,000.00 FOR THE 19 PUBLIC STREET TREES AND THE 10 SHRUBS FOR THE TWO TRASH PADS WILL BE SATISFIED UNDER THE BID COST ESTIMATE.

**LANDSCAPE NOTES**

- AT THE TIME OF PLANT INSTALLATION ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPE PLAN SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENT IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATIONS OF THE REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THE APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO THE APPLICABLE PLANS.
- THE OWNER, TENANT AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION, AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
- SHOULD ANY TREE DESIGNATED FOR PRESERVATION FOR WHICH LANDSCAPING CREDIT IS GIVEN, BE PRIOR TO RELEASE OF BONDS, THE OWNER WILL BE REQUIRED TO REPLACE THE TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD, AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE HOWARD COUNTY LANDSCAPE MANUAL.
- PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THE FINAL PLAN.

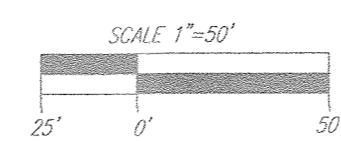
**LANDSCAPE SCHEDULE NOTE:**

- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT MAN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HRD PLANTING SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
- FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
- CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.



**LANDSCAPE PLAN**

SCALE: 1"=50'



**TRASH PAD LANDSCAPING**

SYMBOL	QTY.	DESCRIPTION	SIZE	REMARKS
	10	DWARF JAPANESE YEW	3'-4" HT	B & B

**STREET TREE CALCULATIONS**

STREET NAME	LINEAR FEET	NO. REQUIRED	NO. PROVIDED
ALLNUTT LANE, EXT.	768/40	19	19

**LANDSCAPING PLANT LIST**

SYMBOL	KEY	QUAN.	BOTANICAL NAME	SIZE	REMARKS
	AR	27	ACER RUBRUM 'RED SUNSET' RED SUNSET RED MAPLE	2 1/2"-3" CAL.	A
	QP	36	QUERCUS PHELLOS WILLOW OAK	2 1/2"-3" CAL.	
	CF	20	CORNUS FLORIDA WHITE FLOWERING DOGWOOD	8'-10' HGT.	
	AF	19	ACER RUBRUM 'AUTUMN FLAME' AUTUMN FLAME RED MAPLE	2 1/2"-3" CAL.	A

A. BE ADVISED THAT THESE SPECIES SHOULD NOT BE PLANTED ALONG PROJECT PERIMETERS ADJACENT TO HORSE PASTURES BECAUSE THE WILTED LEAVES, FLOWERS OR NEEDLES MAY BE TOXIC TO HORSES AND OTHER LIVESTOCK.

**SCHEDULE A: PERIMETER LANDSCAPE EDGE**

CATEGORY	ADJACENT TO PERIMETER PROPERTIES AND ROADWAYS									SPECIMEN TREE MITIGATION	TOTAL
	1	2	3	4	5	6	7	8	9		
PERIMETER/FRONTAGE DESIGNATION	A	N/A	N/A	A	A	A	A	A	A	INTERNAL LANDSCAPE	
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	830'	287'	402'	1,147'	1,257'	340'	841'	1,210'	1,114'		
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	YES* 366'			YES 207'	YES 116'	YES 340'	YES 841'	NO 841'	YES 1,034'		
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO			NO	NO	NO	NO	NO	NO		
NUMBER OF PLANTS REQUIRED (LF REMAINING)	464*			940'	1,141'	0	0	1,210'	80'		84
SHADE TREES	1:60 B (7*)			1:60 B	1:60 B	1:60 B	1:60 B	1:60 B	1:60 B		
EVERGREEN TREES											
SHRUBS											
NUMBER OF PLANTS PROVIDED	7*			16	19	0	0	20	1	20	83*
SHADE TREES											
EVERGREEN TREES											
OTHER TREES (2:1 SUBSTITUTION)											
SHRUBS (10:1 SUBSTITUTION)											
DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED											

**NOTE:**  
\*CREDIT IS ALSO BEING TAKEN FOR SPECIMEN TREE #22.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

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[Signature] 11/5/18  
 SIGNATURE OF DEVELOPER

FINAL ROAD CONSTRUCTION PLAN  
 LANDSCAPE PLAN  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 TAX MAP: 34 GRID: 23 5TH ELECTION DISTRICT ZONED: RR-DEO L 4772 / F. 285 HOWARD COUNTY, MARYLAND

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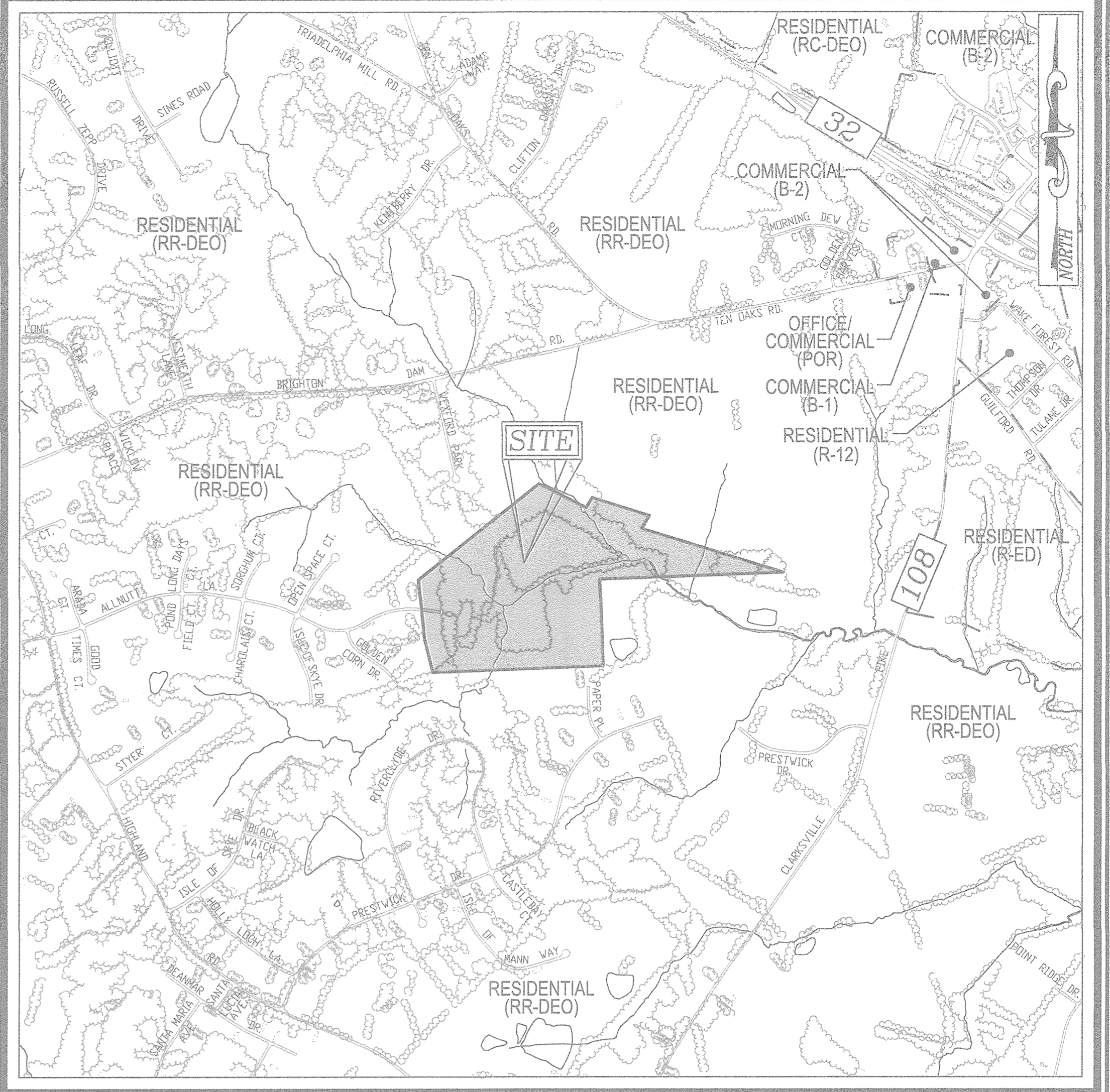
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- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAN
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
- EXISTING MODERATE SLOPES (15% TO 19.9% SLOPES)
- EX. 25' EASEMENT FOR INGRESS AND EGRESS TO LOT 17, AND LOT 1, GREEN PROP. (PRIVATE) (PLAT 7571)
- EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12949)
- FOREST CONSERVATION SIGNS

**FOREST CONSERVATION LEGEND:**

- FOREST CONSERVATION EASEMENT (RETENTION)
- FOREST CONSERVATION EASEMENT (NON-CREATED RETENTION)
- FOREST CONSERVATION EASEMENT (AFFORESTATION)

E 1322900  
N 557650



**VICINITY MAP**  
SCALE: 1"=1,000'  
ADC MAP: PAGE: 31 / GRID: B2, B3, & C2

**Eco-Science Professionals, Inc.**  
Consulting Ecologists  
P.O. Box 5966 Glen Arm, Maryland 21057 Telephone (410) 832-2463 Fax (410) 832-2468

**MD DNR Qualified Professional**  
USACOS Wetland Delimiter  
Certification # WDCP93MD0610044B2  
*R.H. Vogel*

WATERSHED NAME: MIDDLE PATUXENT RIVER  
WATERSHED NUMBER: 02131106

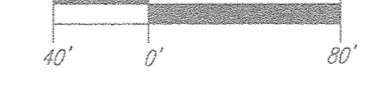
A. GROSS SITE AREA:	42.60 AC.
B. NET SITE AREA:	35.10 AC.
C. AREA OF 100-YEAR FLOODPLAIN:	7.50 AC. HEC-RAS
D. AREA OF WETLANDS AND BUFFERS(ONSITE):	9.22 AC.
E. AREA OF STREAM AND BUFFERS(ONSITE):	12.75 AC.
F. AREA OF >25% STEEP SLOPES:	0.00 AC.
G. EXISTING FOREST:	12.60 AC. RR-DEO RESIDENTIAL
H. PROPOSED USE:	RESIDENTIAL

**GENERAL NOTES**

- NO RARE, THREATENED OR ENDANGERED SPECIES OR THEIR HABITAT WERE OBSERVED ON THE PROPERTY.
- SURROUNDING LAND USE IS PRIMARILY RURAL DENSITY RESIDENTIAL DEVELOPMENT.
- APPROXIMATELY 4.0 ACRES OF FOREST IS PRESENT WITHIN 100 FEET OF THE SUBJECT PROPERTY.
- ALL WETLANDS AND STREAMS ON THE PROPERTY ARE PART OF THE MIDDLE PATUXENT RIVER WATERSHED (02-13-11). THE STREAMS ON SITE ARE CONSIDERED TO BE USE IV-P WATERS. PERENNIAL STREAMS WILL REQUIRE 100 FOOT BUFFERS, INTERMITTENT STREAMS WILL REQUIRE 50 FOOT BUFFERS AND WETLANDS WILL REQUIRE 25 FOOT BUFFERS.
- THERE IS APPROXIMATELY 7.50 ACRES OF 100 YEAR FLOODPLAIN LOCATED WITHIN THE LIMITS OF THIS SITE. APPROXIMATE FLOODPLAIN DELINEATION GENERATED FROM PRELIMINARY HEC-RAS ANALYSIS, PREPARED BY ROBERT H. VOGEL ENGINEERING.
- NO AREAS OF STEEP SLOPES AS SHOWN HEREON THE PLAN ARE REGULATED PER SECTION 16.116 OF THE HOWARD COUNTY SUBDIVISION REGULATIONS.
- THERE ARE NO HISTORIC STRUCTURES OR CEMETERIES ON THIS PROPERTY.
- THERE ARE 25 SPECIMEN TREES LOCATED ON, AND AROUND THE PERIMETER OF THE PROPERTY. THERE ARE NO KNOWN TREES THAT ARE STATE CHAMPION TREES AND OR TREES 75% OF THE SIZE OF THE STATE CHAMPION TREE ON THE PROPERTY.

**FOREST CONSERVATION PLAN**

SCALE: 1"=80'



**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
SsA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	37	YES
Co	CODORUS AND HARBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	32	NO
GbB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	28	NO
Gbc	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	28	NO
Gmb	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	43	YES
Hs	HARBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	37	YES

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

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CHIEF, BUREAU OF HIGHWAYS DATE

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*Chad Clark* 12-2-18  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Kevin Belmont* 1-10-19  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

WARREN MILES  
MAYOR 1988  
1M 34 PARCEL 252  
1120 AC.  
100% AGRICULTURAL  
ZONED RR-DEO

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**FOREST CONSERVATION PLAN**  
**AND FOREST MITIGATION PLAN**  
**THE ESTATES AT RIVER HILL**  
LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 GRID: 23 ZONED: RR-DEO  
TAX MAP: 34 GRID: L 4772 / F. 285  
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERS, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110  
ELLCOTT CITY, MD 21043 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: RHV  
DRAWN BY: JMR  
CHECKED BY: RHV  
DATE: NOVEMBER 2018  
SCALE: AS SHOWN  
W.O. NO.: 15-39

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2020

18 SHEET OF 30

**REFOREST / AFFORESTATION PLAN**

**A. PLANTING PLAN AND METHODS**

PLANT SPECIES SELECTION WAS BASED ON OUR KNOWLEDGE REGARDING PLANT COMMUNITIES IN MARYLAND'S Piedmont Plateau AND INFORMATION PROVIDED IN THE SOIL SURVEY ON TYPICAL VEGETATION FOR THE SOIL TYPE ON THE PLANTING SITE. SPECIES SELECTION WAS ALSO BASED ON OUR KNOWLEDGE OF PLANT AVAILABILITY IN THE NURSERY INDUSTRY.

REFOREST / AFFORESTATION SHALL BE ACCOMPLISHED THROUGH A MIXED PLANTING OF WHIPS AND BRANCHED TRANSPLANTS. CONTAINER GROWN STOCK IS RECOMMENDED BUT BAREROOT STOCK MAY BE USED TO HELP CONTROL AFFORESTATION COSTS IF BAREROOT STOCK IS USED THE ROOT SYSTEMS OF ALL PLANTS WILL BE TRIPPED IN AN ANTI-DESICCANT GEL PRIOR TO PLANTING TO IMPROVE MOISTURE RETENTION IN THE ROOT SYSTEMS.

PRIOR TO PLANTING THE PROPOSED FOREST CONSERVATION EASEMENTS ALL MULTIFLORA ROSE IN THE PLANTING AREA SHALL BE REMOVED. REMOVAL OF THE ROSE MAY BE PERFORMED WITH MOWING AND HERBICIDE TREATMENTS. PHYSICAL REMOVAL OF ALL TOP GROWTH FOLLOWING BY A PERIODIC HERBICIDE TREATMENT OF STUMP SPROUTS IS RECOMMENDED. NATIVE TREE AND SHRUB SPECIES OCCURRING WITHIN THE ROSE THICKETS SHOULD BE RETAINED WHEREVER POSSIBLE. HERBICIDES TREATMENTS SHALL OCCUR ON 2 MONTH INTERVALS DURING THE FIRST GROWING SEASON AND ONCE EACH IN THE SPRING AND FALL FOR SUBSEQUENT YEARS. HERBICIDE USED SHALL BE MADE SPECIFICALLY TO ADDRESS WOODY PLANT MATERIAL AND SHALL BE APPLIED AS PER MANUFACTURERS' SPECIFICATIONS. CARE SHOULD BE TAKEN NOT TO SPRAY PLANTED TREES OR NATURALLY OCCURRING NATIVE TREE/SHRUB SEEDLINGS. IT IS RECOMMENDED THAT INITIATION OF ROSE REMOVAL BEGIN AT LEAST SIX MONTHS PRIOR TO PLANTING.

**B. PLANTING AND SOIL SPECIFICATIONS**

PLANT MATERIAL WILL BE INSTALLED IN ACCORDANCE WITH THE PLANTING DETAIL AND PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN.

AMENDMENTS TO EXISTING SOIL WILL BE IN ACCORDANCE WITH THE PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN. SOIL DISTURBANCE WILL BE LIMITED TO INDIVIDUAL PLANTING LOCATIONS.

**C. MAINTENANCE OF PLANTINGS**

FOR INFORMATION REGARDING MAINTENANCE OF THE AFFORESTATION PLANTINGS, SEE SECTION VIII B.

**D. GUARANTEE REQUIREMENTS**

A 90 PERCENT SURVIVAL RATE OF THE AFFORESTATION PLANTINGS WILL BE REQUIRED AFTER ONE GROWING SEASON. ALL PLANT MATERIAL BELOW THE 90 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE SECOND GROWING SEASON. AT THE END OF THE SECOND GROWING SEASON, A 75 PERCENT SURVIVAL RATE WILL BE REQUIRED. ALL PLANT MATERIAL BELOW THE 75 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED BY THE BEGINNING OF THE NEXT GROWING SEASON.

**E. SECURITY FOR AFFORESTATION**

SECTION 16-1209 OF THE HOWARD COUNTY FOREST CONSERVATION ACT REQUIRES THAT A DEVELOPER SHALL POST A SECURITY (BOND, LETTER OF CREDIT, ETC.) WITH THE COUNTY TO INSURE THAT ALL WORK IS DONE IN ACCORDANCE WITH THE FCP.

**CONSTRUCTION PERIOD PROTECTION PROGRAM**

**A. FOREST PROTECTION TECHNIQUES**

**1. SOIL PROTECTION AREA (CRITICAL ROOT ZONE)**

THE SOIL PROTECTION AREA OR CRITICAL ROOT ZONE OF A TREE IS THAT PORTION OF THE SOIL COLUMN WHERE MOST OF ITS ROOTS MAY BE FOUND. THE MAJORITY OF ROOTS RESPONSIBLE FOR WATER AND NUTRIENT UPTAKE ARE LOCATED JUST BELOW THE SOIL SURFACE. TEMPORARY FENCING SHALL BE PLACED AROUND THE CRITICAL ROOT ZONE OF THE FOREST IN AREAS WHERE THE FOREST LIMITS OCCUR WITHIN 25 FEET OF THE LIMIT OF DISTURBANCE.

**2. FENCING AND SIGNAGE**

EXISTING FOREST LIMITS OCCURRING WITHIN 25 FEET OF THE LIMITS OF DISTURBANCE SHALL BE PROTECTED USING TEMPORARY PROTECTIVE FENCING. PERMANENT SIGNAGE SHALL BE PLACED AROUND THE AFFORESTATION AREA PRIOR TO PLANT INSTALLATION, AS SHOWN ON THE PLAN.

**B. PRE-CONSTRUCTION MEETING**

UPON STAKING OF LIMITS OF DISTURBANCE A PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE DEVELOPER, CONTRACTOR AND APPROPRIATE COUNTY INSPECTOR. THE PURPOSE OF THE MEETING WILL BE TO VERIFY THAT ALL SEDIMENT CONTROL IS IN ORDER, AND TO NOTIFY THE CONTRACTOR OF POSSIBLE PENALTIES FOR NON-COMPLIANCE WITH THE FCP.

**C. STORAGE FACILITIES/EQUIPMENT CLEANING**

ALL EQUIPMENT STORAGE, PARKING, SANITARY FACILITIES, MATERIAL STOCKPIILING, ETC. ASSOCIATED WITH CONSTRUCTION OF THE PROJECT WILL BE RESTRICTED TO THOSE AREAS OUTSIDE OF THE PROPOSED FOREST CONSERVATION EASEMENT. CLEANING OF EQUIPMENT WILL BE LIMITED TO AREA WITHIN THE LOD OF THE PROPOSED HOMESITES. WASTEWATER RESULTING FROM EQUIPMENT CLEANING WILL BE CONTROLLED TO PREVENT RUNOFF INTO ENVIRONMENTALLY SENSITIVE AREAS.

**D. SEQUENCE OF CONSTRUCTION**

THE FOLLOWING TIMETABLE REPRESENTS THE PROPOSED TIMETABLE FOR DEVELOPMENT. THE ITEMS OUTLINED IN THE FOREST CONSERVATION PLAN WILL BE ENACTED WITHIN TWO (2) YEARS OF SUBDIVISION APPROVAL.

**BELOW FIND A PROPOSED SEQUENCE OF CONSTRUCTION:**

- INSTALL ALL SIGNAGE AND SEDIMENT CONTROL DEVICES.
- HOLD PRE-CONSTRUCTION MEETING BETWEEN DEVELOPER, CONTRACTOR AND COUNTY INSPECTOR.
- BUILD ACCESS ROADS, INSTALL UTILITIES, AND CONSTRUCT HOME. STABILIZE ALL DISTURBED AREAS ACCORDINGLY.
- BEGIN MULTIFLORA ROSE REMOVAL, AS NEEDED. INSTALL PERMANENT PROTECTIVE SIGNAGE FOR EASEMENTS AND INITIATE PLANTINGS IN ACCORDANCE WITH FOREST CONSERVATION PLAN. PLANTINGS WILL BE COMPLETED WITHIN TWO (2) YEARS OF SUBDIVISION APPROVAL.
- REMOVE SEDIMENT CONTROL.
- HOLD POST-CONSTRUCTION MEETING WITH COUNTY INSPECTORS TO ASSURE COMPLIANCE WITH FCP.
- SUBMIT CERTIFICATION OF INSTALLATION.
- MONITOR AND MAINTAIN PLANTINGS FOR 2 YEARS.

**E. CONSTRUCTION MONITORING**

ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL MONITOR CONSTRUCTION OF THE PROJECT TO ENSURE THAT ALL ACTIVITIES ARE IN COMPLIANCE WITH THE FOREST CONSERVATION PLAN.

**F. POST-CONSTRUCTION MEETING**

UPON COMPLETION OF CONSTRUCTION, ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL NOTIFY THE COUNTY THAT CONSTRUCTION HAS BEEN COMPLETED AND ARRANGE FOR A POST-CONSTRUCTION MEETING TO REVIEW THE PROJECT SITE. THE MEETING WILL ALLOW THE COUNTY INSPECTOR TO VERIFY THAT AFFORESTATION PLANTINGS HAVE BEEN INSTALLED.

**POST-CONSTRUCTION MANAGEMENT PLAN**

HOWARD COUNTY REQUIRES A TWO YEAR POST-CONSTRUCTION MANAGEMENT PLAN BE PREPARED AS PART OF THE FOREST CONSERVATION PLAN. THE PLAN GOES INTO EFFECT UPON ACCEPTANCE OF THE CONSTRUCTION CERTIFICATION OF COMPLETION BY THE COUNTY. ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL BE RESPONSIBLE FOR IMPLEMENTATION OF THE POST-CONSTRUCTION MANAGEMENT PLAN.

**THE FOLLOWING ITEMS WILL BE INCORPORATED INTO THE PLAN:**

- FENCING AND SIGNAGE
- PERMANENT SIGNAGE INDICATING THE LIMITS OF THE RETENTION/AFFORESTATION AREA SHALL BE MAINTAINED.
- GENERAL SITE INSPECTIONS/MAINTENANCE OF PLANTINGS

SITE INSPECTIONS WILL BE PERFORMED A MINIMUM OF THREE TIMES DURING THE GROWING SEASON. THE PURPOSE OF THE INSPECTIONS WILL BE TO ASSESS THE HEALTH OF THE AFFORESTATION PLANTINGS. APPROPRIATE MEASURES WILL BE TAKEN TO RECTIFY ANY PROBLEMS WHICH MAY ARISE.

**IN ADDITION, MAINTENANCE OF THE AFFORESTATION PLANTINGS WILL INVOLVE THE FOLLOWING STEPS:**

- WATERING - ALL PLANT MATERIAL SHALL BE WATERED TWICE A MONTH DURING THE 1ST GROWING SEASON, MORE OR LESS FREQUENTLY DEPENDING ON WEATHER CONDITIONS. DURING THE SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.
- REMOVAL OF INVASIVE EXOTICS AND NOXIOUS WEEDS. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED.
- IDENTIFICATION OF SERIOUS PLANT PESTS AND DISEASES. TREATMENT WITH APPROPRIATE AGENT.
- PRUNING OF DEAD BRANCHES.
- AFTER 12 AND 24 MONTHS, REPLACEMENT OF PLANTS, IF REQUIRED, IN ACCORDANCE WITH THE GUARANTEE REQUIREMENTS SHOWN ON THE FCP.

C. EDUCATION  
THE DEVELOPER WILL PROVIDE APPROPRIATE MATERIALS TO PROPERTY OWNERS INFORMING THEM OF THE LOCATION AND PURPOSE OF THE AFFORESTATION AREA. MATERIALS MAY INCLUDE SITE PLANS AND INFORMATION EXPLAINING THE INTENT OF THE FOREST CONSERVATION LAW.

**D. FINAL INSPECTION**

AT THE END OF THE TWO YEAR POST-CONSTRUCTION MANAGEMENT PERIOD, ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL, WILL SUBMIT TO THE ADMINISTRATOR OF THE HOWARD COUNTY FOREST CONSERVATION PROGRAM A CERTIFICATION THAT ALL RETENTION/AFFORESTATION REQUIREMENTS HAVE BEEN MET. UPON ACCEPTANCE OF THIS CERTIFICATION, THE COUNTY WILL RELEASE THE DEVELOPER FROM ALL FUTURE OBLIGATIONS AND RELEASE THE DEVELOPER'S BOND.

**APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS**

*[Signature]*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 11/27/2018

**APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING**

*[Signature]*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 12-2-18

*[Signature]*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 1-10-19

**PLANTING NOTES:**

- PLANTING DENSITY BASED SPACING REQUIREMENTS WHIPS WITH SHELTER @ 11' ON CENTER.
- PLANTING MAY BE MADE IN A CURVILINEAR FASHION ALONG CONTOUR. THE PLANTING SHOULD AVOID A GRID APPEARANCE BUT SHOULD BE SPACED TO FACILITATE MAINTENANCE.
- MULTIFLORA ROSE/HEAVY BRUSH REMOVAL/CONTROL MAY BE REQUIRED PRIOR TO INSTALLATION OF PLANTING.
- ALL WHIPS ARE REQUIRED TO BE INSTALLED WITH TREE SHELTERS PER HOWARD COUNTY FCA REQUIREMENTS.
- PLANTING UNITS DEFINED BY THE SPACING REQUIREMENTS ESTABLISHED IN THE FCA MANUAL. ONE PLANT UNIT IS DEFINED AS 1 SEEDLING OR WHIP WITHOUT SHELTER. THE MANUAL STATES THAT 700 SEEDLINGS/WHIPS WITHOUT SHELTERS ARE REQUIRED PER ACRE, OR 350 WHIPS W/SHELTERS, OR 200 1" CALIPER TREES, OR 100 2" CALIPER TREES, BY CONVERSION IT HAS BEEN DETERMINED THAT A SEEDLING OR WHIP WITHOUT SHELTER = 1 UNIT, WHIP WITH SHELTER = 2 UNITS, 1" CALIPER TREE = 3.5 UNITS AND 2" CALIPER TREE = 7 UNITS. THE USE OF PLANT UNITS SIMPLIFIES THE PLANT DENSITY CALCULATIONS WHEN MIXING STOCK SIZE.

**PLANTING/SOIL SPECIFICATIONS**

- INSTALLATION OF BAREROOT/PLUG PLANT STOCK SHALL TAKE PLACE BETWEEN MARCH 15 - APRIL 20; B&B/CONTAINER STOCK MARCH 15 -MAY 30 OR SEPTEMBER 15 - NOVEMBER 15. FALL PLANTING OF B&B STOCK IS NOT RECOMMENDED.
- DISTURBED AREAS SHALL BE SEEDED AND STABILIZED AS PER GENERAL CONSTRUCTION PLAN FOR PROJECT. PLANTING AREAS NOT IMPACTED BY SITE GRADING SHALL HAVE NO ADDITIONAL TOPSOIL INSTALLED. BAREROOT PLANTS SHALL BE INSTALLED SO THAT THE TOP OF ROOT MASS IS LEVEL WITH THE TOP OF EXISTING GRADE. ROOTS SHALL BE DIPPED IN AN ANTI-DESICCANT GEL PRIOR TO PLANTING. BACKFILL IN THE PLANTING PITS SHALL CONSIST OF 3 PARTS EXISTING SOIL TO 1 PART PINE FINES OR EQUIVALENT.
- FERTILIZER SHALL CONSIST OF AGRIFORM 22-8-2, OR EQUIVALENT, APPLIED AS PER MANUFACTURER'S SPECIFICATIONS, FOR WOODY PLANTS. HERBACEOUS PLANT SHALL BE FERTILIZED WITH OSMOCOTE 8-8-12.
- PLANT MATERIAL SHALL BE TRANSPORTED TO THE SITE IN A TARPED OR COVERED TRUCK. PLANTS SHALL BE KEPT MOIST PRIOR TO PLANTING.
- THE CONTRACTOR SHALL REMOVE ALL NON-ORGANIC DEBRIS ASSOCIATED WITH THE PLANTING OPERATION FROM THE SITE.
- SEDIMENT CONTROL SHALL BE INSTALLED IN ACCORDANCE WITH GENERAL CONSTRUCTION PLAN FOR SITE.

- PLANTS SHALL BE INSTALLED AS PER PLANT SCHEDULE AND THE PLANTING/SOIL SPECIFICATIONS FOR THE PROJECT.
- UPON COMPLETION OF THE PLANTING, SIGNAGE SHALL BE INSTALLED AS SHOWN.
- PLANTINGS SHALL BE MAINTAINED AND GUARANTEED IN ACCORDANCE WITH THE MAINTENANCE AND GUARANTEE REQUIREMENTS FOR PROJECT.
- MAINTENANCE OF PLANTINGS

- MAINTENANCE OF PLANTINGS SHALL LAST FOR A PERIOD OF TWO YEARS.
- PLANTINGS MUST RECEIVE 2 GALLONS OF WATER, EITHER THROUGH PRECIPITATION OR WATERING, WEEKLY DURING THE 1ST GROWING SEASON, AS NEEDED. DURING SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.
- INVASIVE EXOTICS AND NOXIOUS WEEDS WILL BE REMOVED, AS REQUIRED, FROM PLANTING AREAS MECHANICALLY AND/OR WITH LIMITED HERBICIDE. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED. PLANTS SHALL BE EXAMINED A MINIMUM TWO TIMES DURING THE GROWING SEASON FOR SERIOUS PLANT PESTS AND DISEASES. SERIOUS PROBLEMS WILL BE TREATED WITH THE APPROPRIATE AGENT.
- DEAD BRANCHES WILL BE PRUNED FROM PLANTINGS.

- A 90 PERCENT SURVIVAL RATE OF THE REFORESTATION PLANTINGS WILL BE REQUIRED AFTER ONE GROWING SEASON. ALL PLANT MATERIAL BELOW THE 90 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE SECOND GROWING SEASON. AT THE END OF THE SECOND GROWING SEASON, A 75 PERCENT SURVIVAL RATE WILL BE REQUIRED. ALL PLANT MATERIAL BELOW THE 75 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED BY THE BEGINNING OF THE NEXT GROWING SEASON.

**EDUCATION OF NEW OCCUPANTS**

- THE DEVELOPER SHALL PROVIDE EDUCATIONAL INFORMATION TO ALL PROPERTY OWNERS WITHIN THE NEW DEVELOPMENT/HOME ABOUT THE PROPER USE OF FOREST CONSERVATION AREAS.
- FINAL INSPECTION AND RELEASE OF OBLIGATIONS

**CONSTRUCTION PERIOD PROTECTION AND MANAGEMENT NOTES FOR FOREST CONSERVATION**

- 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.
- A QUALIFIED TREE CARE EXPERT SHALL DETERMINE IF ROOT PRUNING IS REQUIRED ALONG THE LIMIT OF DISTURBANCE. ROOT PRUNING IS REQUIRED WATER ANY ROOT-PRUNED TREES IMMEDIATELY AFTER ROOT-PRUNING AND MONITOR FOR SIGNS OF STRESS DURING CONSTRUCTION.

**CONSTRUCTION PHASE**

- NO DISTURBANCE OR DUMPING IS ALLOWED INSIDE THE TREE RETENTION AREA.
  - NO EQUIPMENT SHALL OPERATE, STAKE OR STORED INSIDE THE TREE RETENTION AREA INCLUDING TREE CANOPIES.
  - IN THE EVENT OF DROUGHT, THE PROTECTED TREES SHALL BE MONITORED FOR SIGNS OF STRESS AND WATERED AS NEEDED.
- POST-CONSTRUCTION PHASE**
- AT THE DIRECTION OF A QUALIFIED TREE CARE EXPERT, DAMAGES TO RETAINED TREES SHALL BE REPAIRED BY THE CONTRACTOR.
  - FENCE REMOVAL AND STABILIZATION SHALL BE AS PER THE SEDIMENT AND EROSION CONTROL PLAN.
  - POST CONSTRUCTION MANAGEMENT PROGRAM (FOREST CONSERVATION MANUAL) - INSPECTION
    - NOTICE OF TWO YEAR GROWING SEASON MANAGEMENT PROGRAM
    - MANAGEMENT OF RETENTION AREAS
    - MANAGEMENT OF REFORESTATION AREAS (WATERING SCHEDULE, FERTILIZING, CONTROL OF INVASIVES AND PROTECTION FROM PESTS, DISEASES AND MECHANICAL INJURY)
    - REPLACEMENT OF DEAD MATERIAL
    - EDUCATION OF NEW RESIDENTS
    - DO NOT REMOVE SIGNS.

**SEQUENCE OF CONSTRUCTION-FOREST CONSERVATION**

- PRECONSTRUCTION MEETING /SITE WALK WITH CONTRACTORS AND OTHER RESPONSIBLE PARTIES TO DEFINE PROTECTION MEASURES TO BE UTILIZED AND TO POINT OUT PARTICULAR TREES TO BE SAVED.
- STAKE OUT LIMITS OF DISTURBANCE AND TREE PROTECTION FENCING LOCATIONS.
- INSTALL TREE PROTECTION FENCING; FENCING TO BE INSPECTED BY THE PROJECT ENGINEER OR THE PROJECT ECOLOGIST AND HOWARD COUNTY PLANNING AND ZONING.
- PROCEED WITH TREE REMOVAL AND SITE IMPROVEMENTS AS PER APPROVED SEDIMENT CONTROL PLAN - TO BE INSPECTED BY HOWARD COUNTY PLANNING AND ZONING.
- TEMPORARY TREE PROTECTION DEVICES SHALL BE REMOVED AFTER ALL FINISHED GRADING AND UTILITY CONSTRUCTION HAS OCCURRED AND WITH APPROVAL FROM THE HOWARD COUNTY OFFICE OF PLANNING AND ZONING.

FOREST STAND DATA				
KEY	COMMUNITY TYPE	ACREAGE (NTA)	DOMINANT VEGETATION	PRIORITY ACREAGE
F1	OAK/POPLAR	9.8	LIRIODENDRON TULIPIFERA, QUERCUS ALBA, QUERCUS VELUTINA, QUERCUS RUBRA, ACER RUBRUM, PLATANUS OCCIDENTALIS	5± ACRES BUFFERS, SLOPES
F2	SUCCESSIONAL	2.8	ACER RUBRUM, ACER NEGUNDO, FRAXINUS PENNSYLVANICA, JUGLANS NIGRA, LIRIODENDRON TULIPIFERA	2.6± ACRES BUFFERS, WETLANDS

SEE ACCOMPANYING REPORT FOR COMPLETE STAND DESCRIPTIONS

WETLAND DESCRIPTIONS		
WETLAND SYSTEM	COMARON CLASSIFICATION	DOMINANT VEGETATION
A FORESTED	PF01A-E R3UB1	ACER RUBRUM, LINDERA BENZON, SYMPLOCARPUS FOETIDUS, BOEHMERIA CYLINDRICA, CINNA ARUNDINACEA, IMPATIENS CAPENSIS
A PASTURE	PEMZA	POA TRIVIALIS, LYCOPIUS VIRGINICUS, RANUNCULUS SP., FESTUCA ARUNDINACEA

SEE ACCOMPANYING REPORT FOR COMPLETE WETLAND DESCRIPTIONS

SOILS LEGEND				
SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE
B5A	BAILE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
Cc	CODORUS AND HATBORO SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
G8B	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
G8C	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
G8D	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
H6	HATBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

-SOILS INFORMATION FROM USDA NEB SOIL SURVEY WEBSITE  
-HOWARD COUNTY SOILS MAP NUMBER 16 - CLARKSVILLE NW

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

**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAWING
- EXISTING STREAM
- EXISTING TREENLINE
- PROPOSED TREENLINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAN
- EXISTING 1' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
- EXISTING MODERATE SLOPES (15% TO 19.99% SLOPES)
- EX. FOREST CONSERVATION EASEMENT 7A (PLAT 12349)
- FOREST CONSERVATION EASEMENT (RETENTION)
- FOREST CONSERVATION EASEMENT (NON-CREDITED RETENTION)
- FOREST CONSERVATION EASEMENT (AFFORESTATION)
- FOREST CONSERVATION SIGNS

SALE	RETENTION OBLIGATION	PROJECT NAME	HOWARD COUNTY FILE NO.	REMAINING ACREAGE

\* 3.75 ACRES TOTAL FOREST MITIGATION (AFFORESTATION)

SPECIMEN TREE CHART					
NO.	SIZE	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 1	30"	45'	TULIP POPLAR	GOOD CONDITION	TO BE REMOVED
ST 2	30.5"	45.75'	TULIP POPLAR	FAIR, SOME DIEBACK NOTED	TO BE REMOVED
ST 3	35"	52.5'	BLACK OAK	POOR CROWN AND SHAPE	TO BE REMOVED
ST 4	33"	49.5'	BLACK OAK	POOR, DIEBACK NOTED	TO REMAIN
ST 5	32"	48"	TULIP POPLAR	TRIPLE STEMMED	TO REMAIN
ST 6	57"	85.5'	RED OAK	GOOD, SPLITS TO THREE STEMS ABOVE BH	TO REMAIN
ST 7	44.5"	66.75'	TULIP POPLAR	FAIR, SOME DIEBACK NOTED	TO REMAIN
ST 8	62.5"	93.75'	TULIP POPLAR	FAIR, CROWN DIEBACK, TWO STEMS ABOVE BH	TO REMAIN
ST 9	30"	45'	WHITE PINE	GOOD CONDITION	TO BE REMOVED
ST 10	31"	46.5'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 11	42"	63'	WHITE OAK	GOOD CONDITION	TO BE REMOVED
ST 12	39.5"	59.25'	WHITE OAK	GOOD CONDITION	TO BE REMOVED
ST 13	30"	45'	TULIP POPLAR	FAIR, LIMITED CROWN	TO BE REMOVED
ST 14	58.5"	87.75'	TULIP POPLAR	POOR, TRUNK ROT	TO REMAIN
ST 15	33.5"	50.25'	TULIP POPLAR	LIMITED CROWN	TO REMAIN
ST 16	31"	46.5'	SILVER MAPLE	FAIR, LEAVING	TO REMAIN
ST 17	47"	70.5'	WHITE OAK	GOOD CONDITION	TO REMAIN
ST 18	34.5"	51.75'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 19	45"	67.5'	BLACK OAK	FAIR, LIMBS DIEBACK	TO REMAIN
ST 20	37.5"	56.25'	BLACK OAK	POOR, SEVERE DIEBACK	TO REMAIN
ST 21	44"	66"	RED OAK	POOR, SEVERE DIEBACK	TO REMAIN
ST 22	38"	57"	RED OAK	POOR, NOTICEABLE DIEBACK	TO REMAIN
ST 23	33.5"	50.25'	TULIP POPLAR	POOR, TRUNK ROT	TO BE REMOVED
ST 24	37"	55.5'	TULIP POPLAR	MAJOR TRUNK WOUND	TO BE REMOVED
ST 25	34.5"	51.75'	TULIP POPLAR	POOR, TRUNK CAVITY	TO REMAIN

**HOWARD COUNTY FOREST CONSERVATION WORKSHEET**

ZONED RR-DEO  
NET TRACT AREA:  
A. TOTAL TRACT AREA = 42.6 AC.  
B. AREA WITHIN 100' YEAR FLOODPLAIN = 7.5 AC.  
C. AREA TO REMAIN IN AGRICULTURAL PRESERVATION = 0.0 AC.  
D. NET TRACT AREA = 35.1 AC.

LAND USE CATEGORY  
INPUT THE NUMBER "1" UNDER THE APPROPRIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY. ZONED R-20

ARA MDR IDA HDR MPD CIA  
0 1 0 0 0 0

E. AFFORESTATION THRESHOLD = 25% X D. = 7.0 AC  
F. CONSERVATION THRESHOLD = 20% X D. = 6.8 AC

EXISTING FOREST COVER:  
G. EXISTING FOREST COVER (EXCLUDING FLOODPLAIN) = 12.6 AC  
H. AREA OF FOREST ABOVE AFFORESTATION THRESHOLD = 5.8 AC  
I. AREA OF FOREST ABOVE CONSERVATION THRESHOLD = 3.8 AC

BREAK EVEN POINT:  
(.2 X 1) + F = BREAK EVEN POINT (0 AC)  
J. FOREST RETENTION ABOVE THRESHOLD W/ NO MITIGATION = 9.6 AC  
K. CLEARING PERMITTED WITHOUT MITIGATION = 3.0 AC

PROPOSED FOREST CLEARING:  
L. TOTAL AREA OF FOREST TO BE CLEARED = 5.2 AC  
M. TOTAL AREA OF FOREST TO BE RETAINED = 7.4 AC

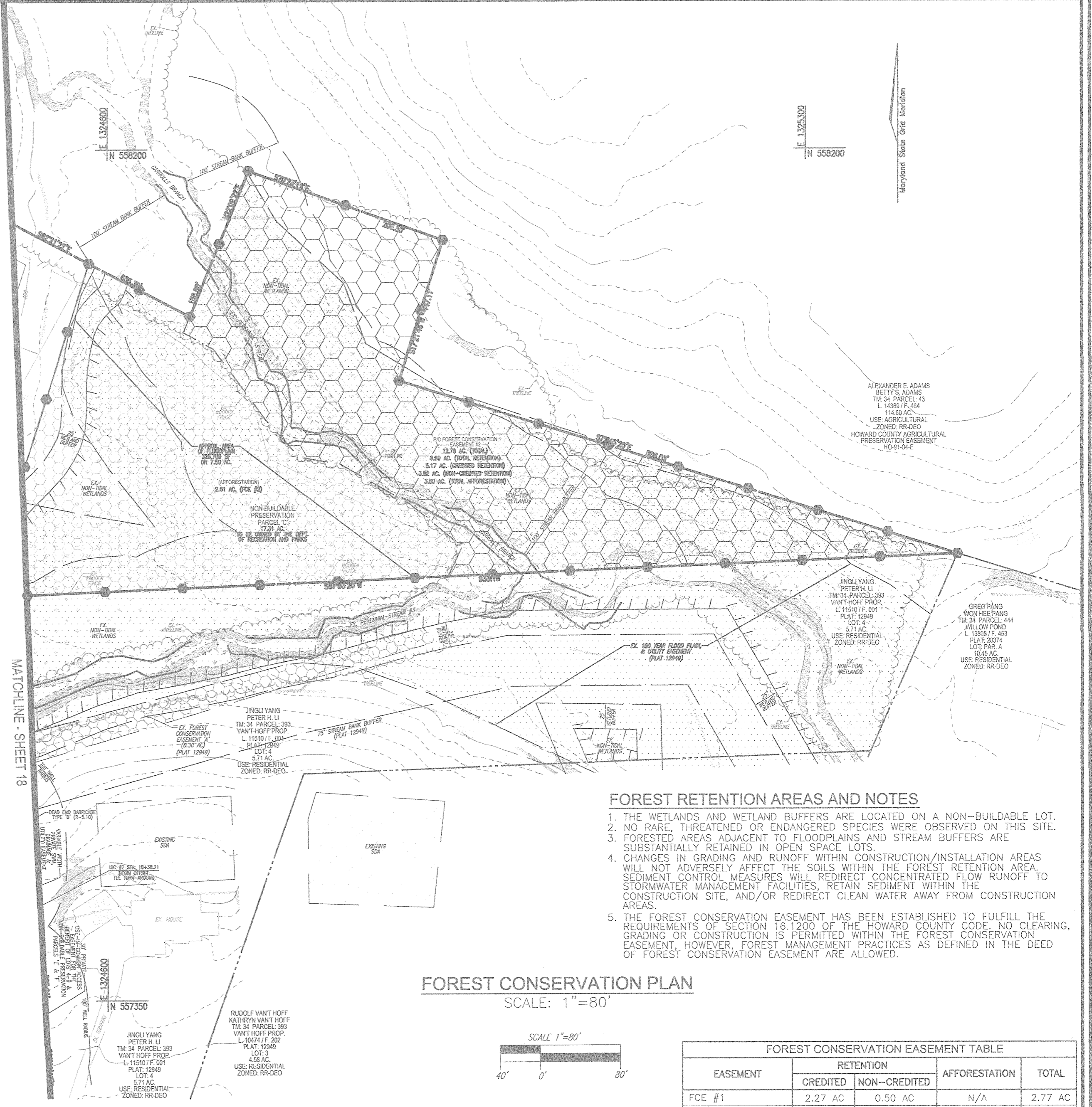
**PLANTING REQUIREMENTS:**  
L. REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD (L X 25) = 1.0 AC  
M. REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD = 2.8 AC  
N. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD (M-F) = 0.0 AC  
P. TOTAL REFORESTATION REQUIRED (N+P-Q) = 3.8 AC  
Q. TOTAL AFFORESTATION REQUIRED = 0.0 AC  
R. TOTAL PLANTING REQUIREMENT (REFORESTATION AND AFFORESTATION) = 3.8 AC

FOREST CONSERVATION EASEMENTS HAVE BEEN ESTABLISHED TO FULFILL A PORTION OF THE REQUIREMENTS OF SECTION 16.1209 OF THE HOWARD COUNTY FOREST CONSERVATION MANUAL. 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.

THE REQUIRED FOREST CONSERVATION WILL BE PROVIDED ON NON-BUILDABLE PRESERVATION PARCEL "B" & "C" AND SHALL MEET THE INTENT OF SECTION 16.117 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

TOTAL FOREST CONSERVATION OBLIGATION OF THIS PROJECT TO BE FULFILLED BY:  
- 3.75 ACRES CREDITED CREDITED (NO SURETY REQUIRED)  
- 3.80 ACRES OF AFFORESTATION EASEMENT  
- 3.75 ACRES OF ADDITIONAL AFFORESTATION HAVE BEEN PROVIDED FOR THE PURPOSE OF A FOREST MITIGATION BANK.

FINANCIAL SURETY FOR THE REQUIRED AFFORESTATION AND FOREST MITIGATION BANK SHALL BE POSTED WITH THE FINAL PLAN DEVELOPER'S AGREEMENT.



**FOREST RETENTION AREAS AND NOTES**

- THE WETLANDS AND WETLAND BUFFERS ARE LOCATED ON A NON-BUILDABLE LOT.
- NO RARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THIS SITE.
- FORESTED AREAS ADJACENT TO FLOODPLAINS AND STREAM BUFFERS ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.
- 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.
- THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1209 OF THE HOWARD COUNTY CODE AND 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 CONSERVATION PLAN SCALE: 1"=80'**

EASEMENT	RETENTION		AFFORESTATION	TOTAL
	CREDITED	NON-CREDITED		
FCE #1	2.27 AC	0.50 AC	N/A	2.77 AC
FCE #2	5.17 AC	3.82 AC	3.80 AC	12.79 AC
FCE #3 (MITIGATION)	N/A	N/A	3.75 AC	3.75 AC
TOTAL	7.44 AC	4.32 AC	7.55 AC	19.31 AC

**Eco-Science Professionals, Inc.**  
Consulting Ecologists  
P.O. Box 5906 Ches Arm, Maryland 21057 Telephone (410) 833-2488 Fax (410) 833-2488

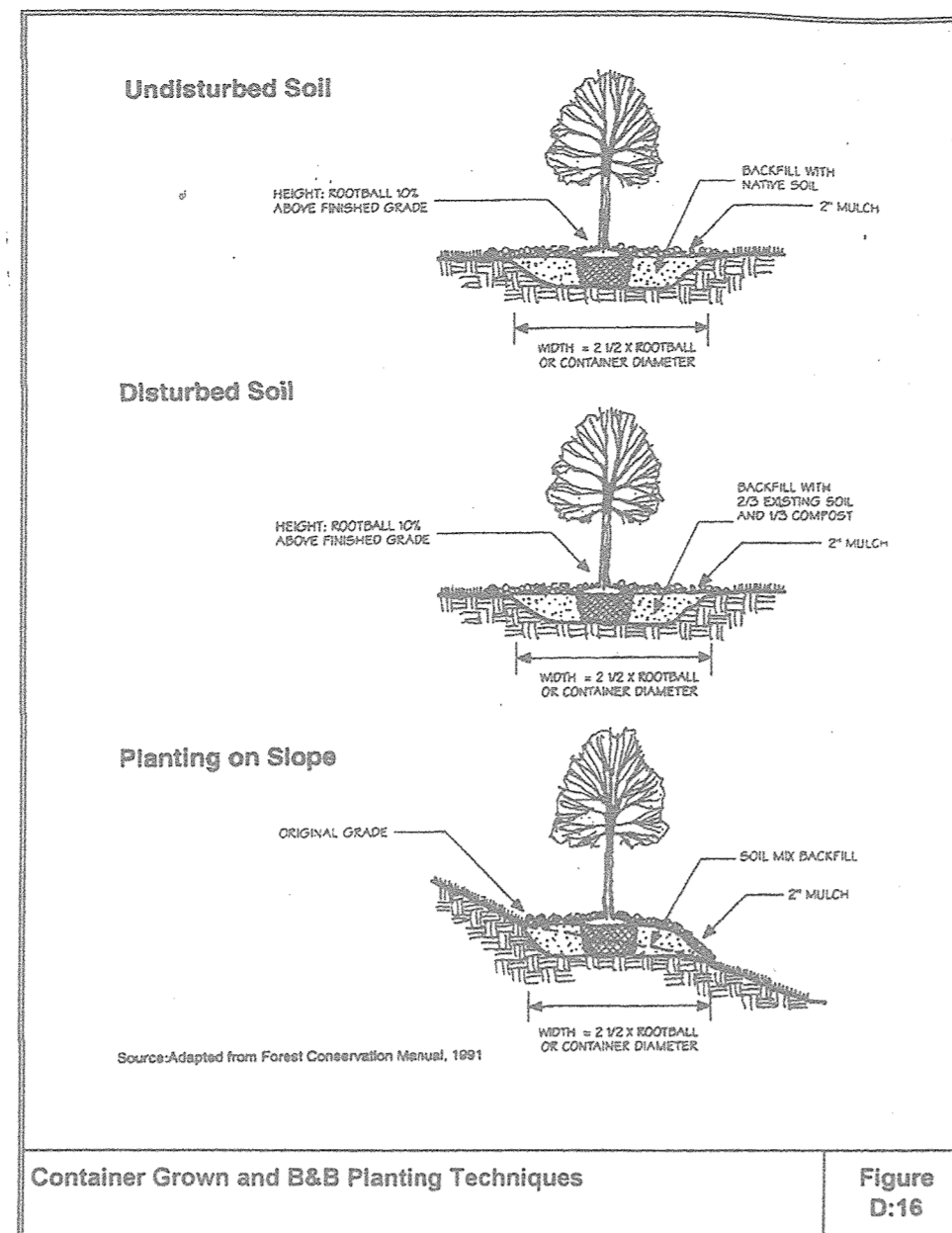
**MD DNR Qualified Professional**  
USACOE Wetland Deliberator  
Certification # WDCP93MD061004482

**REFORESTATION AREA MONITORING NOTES**

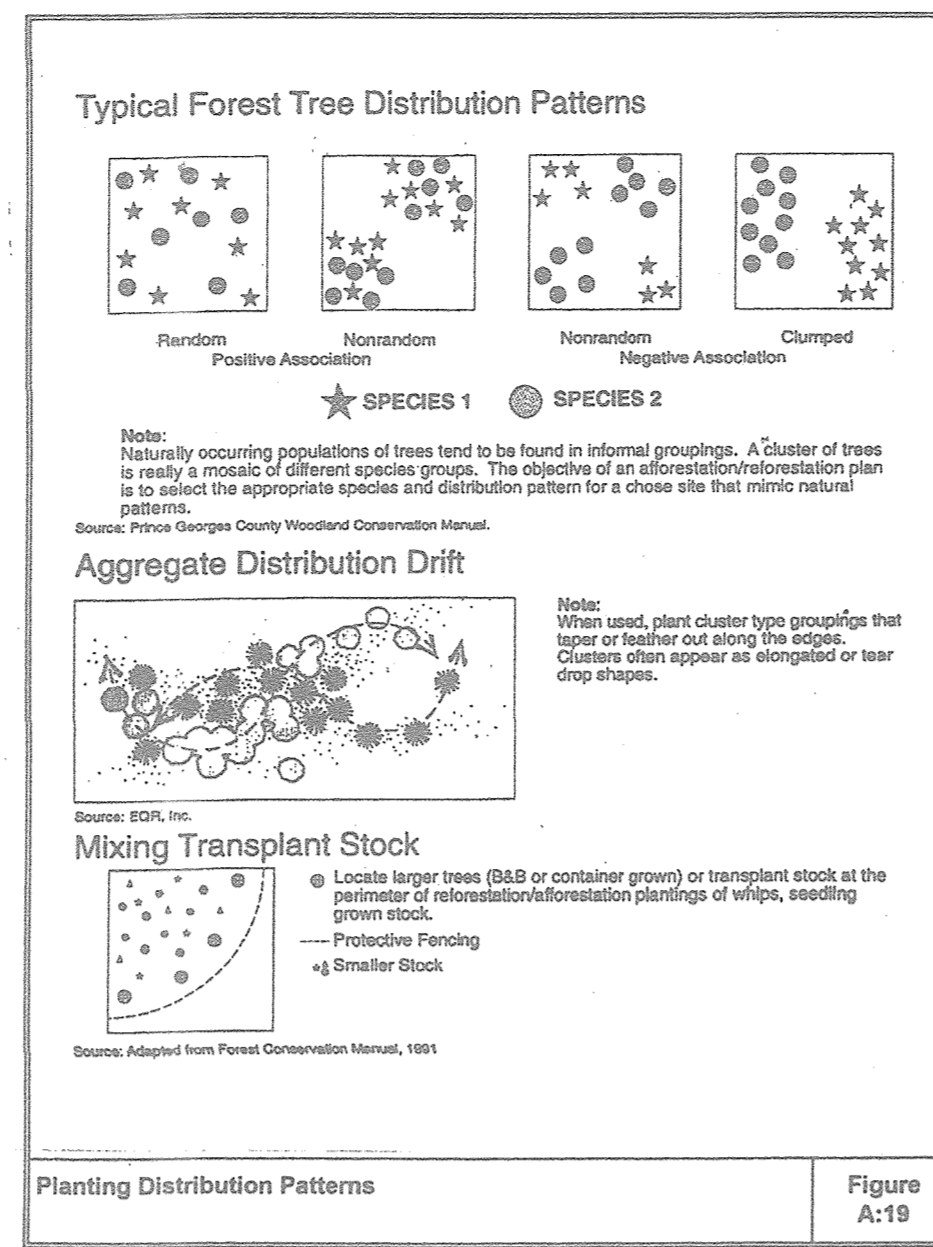
- MONTHLY VISITS DURING THE FIRST GROWING SEASON ARE TO ASSESS THE SUCCESS OF THE PLANTINGS AND TO DETERMINE IF SUPPLEMENTAL WATERING, PEST CONTROL OR OTHER ACTIONS ARE NECESSARY. EARLY SPRING VISITS WILL DOCUMENT WINTER KILL AND AUTUMN VISITS WILL DOCUMENT SUMMER KILL.
- THE MINIMUM SURVIVAL RATE SHALL BE 75% OF THE TOTAL NUMBER OF TREES PLANTED PER ACRE AT THE END OF THE TWO YEAR MAINTENANCE PERIOD. WILD TREE SEEDLINGS FROM NATURAL REGENERATION ON THE PLANTING SITE MAY BE COUNTED UP TO 50% TOWARD THE TOTAL SURVIVAL NUMBER IF THE ARE HEALTHY NATIVE SPECIES AT LEAST 12 INCHES TALL.
- SURVIVAL WILL BE DETERMINED BY A STRATIFIED RANDOM SAMPLING OF THE PLANTINGS. THE SPECIES COMPOSITION OF THE SAMPLE POPULATION SHOULD BE PROPORTIONATE TO THE AMOUNT OF EACH SPECIES IN THE ENTIRE PLANTING TO BE SAMPLED.
- EFFECTIVE MONITORING WILL ASSESS PLANT SURVIVABILITY DURING THE FIRST GROWING SEASON AND MAKE RECOMMENDATIONS FOR REFORESTATION PLANTINGS IF REQUIRED AT THAT TIME.

**REFORESTATION PLANTING NOTES**

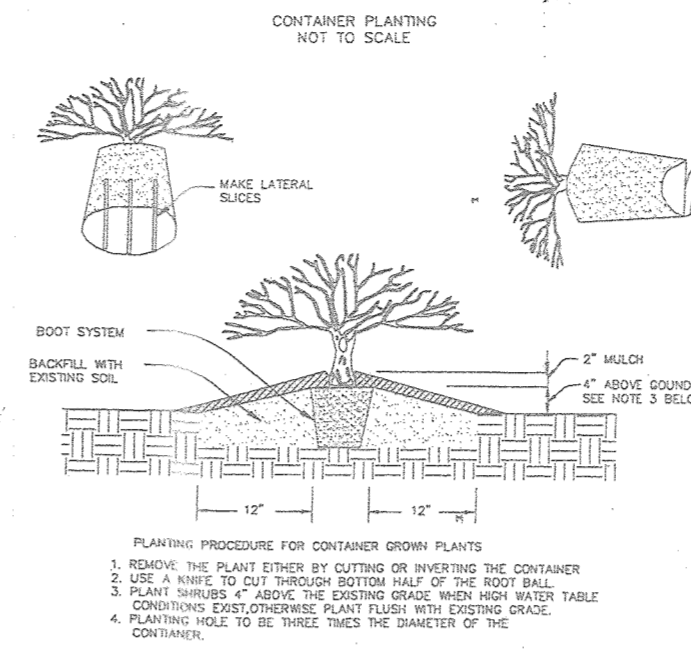
- AFFORESTATION AREAS MAY BE PLANTED AS SOON AS REASONABLE TO DO SO. LATE WINTER-EARLY SPRING PLANTINGS ARE PREFERRED. EARLIEST PLANTING DATES WILL VARY FROM YEAR TO YEAR BUT PLANTING MAY GENERALLY BEGIN AS SOON AS THE GROUND IS NO LONGER FROZEN. ALTERNATE PLANTING DATES MAY BE CONSIDERED AS CONDITION WARRANTS.
- SOIL AMENDMENTS AND FERTILIZATION RECOMMENDATIONS WILL BE MADE BASED UPON THE RESULTS OF SOIL ANALYSIS FOR NITROGEN, PHOSPHORUS, POTASSIUM, ORGANIC MATTER CONTENT AND pH. IF REQUIRED, FERTILIZER WILL BE PROVIDED USING A SLOW RELEASE, SOLUBLE 16-8-16 ANALYSIS DESIGNED TO LAST 5-8 YEARS CONTAINED IN POLYETHYLENE PERFORATED BAGS SUCH AS MANUFACTURED BY ADCO WORKS, P.O. BOX 310 HOLLIS, N.Y. 11423 OR APPROVED EQUAL.
- PLANT MATERIALS WILL BE PLANTED IN ACCORDANCE WITH THE PLANTING DETAILS AND PLANT SCHEDULE.
- PLANT MATERIAL SHALL BE NURSERY GROWN AND INSPECTED PRIOR TO PLANTING. PLANTS NOT CONFORMING TO THE AMERICAN STANDARD FOR NURSERY STOCK SPECIFICATIONS FOR SIZE, FORM, VIGOR, OR ROOTS, OR DUE TO TRUNK WOUNDS, BREAKAGE, DESICCATION, INSECT OR DISEASE MUST BE REPLACED.
- PLANTING STOCK MUST BE PROTECTED FROM DESICCATION AT ALL TIMES PRIOR TO PLANTING. MATERIALS HELD FOR PLANTING SHALL BE MOISTENED AND PLACED IN COOL SHADED AREAS UNTIL READY FOR PLACEMENT.
- NEWLY PLANTED TREES MAY REQUIRE WATERING AT LEAST ONCE PER WEEK DURING THE FIRST GROWING SEASON DEPENDING ON RAINFALL IN ORDER TO GET ESTABLISHED. THE INITIAL PLANTING OPERATION SHOULD ALLOW FOR WATERING DURING INSTALLATION TO COMPLETELY SOAK BACKFILL MATERIAL.
- MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE DIAGRAM PROVIDED AND SHALL CONSIST OF COMPOSTED, SHREDDED HARDWOOD BARK MULCH, FREE OF WOOD ALCOHOL.
- ALL NURSERY STOCK TO BE SPRAYED WITH DEER REPELLENT CONTAINING BITREX, SUCH AS REPELLEX. ALL NURSERY STOCK TO BE GROWN WITH DEER REPELLENT TABLETS IN GROWING MEDIUM, SUCH AS REPELLEX TABLETS.



Container Grown and B&B Planting Techniques Figure D-16



Planting Distribution Patterns Figure A-19



Size	Number Required per Acre	Approximate Spacing feet on center	Survivability Requirement At the end of the second growing season	
Container Grown 5, 7 Gallon or 1" Caliper B & B	200	15 x 15	75%	170

Notes:

- These stocking and survival requirements are the minimum numbers estimated to meet the definition of forest from bare land.
- In certain circumstances, any combination of the above mentioned stocking options, dry seeding, tree shelters, transplants, and/or natural regeneration may be appropriate strategies to fulfill the requirements of an approved FCD. They will be evaluated on a case-by-case basis by the approving authority.
- Spacing does not imply that trees or shrubs must be planted in a grid pattern.

Site Stocking Figure A-18

AFFORESTATION PLANTING SCHEDULE FOREST CONSERVATION EASEMENTS 7.55 ACRES			
EASEMENT #2: 3.80 AC. (AFFORESTATION) @ 200 TREES/AC. = 760 TREES			
QTY.	BOTANICAL NAME	SIZE	SPACING
152	BETULA NIGRA RIVER BIRCH	1" CAL.	15' x 15'
152	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1" CAL.	15' x 15'
152	NYSSA SYLVATICA BLACK GUM	1" CAL.	15' x 15'
152	QUERCUS RUBRA RED OAK	1" CAL.	15' x 15'
152	TAXODIUM DISTICHUM COMMON BALD CYPRESS	1" CAL.	15' x 15'
EASEMENT #3: 3.75 AC. (AFFORESTATION) @ 200 TREES/AC. = 750 TREES			
QTY.	BOTANICAL NAME	SIZE	SPACING
150	BETULA NIGRA RIVER BIRCH	1" CAL.	15' x 15'
150	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1" CAL.	15' x 15'
150	NYSSA SYLVATICA BLACK GUM	1" CAL.	15' x 15'
150	QUERCUS RUBRA RED OAK	1" CAL.	15' x 15'
150	TAXODIUM DISTICHUM COMMON BALD CYPRESS	1" CAL.	15' x 15'

(MITIGATION)

AFFORESTATION PROVIDED

7.55 ACRES  
1" CALIPER TREES  
1,510 TREES @ 200 TREES PER ACRE OR EQUAL

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

OWNER  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

DEVELOPER  
 TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

PARCEL: 388 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L 4772 / F. 285  
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

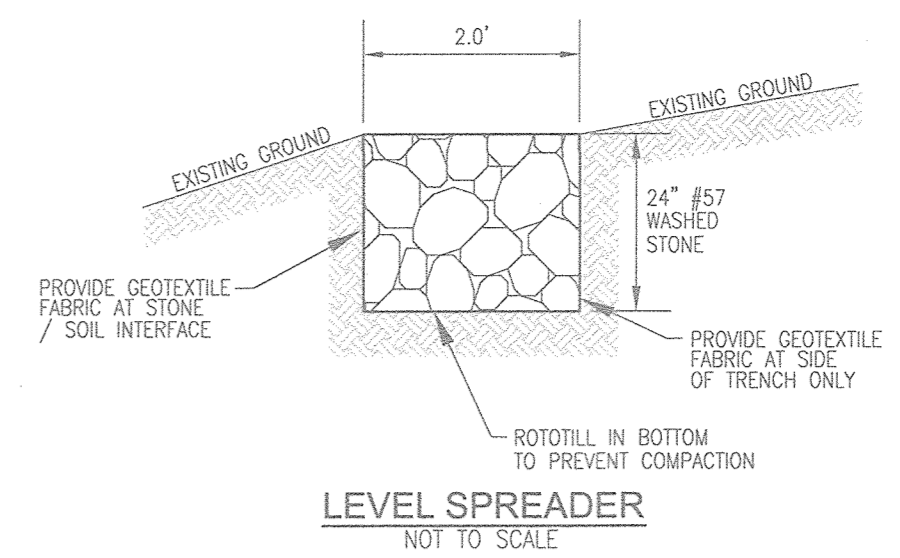
DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

PROFESSIONAL CERTIFICATE  
 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: 08-27-2020

20 SHEET OF 30

SOILS LEGEND			
SYMBOL	NAME/DESCRIPTION	GROUP	K-FACTOR/ERODIBLE
Bsa	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	37 YES
Co	COODORUS AND HARBOR SILT LOAMS, 0 TO 3 PERCENT SLOPES	A	32 NO
CbB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	28 NO
CbC	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	28 NO
ChB	GLENNVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	43 YES
Hd	HARBOR-COODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	37 YES

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



**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING STREAM
- EXISTING TRENLINE
- PROPOSED TRENLINE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING SPECIMEN TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EX. PUBLIC 100-YEAR FLOOD PLAN
- EX. 20' DRAINAGE & UTILITY EASEMENT (PLAT 12646)
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. PUBLIC SWM DRAINAGE & UTILITY EASEMENT
- PROP. 25' PRIVATE EASEMENT
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
- EXISTING MODERATE SLOPES (15% TO 19.9% SLOPES)
- DRAINAGE AREA DIVIDE
- PROPOSED MICRO-BIORETENTION FACILITY (M-6)
- PROPOSED DRY WELL (M-5)
- AREA OF DRAINAGE TO SHEETFLOW TO LEVEL SPREADER AND CONSERVATION (N-3)
- AREA OF DRAINAGE TO GO TO DRY WELL (M-5)
- AREA OF DRAINAGE TO GO TO MICRO BIO-RETENTION FACILITY (M-6)
- AREA OF DRIVEWAY DRAINAGE TO GO TO NON-ROOFTOP DISCONNECT (N-2)
- AREA OF ROOFTOP DRAINAGE TO GO TO ROOFTOP DISCONNECT (N-1)
- ROOFTOP DISCONNECT (N-1)
- PROP. SEWAGE DISPOSAL AREA
- PROP. WELL AREA
- PROP. MBR TEST PIT

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

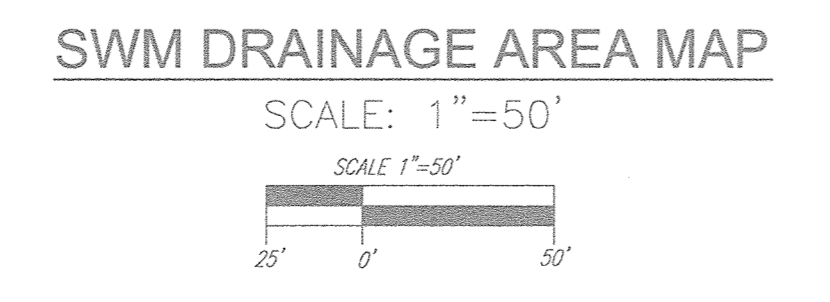
- MATERIAL SPECIFICATIONS**  
THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.
- FILTERING MEDIA OR PLANTING SOIL**  
THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 18.06.03.02. THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:  
  - SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION)
  - ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (50%), COARSE SAND (20%), AND COMPOST (30%).
  - CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
  - PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.
- COMPACTION**  
IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.  
COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO RESTRUCTURE THE SOIL PROFILE THROUGHOUT THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.  
ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.  
WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.  
WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.
- PLANT MATERIAL**  
RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.
- PLANT INSTALLATION**  
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.  
ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS THROUGHOUT WATER GROUND RED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.  
GRASSES AND LEGUME SEED SHOULD BE BRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.  
THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS, DEERETS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.
- UNDERDRAINS**  
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:  
  - PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM 756, TYPE PS 28, OR ASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HOPE).
  - PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 10 OR 14) GALVANIZED HARDWARE CLOTH.
  - GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.
  - THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.
  - A RIGID, NON-PERFORATED DISTRIBUTION WELL MUST BE PROVIDED (ONE PER EVERY 1000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.
  - A 4" LAYER OF FINE GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES IN TO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".
- MISCELLANEOUS**  
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-18

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19



**NOTE:**  
 MBR-1A and MBR-1B ARE LOCATED IN A PUBLIC SWM EASEMENT. FACILITIES ARE TO BE PRIVATELY OWNED BY THE HOMEOWNERS ASSOCIATION AND JOINTLY MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND HOWARD COUNTY.

MATCHLINE - SHEET 23

**THE ESTATES AT RIVER HILL**

STORMWATER TEST PITS

TEST PIT	SURFACE ELEVATION	BORING DEPTH	CONDITION
300	448.84	11'	NO ROCK OR WATER PRESENT
301	431.87	10'	WATER PRESENT AT 421.87
302	425.69	9'	NO ROCK OR WATER PRESENT
303	420.57	9'	WATER PRESENT AT 411.57
309	441.73	12'	NO ROCK OR WATER PRESENT
310	428.00	12'	NO ROCK OR WATER PRESENT
311	418.42	9'	ROCK PRESENT AT 412.42

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORMWATER MANAGEMENT DRAINAGE  
 AREA MAP, NOTES, AND DETAILS  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043

ZONED: RR-DEO  
 L 4772 / F. 285  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERS, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS

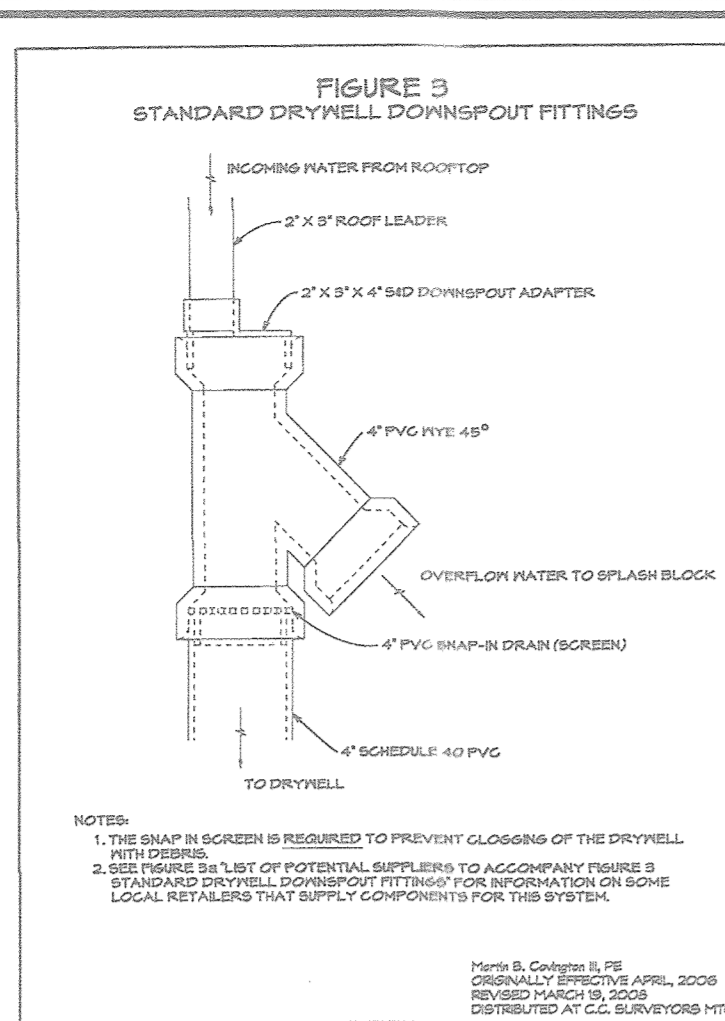
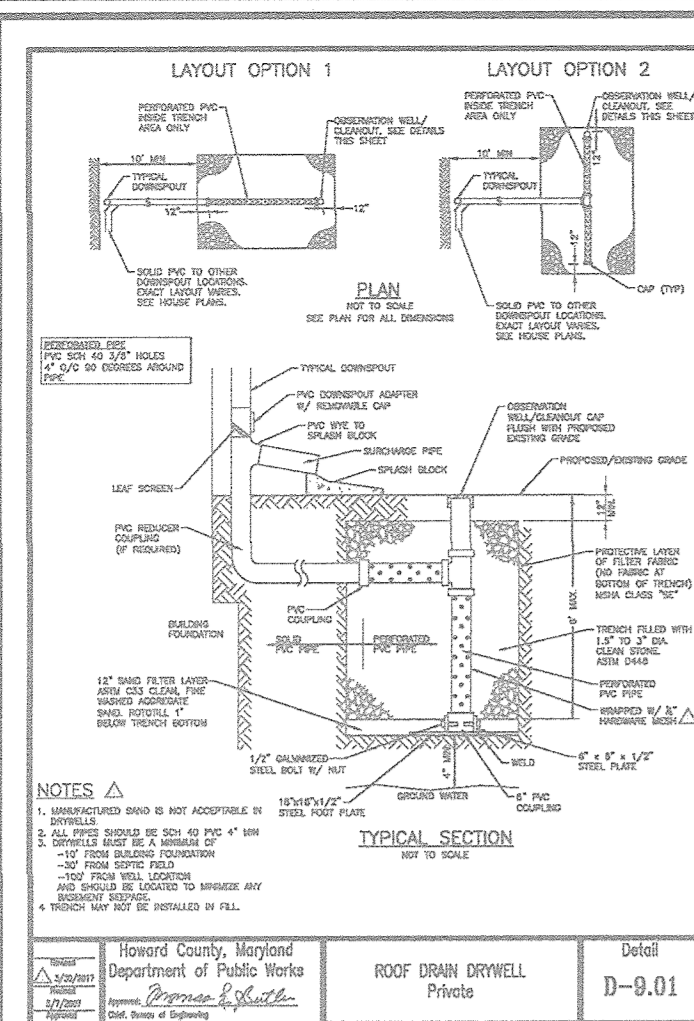
3900 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

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. 16183, EXPIRATION DATE: 08-27-2020

21 SHEET OF 30

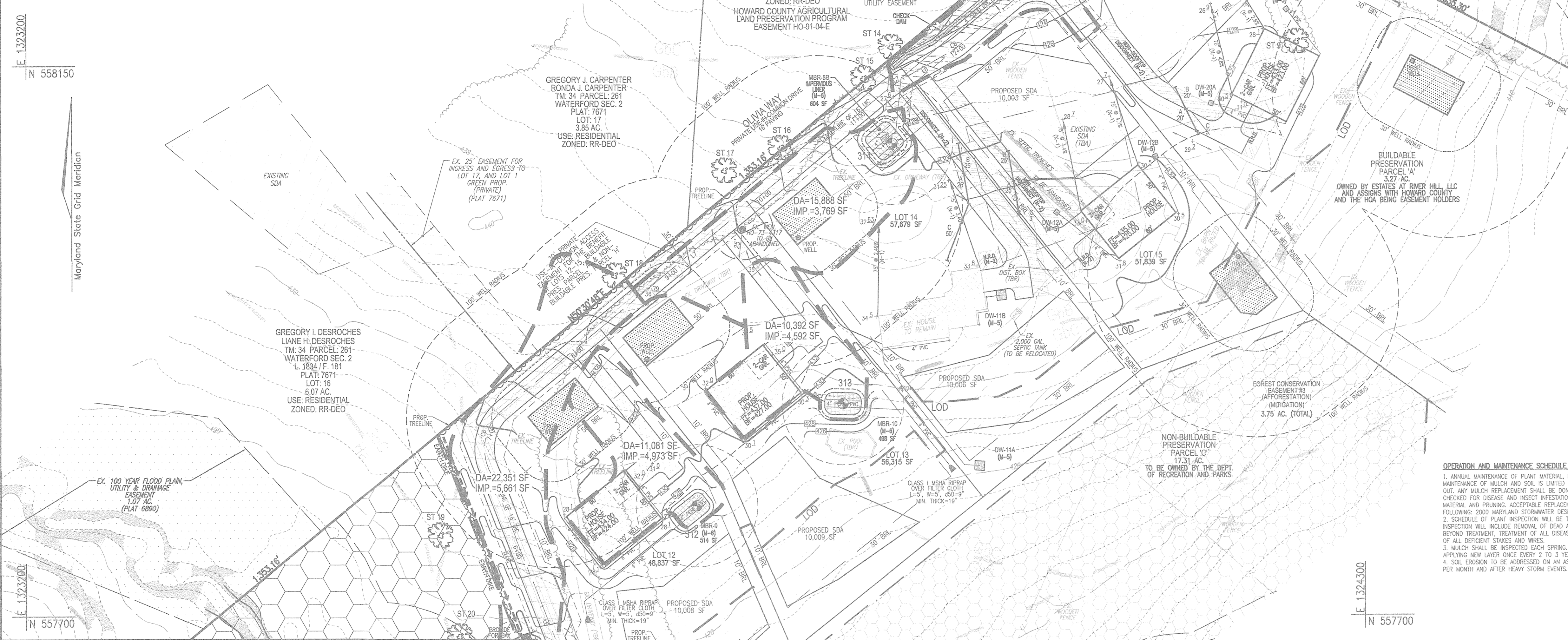
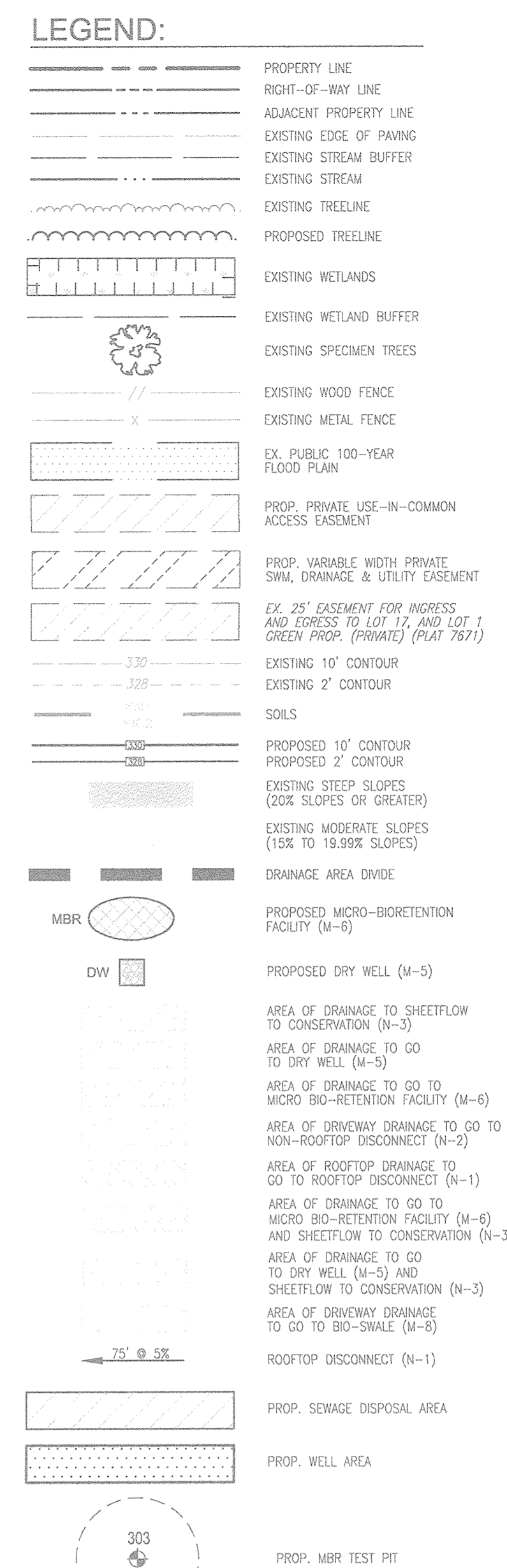


**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER INFILTRATION TRENCHES (I-1) AND DRY WELLS (M-5)**

1. THE OWNER SHALL INSPECT THE MONITORING WELLS AND STRUCTURES ON A QUARTERLY BASIS, AND AFTER EVERY LARGE STORM EVENT.
2. THE OWNER SHALL RECORD THE WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
3. THE OWNER SHALL MAINTAIN A LOG BOOK TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
4. WHEN THE FACILITY BECOMES CLOGGED, SO THAT IT DOES NOT DRAIN DOWN WITHIN A SEVENTY-TWO (72) HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
5. THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
6. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS, UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

**THE ESTATES AT RIVER HILL**

TEST PIT	SURFACE ELEVATION	BORING DEPTH	CONDITION
312	427.40	10'	NO ROCK OR WATER PRESENT
313	427.29	10'	NO ROCK OR WATER PRESENT
314	429.13	10'	NO ROCK OR WATER PRESENT



**OPERATION AND MAINTENANCE SCHEDULE FOR BIORETENTION SWALE (M-8)**

1. ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOL. 4, TABLE A.4.1 AND 2.
2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.
3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
4. SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

MATCHLINE - SHEET 21

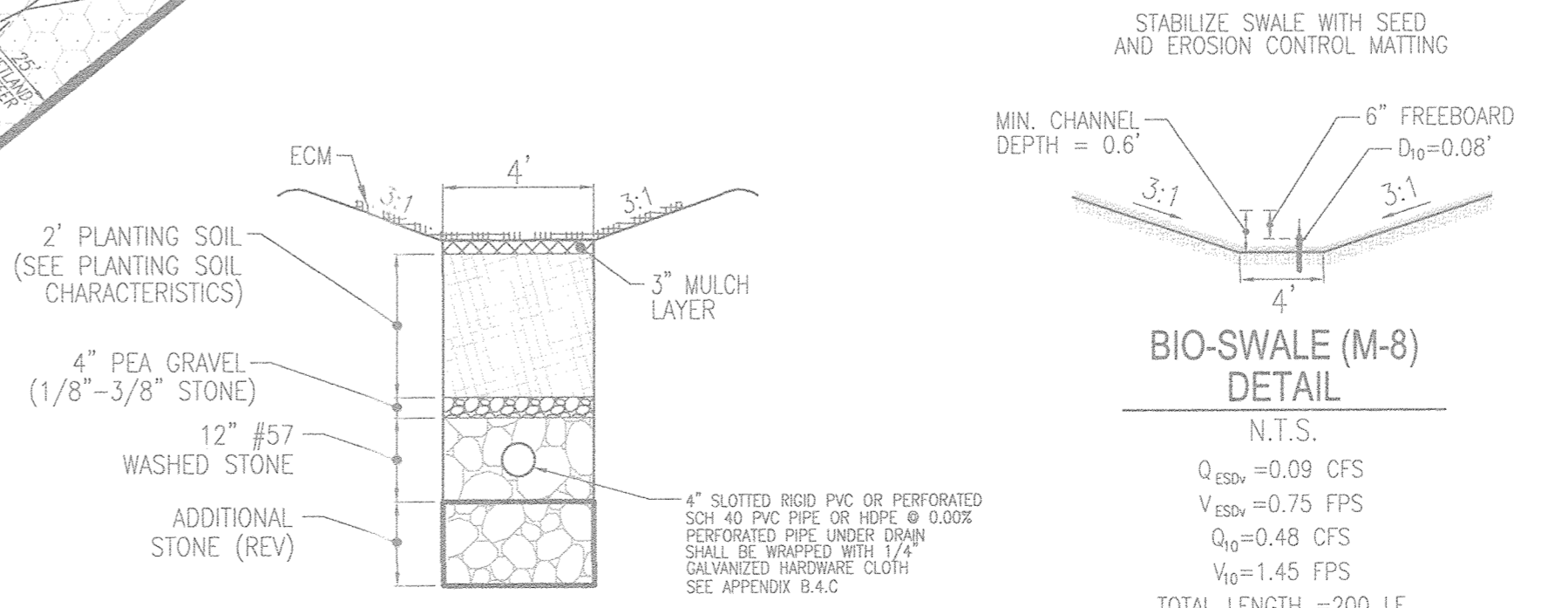
MATCHLINE - SHEET 23

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DISCONNECTION OF ROOFTOP RUNOFF (N-1) AND DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2)**

1. MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION OR DEVELOPMENT OF IMPERVIOUS AREA. IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SHEETFLOW TO CONSERVATION AREA (N-3)**

1. CONSERVATION AREAS SHALL REMAIN UNDISTURBED AND UNMANAGED OTHER THAN ROUTINE DEBRIS REMOVAL AND REPAIRING AREAS OF CONCENTRATED FLOW. INVASIVE AND NOXIOUS PLANT REMOVAL AND BI-ANNUAL MOWING FOR MEADOW AREAS MAY BE NEEDED. SIGNS DELINEATING THE LIMITS OF THE CONSERVATION AREA SHOULD BE MAINTAINED AND SUPPLEMENTAL PLANTINGS PERFORMED AS NEEDED.



**SOILS LEGEND**

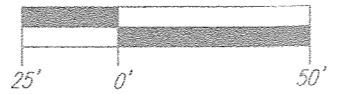
SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
DBR	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	.37	YES
CD	CODORUS AND HAIROBOR SILT LOAMS, 0 TO 3 PERCENT SLOPES	C	.32	NO
CSB	GLADSTONE LOAM, 3 TO 8 PERCENT SLOPES	A	.28	NO
CS	GLADSTONE LOAM, 8 TO 15 PERCENT SLOPES	A	.28	NO
CSB	GLADSTONE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.43	YES
CSB	HAIROBOR-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	B/D	.37	YES

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12.2.18

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19

**SCALE: 1"=50'**



NO.	REVISION	DATE

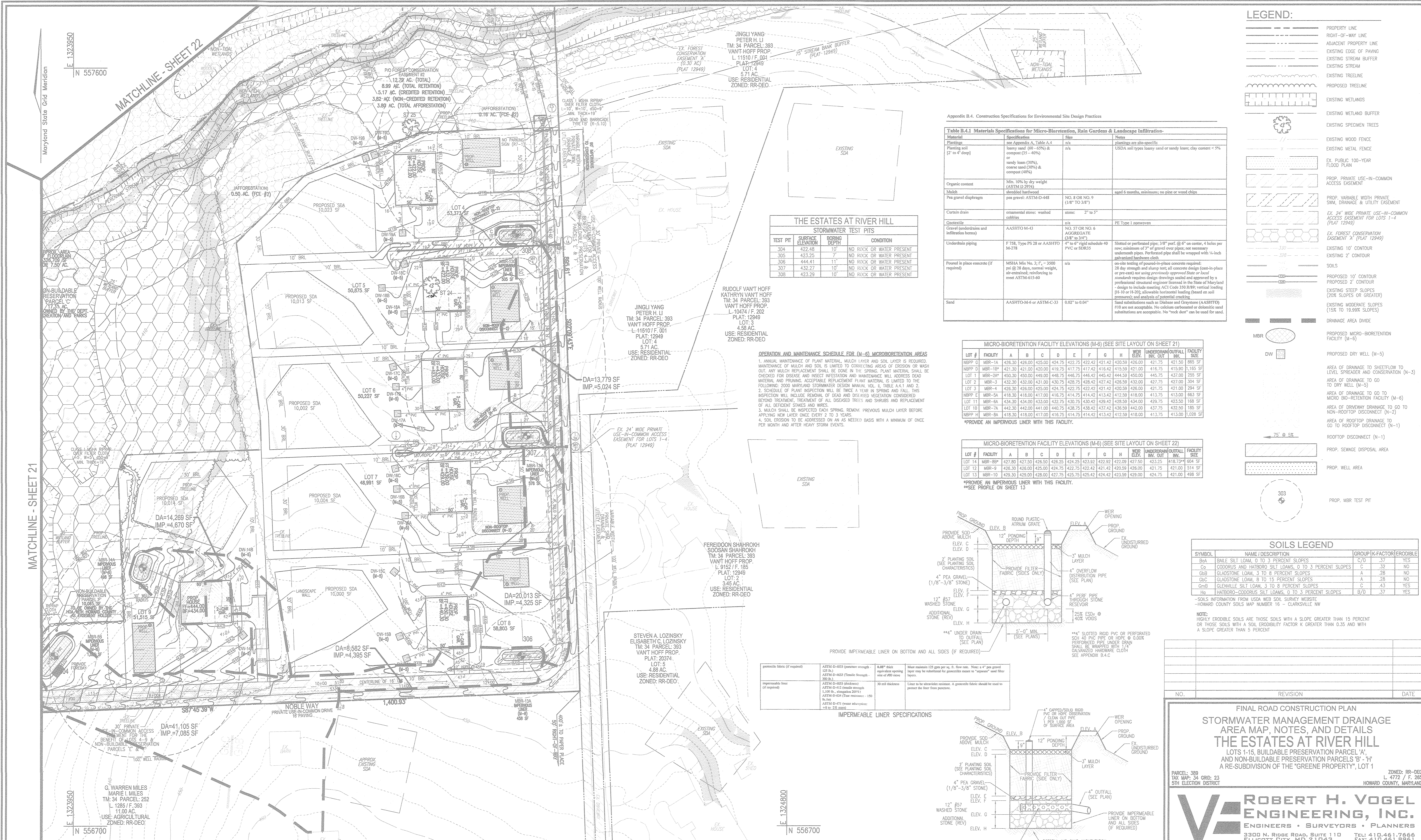
FINAL ROAD CONSTRUCTION PLAN  
 STORMWATER MANAGEMENT DRAINAGE  
 AREA MAP, NOTES, AND DETAILS  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410-461-7666  
 FAX: 410-461-8961

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.G. NO.: 15-39

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2020

22 OF 30



### LEGEND:

[Symbol]	PROPERTY LINE
[Symbol]	RIGHT-OF-WAY LINE
[Symbol]	ADJACENT PROPERTY LINE
[Symbol]	EXISTING EDGE OF PAVING
[Symbol]	EXISTING STREAM BUFFER
[Symbol]	EXISTING STREAM
[Symbol]	EXISTING TREETRINE
[Symbol]	EXISTING WETLANDS
[Symbol]	EXISTING WETLAND BUFFER
[Symbol]	EXISTING SPECIMEN TREES
[Symbol]	EXISTING WOOD FENCE
[Symbol]	EXISTING METAL FENCE
[Symbol]	EX PUBLIC 100-YEAR FLOOD PLAIN
[Symbol]	PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
[Symbol]	PROP. VARIABLE WIDTH PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
[Symbol]	EX 24' WIDE PRIVATE USE-IN-COMMON ACCESS EASEMENT FOR LOTS 1-4 (PLAT 12949)
[Symbol]	EX FOREST CONSERVATION EASEMENT #1 (PLAT 12949)
[Symbol]	EXISTING 10' CONTOUR
[Symbol]	EXISTING 2' CONTOUR
[Symbol]	PROPOSED 10' CONTOUR
[Symbol]	PROPOSED 2' CONTOUR
[Symbol]	EXISTING STEEP SLOPES (20% SLOPES OR GREATER)
[Symbol]	EXISTING MODERATE SLOPES (15% TO 19.9% SLOPES)
[Symbol]	DRAINAGE AREA DIVIDE
[Symbol]	PROPOSED MICRO-BIORETENTION FACILITY (M-6)
[Symbol]	PROPOSED DRY WELL (M-5)
[Symbol]	AREA OF DRAINAGE TO SHEETFLOW TO LEVEL SPREADER AND CONSERVATION (N-3)
[Symbol]	AREA OF DRAINAGE TO GO TO DRY WELL (M-5)
[Symbol]	AREA OF DRAINAGE TO GO TO MICRO-BIORETENTION FACILITY (M-6)
[Symbol]	AREA OF DRAINAGE TO GO TO NON-ROOFTOP DISCONNECT (N-2)
[Symbol]	AREA OF ROOFTOP DRAINAGE TO GO TO ROOFTOP DISCONNECT (N-1)
[Symbol]	ROOFTOP DISCONNECT (N-1)
[Symbol]	PROP. SEWAGE DISPOSAL AREA
[Symbol]	PROP. WELL AREA
[Symbol]	PROP. MBR TEST PIT

### Table B.4.1 Materials Specifications for Micro-Bioretention, Rain Gardens & Landscape Infiltration

Material	Specification	Size	Notes
Planting soil (2" to 4" deep)	loamy sand (60-65%) & compost (35-40%) or sandy loam (50%), coarse sand (20%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	sterilized hardwood		aged 6 months, minimum; no pine or wood chips
Post gravel diaphragm	post gravel: ASTM D 4248	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain stain	ornamental stone: washed cobbles	stone: 2" to 5"	
Gravel	AASHTO M-43	NO. 57 OR NO. 6	FE Type 1 nonsewer
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" center, 4 holes per row; minimum of 3" of gravel over pipe; not necessary underdrain pipes. Perforated pipe shall be wrapped with 1/4" galvanized hardware cloth.
Poured in place concrete (if required)	MSHA Mix No. 3, F = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM A-615-60	n/a	on-site testing of poured-in-place concrete required; 28 day strength and slump tests; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland design to include meeting ACI Code 309.50W; vertical loading (18" or 18.20) allowable horizontal loading (based on soil pressures) and analysis of potential cracking.
Sand	AASHTO M-6 or ASTM C-33	0.075" to 0.04"	Sand substitutions such as Dabbone and Craystone (AASHTO #10 are not acceptable. No calcium carbonate or dolomite sand substitutions are acceptable. No "rock dust" can be used for sand.

### MICRO-BIORETENTION FACILITY ELEVATIONS (M-6) (SEE SITE LAYOUT ON SHEET 21)

LOT #	FACILITY	A	B	C	D	E	F	G	H	NEW ELEV.	UNDERDRAIN INV.	OUTFALL INV.	FACILITY SIZE
MBPP	MBR-1A	426.30	426.00	425.00	424.75	422.75	422.42	421.42	420.59	426.00	421.75	421.50	895 SF
MBPP	MBR-1B	421.30	421.00	420.00	419.75	417.75	417.42	416.42	415.59	421.00	416.75	415.50	1,165 SF
LOT 1	MBR-2A	450.30	450.00	449.00	448.75	446.75	446.42	445.42	444.59	450.00	445.75	437.00	255 SF
LOT 2	MBR-3	432.30	432.00	431.00	430.75	428.75	428.42	427.42	426.59	432.00	427.75	427.00	304 SF
LOT 3	MBR-4	426.30	426.00	425.00	424.75	422.75	422.42	421.42	420.59	426.00	421.75	421.00	294 SF
MBPP	MBR-5A	418.30	418.00	417.00	416.75	414.75	414.42	413.42	412.59	418.00	413.75	413.00	663 SF
LOT 11	MBR-6A	434.30	434.00	433.00	432.75	430.75	430.42	429.42	428.59	434.00	429.75	423.50	166 SF
LOT 10	MBR-7A	442.30	442.00	441.00	440.75	438.75	438.42	437.42	436.59	442.00	437.75	432.50	185 SF
MBPP	MBR-8A	418.30	418.00	417.00	416.75	414.75	414.42	413.42	412.59	418.00	413.75	413.00	1,028 SF

### MICRO-BIORETENTION FACILITY ELEVATIONS (M-6) (SEE SITE LAYOUT ON SHEET 22)

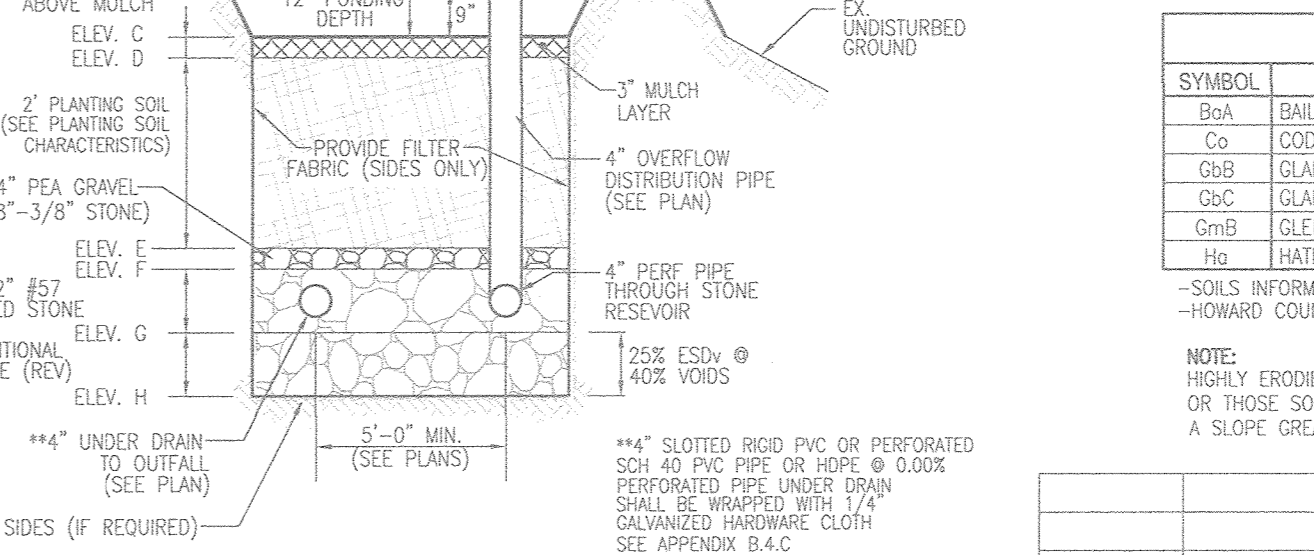
LOT #	FACILITY	A	B	C	D	E	F	G	H	NEW ELEV.	UNDERDRAIN INV.	OUTFALL INV.	FACILITY SIZE
LOT 14	MBR-9A	427.30	427.00	426.00	425.75	423.75	423.42	422.42	421.59	427.00	422.75	421.50	604 SF
LOT 12	MBR-9	428.30	428.00	427.00	426.75	424.75	424.42	423.42	422.59	428.00	423.75	423.00	514 SF
LOT 13	MBR-10	429.30	429.00	428.00	427.75	425.75	425.42	424.42	423.59	429.00	424.75	424.00	498 SF

### OPERATION AND MAINTENANCE SCHEDULE FOR (M-6) MICROBIORETENTION AREAS

1. ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOL. 1, TABLE A.4.1 AND 2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.

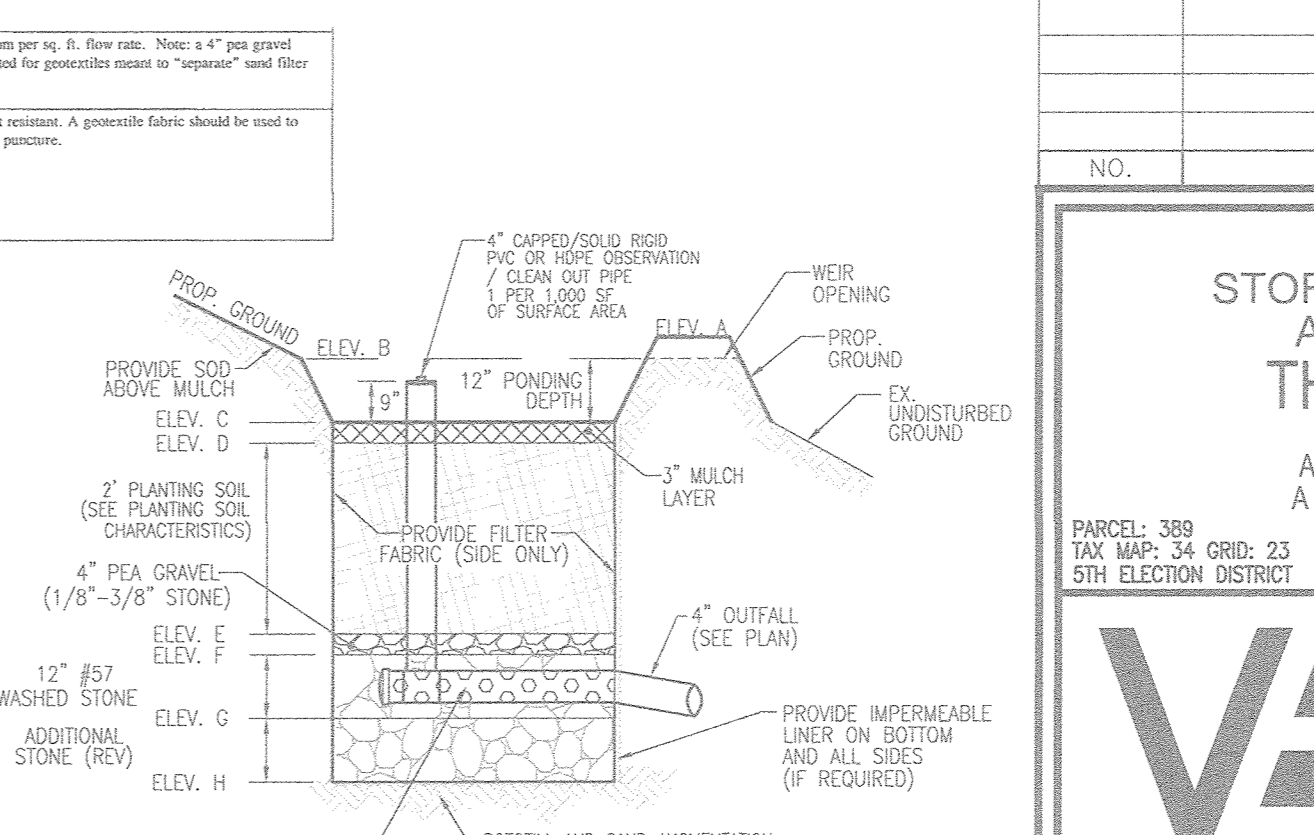
2. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.

3. A SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.



### IMPERVIOUS LINER SPECIFICATIONS

geotextile fabric (if required)	ASTM D-4853 (greater strength: 155 lb.) ASTM D-4632 (Tensile Strength: 300 lb.)	6.00" thick equivalent opening size of 90 sieve	Must maintain 120 gsm per sq. ft. flow rate. Note: a 4" pea gravel layer may be substituted for geotextile fabric to support and filter layers.
impermeable liner (if required)	ASTM D-4853 (thickness) ASTM D-4853 (tensile strength: 1,000 lb., elongation 20%) ASTM D-494 (tensile strength: 150 lb./sq. ft.) ASTM D-471 (water absorption: < 0.25 mm)	30 mil thickness	Line to be ultrasonically inspected. A geotextile fabric should be used to protect the liner from puncture.



### MICRO-BIORETENTION FACILITY ELEVATIONS (M-6) (SEE SITE LAYOUT THIS SHEET)

LOT #	FACILITY	A	B	C	D	E	F	G	H	NEW ELEV.	UNDERDRAIN INV.	OUTFALL INV.	FACILITY SIZE
MBPP	MBR-5B	422.30	422.00	421.00	420.75	418.75	418.42	417.42	416.59	422.00	417.75	417.00	1,025 SF
LOT 8	MBR-13A	444.30	444.00	443.00	442.75	440.75	440.42	439.42	438.59	444.00	439.75	431.50	458 SF
LOT 6	MBR-13B	434.30	434.00	433.00	432.75	430.75	430.42	429.42	428.59	434.00	429.75	429.00	578 SF
LOT 4	MBR-13C	424.30	424.00	423.00	422.75	420.75	420.42	419.42	418.59	424.00	419.75	419.00	565 SF
LOT 9	MBR-14A	424.30	424.00	423.00	422.75	420.75	420.42	419.42	418.59	424.00	419.75	419.00	498 SF

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12.2.18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

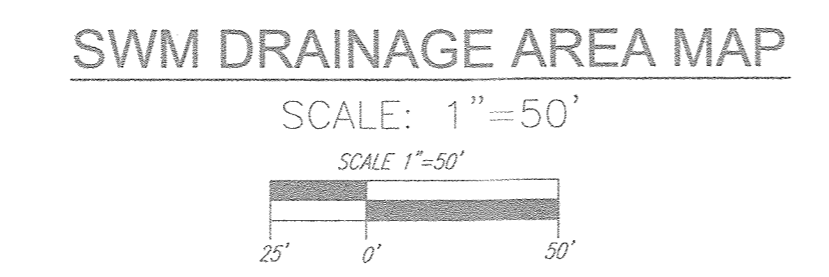
[Signature] 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

### MICROBIORETENTION NOTES:

1. ONLY THE SIDES OF MICROBIORETENTION ARE TO BE WRAPPED IN FILTER FABRIC. FILTER FABRIC BETWEEN LAYER OR AT THE BOTTOM OF THE MICROBIORETENTION WILL CAUSE THE MBR TO FAIL, AND THEREFORE SHALL NOT BE INSTALLED.

2. WHEN THE PERFORATED MBR UNDERDRAIN PIPE WITH 1/4" MESH (#4) OR SMALLER GALVANIZED HARDWARE CLOTH.

3. PROVIDE 5" MINIMUM SPACING BETWEEN UNDER DRAIN AND PERFORATED PIPE THROUGH STORM RESERVOIR OR SPACE PIPE EQUALLY ACROSS BOTTOM FOR SMALL BAYS. (SEE PLANS)



### FINAL ROAD CONSTRUCTION PLAN

## STORMWATER MANAGEMENT DRAINAGE AREA MAP, NOTES, AND DETAILS

# THE ESTATES AT RIVER HILL

LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A', AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H' A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L 4772 / F. 285  
 HOWARD COUNTY, MARYLAND

## ROBERT H. VOGEL ENGINEERING, INC.

ENGINEERS • SURVEYORS • PLANNERS

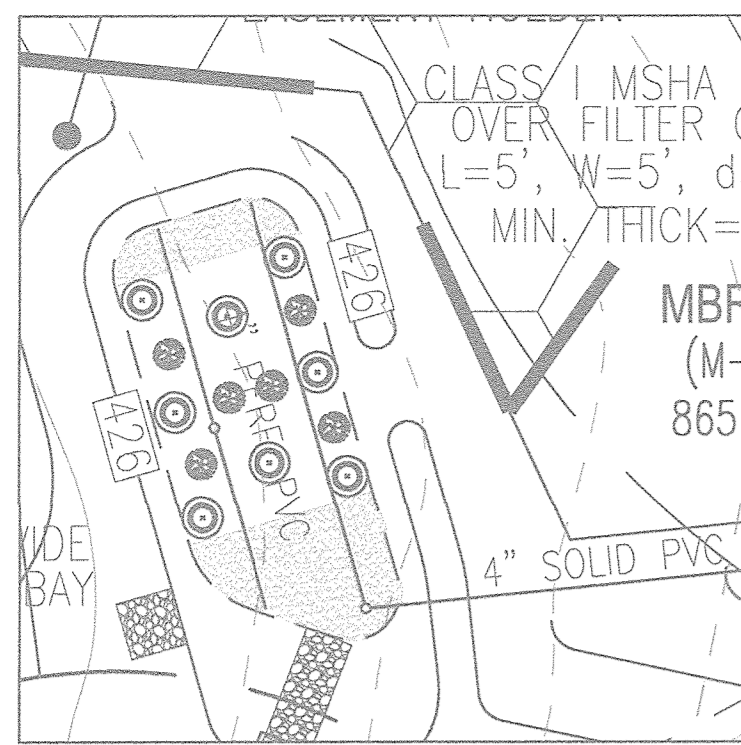
3300 N. RIDGE ROAD, SUITE 110  
 ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666  
 FAX: 410.461.8961

DESIGN BY: RHV  
 DRAWN BY: JMR  
 CHECKED BY: RHV  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

PROFESSIONAL CERTIFICATE  
 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: 08-27-2020

11/21/18  
 R. H. VOGEL, PE No. 16193

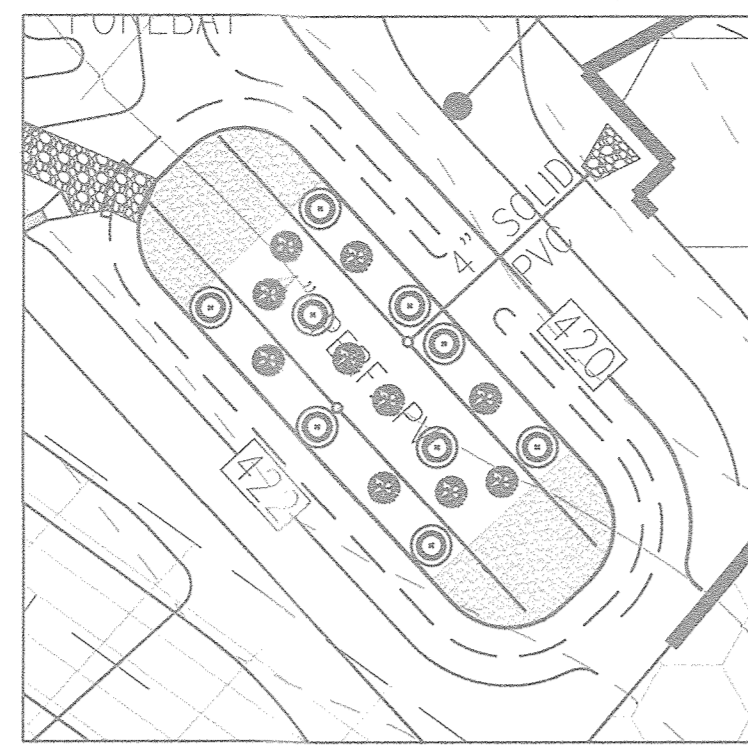
23 SHEET OF 30



MBR-1A PLANTING DETAIL (865 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
8	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
6	ILEX GLABRA INKBERRY	3 GALLON	CONT
300 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

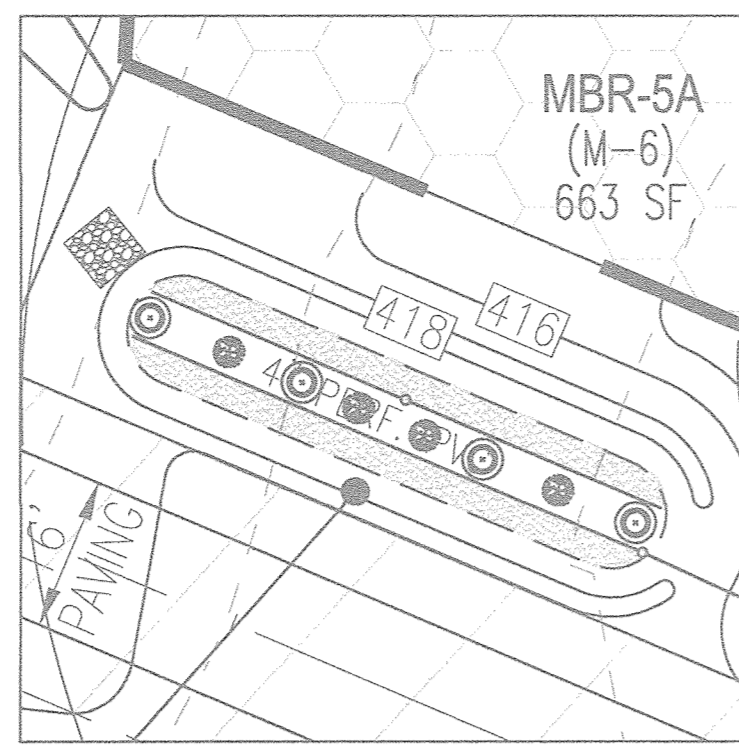
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 20
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-1B PLANTING DETAIL (1,165 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
9	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
4	ILEX GLABRA INKBERRY	3 GALLON	CONT
400 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

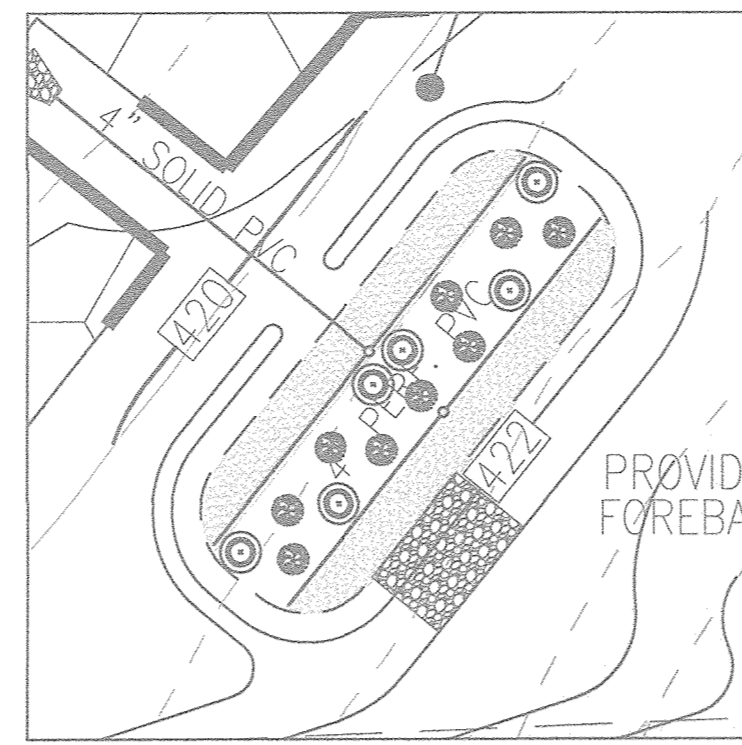
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 27
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-5A PLANTING DETAIL (663 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
4	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
4	ILEX GLABRA INKBERRY	3 GALLON	CONT
350 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

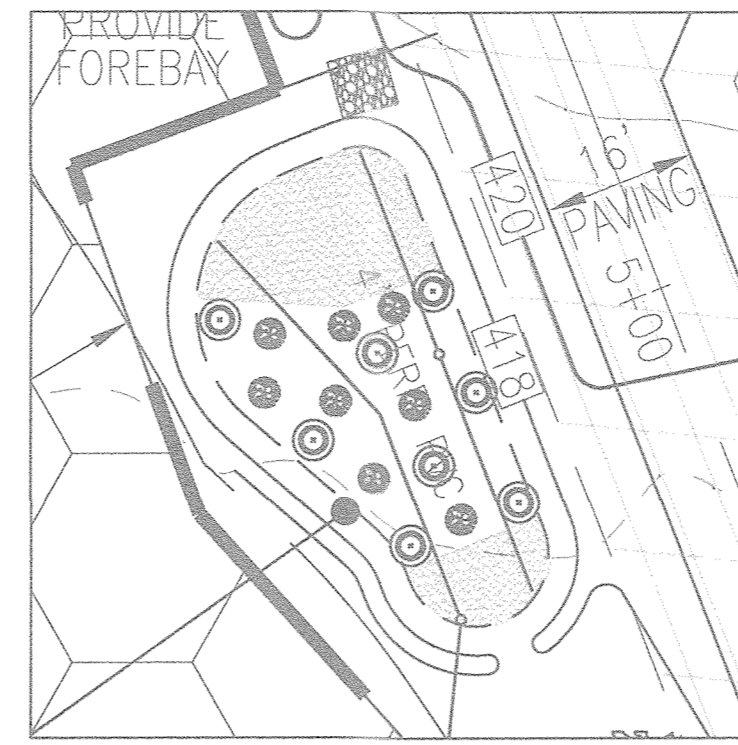
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 15
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-5B PLANTING DETAIL (1,025 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
6	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
9	ILEX GLABRA INKBERRY	3 GALLON	CONT
500 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

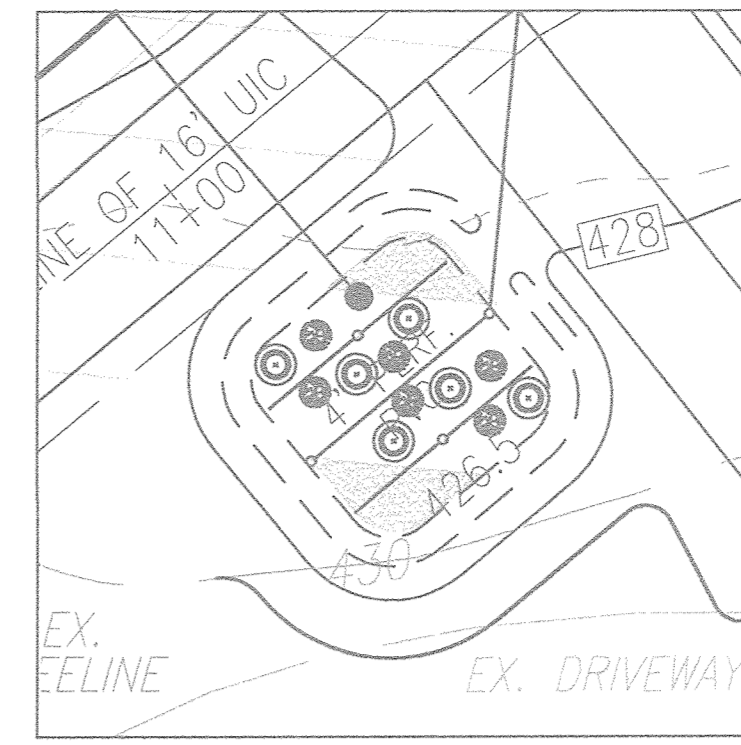
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 23
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-8A PLANTING DETAIL (1,028 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
8	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
9	ILEX GLABRA INKBERRY	3 GALLON	CONT
400 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

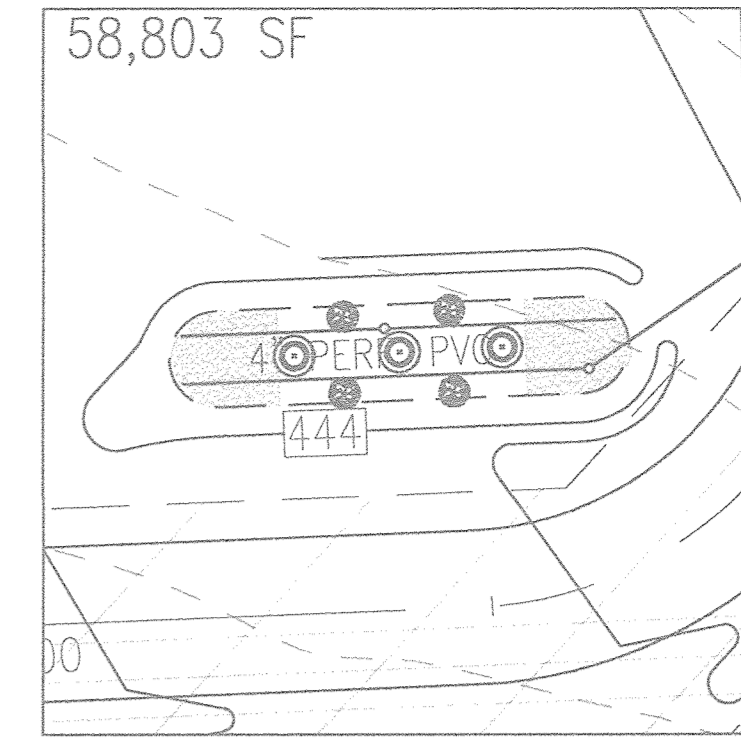
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 24
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-8B PLANTING DETAIL (604 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
6	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
6	ILEX GLABRA INKBERRY	3 GALLON	CONT
150 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

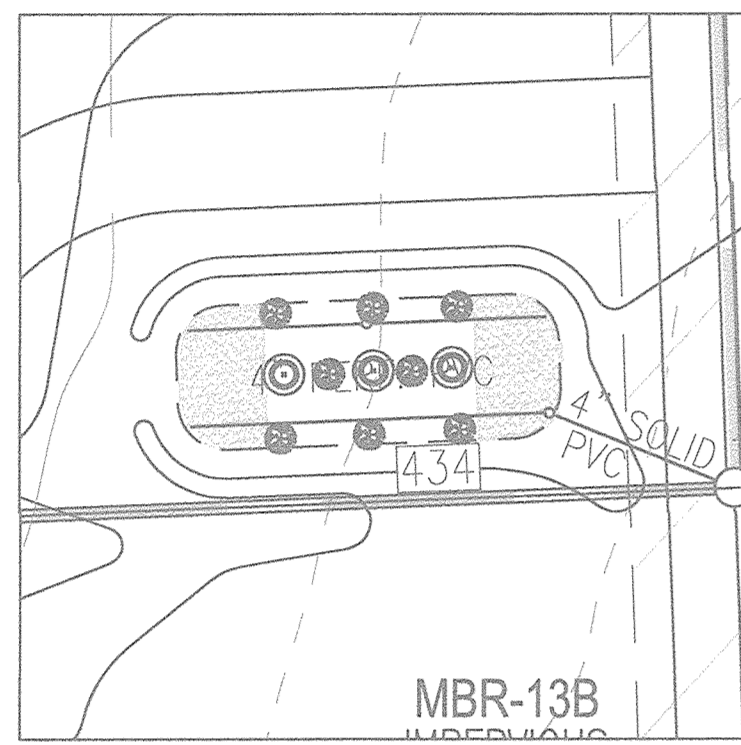
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 14
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-13A PLANTING DETAIL (458 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
3	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
4	ILEX GLABRA INKBERRY	3 GALLON	CONT
200 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

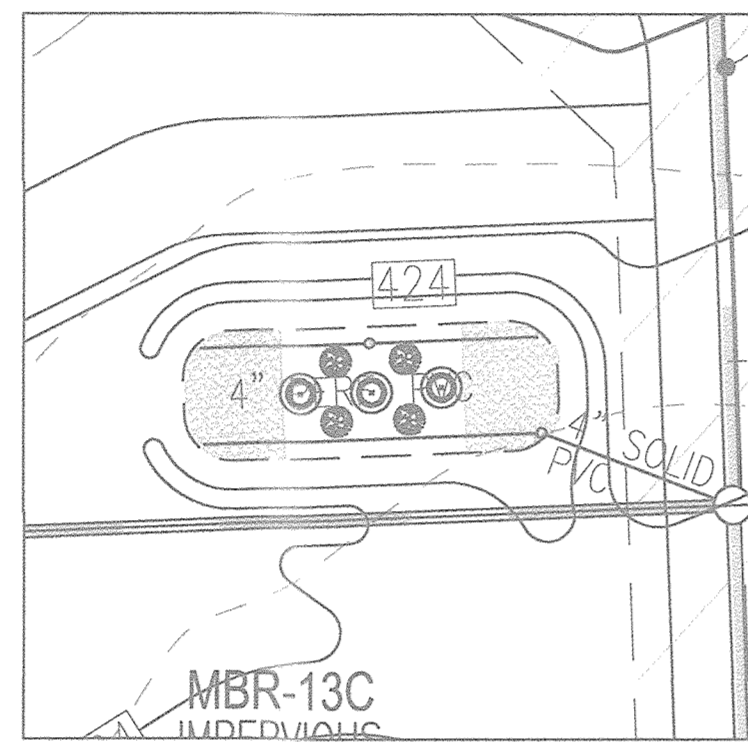
- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 19
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-13B PLANTING DETAIL (578 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
3	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
8	ILEX GLABRA INKBERRY	3 GALLON	CONT
250 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 13
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT



MBR-13C PLANTING DETAIL (505 SF)  
SCALE: 1"=20'

QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
3	LINDERA BENZOIN SPICEBUSH	3 GALLON	CONT
4	ILEX GLABRA INKBERRY	3 GALLON	CONT
250 SF	LOBELIA CARDINALIS CARDINAL FLOWER	2" POT	1" O.C.

- 1 SF x 0.0229 STEMS PER SQUARE FOOT = PLANTS REQUIRED
- 2 PLANTINGS REQUIRED: 12
- 3 (50 SF) CARDINAL FLOWER = 1 PLANTING UNIT

Table A.4 Commonly Used Species for Bioretention Areas

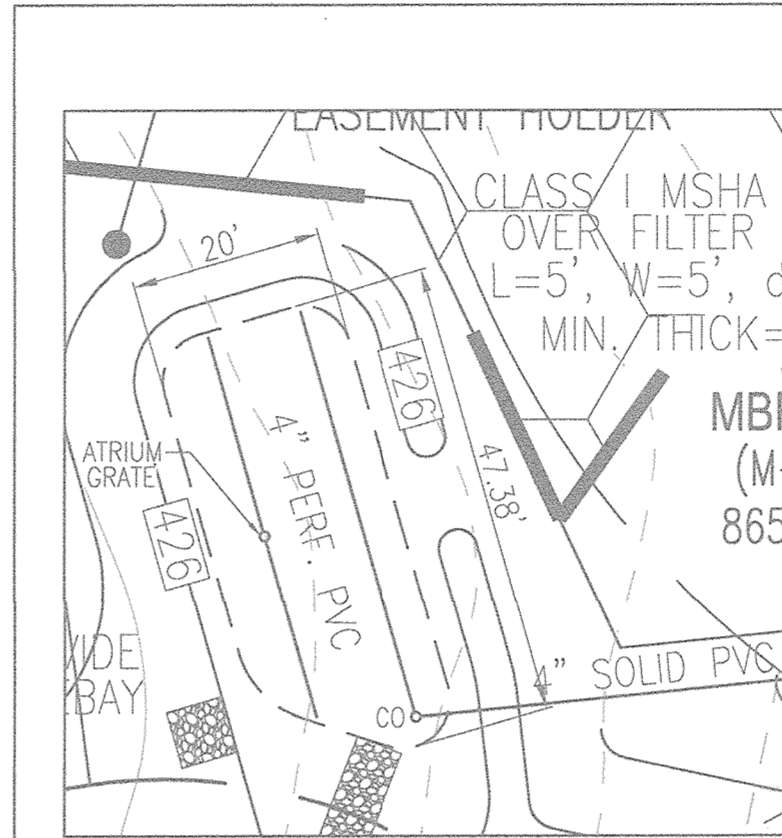
Trees	Shrubs	Herbaceous Species
<i>Acer rubrum</i>	<i>Aesculus parviflora</i>	<i>Andropogon virginicus</i>
Red Maple	Butterfly Buckeye	Broomsedge
<i>Betula nigra</i>	<i>Cephalanthus occidentalis</i>	<i>Eupatorium purpurea</i>
River Birch	Butterbush	Joe Pye Weed
<i>Juniperus virginiana</i>	<i>Hamamelis virginiana</i>	<i>Scirpus pungens</i>
Eastern Red Cedar	Witch Hazel	Three Square Bulrush
<i>Chionanthus virginicus</i>	<i>Vaccinium corymbosum</i>	<i>Iris versicolor</i>
Fringe-tree	Highbush Blueberry	Blue Flag
<i>Nyssa sylvatica</i>	<i>Ilex glabra</i>	<i>Labelia cardinalis</i>
Black Gum	Inkberry	Cardinal Flower
<i>Diospyros virginiana</i>	<i>Ilex verticillata</i>	<i>Panicum virgatum</i>
Persimmon	Winterberry	Switchgrass
<i>Platanus occidentalis</i>	<i>Viburnum dentatum</i>	<i>Dichanthelium scoparium</i>
Sycamore	Arrowwood	Broom Panic Grass
<i>Quercus palustris</i>	<i>Lindera benzoin</i>	<i>Rudbeckia laciniata</i>
Pin Oak	Spicebush	Tall Coneflower
<i>Quercus phellos</i>	<i>Myrica pennsylvanica</i>	<i>Scirpus coprinus</i>
Willow Oak	Bayberry	Woolgrass
<i>Salix nigra</i>		<i>Vernonia noveboracensis</i>
Black willow		New York Ironweed

Note 1: For more options on plant selection for bioretention, consult Bioretention Manual (ETAB, 1993) or the Design of Stormwater Filtering Systems (Clayton and Schueler, 1997).

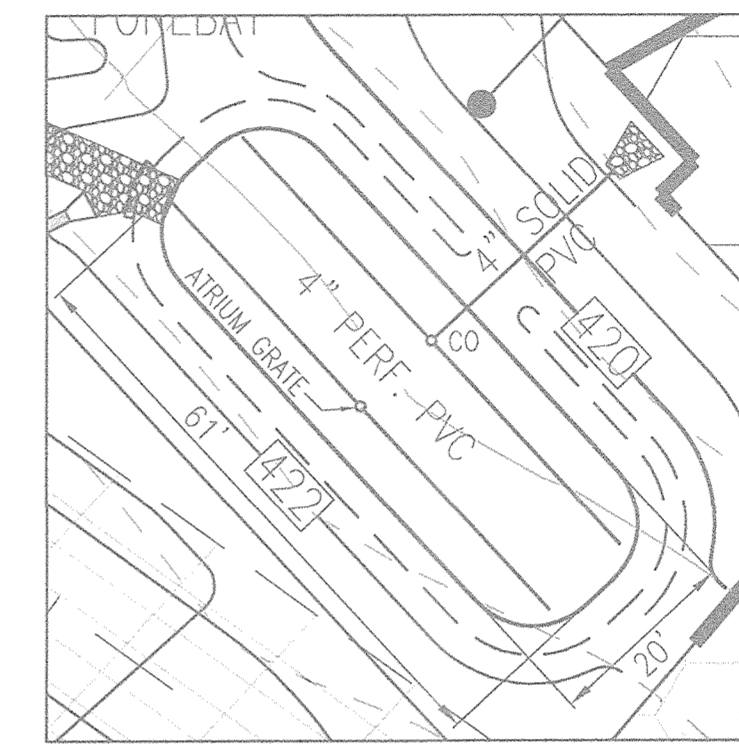
"MICRO-BIORETENTION" PLANTING SCHEDULE NOTES:

1. ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HOWARD COUNTY PLANTING SPECIFICATIONS.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
3. FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
4. CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.
5. MICROBIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT). ABOVE PLANTING RATIOS ARE TO BE APPLIED TO THE AREAS PROVIDED IN THE ESDV SUMMARY.
6. FILTER AREA SHALL BE 50% COVERED BY PLANTINGS AT FULL GROWTH.

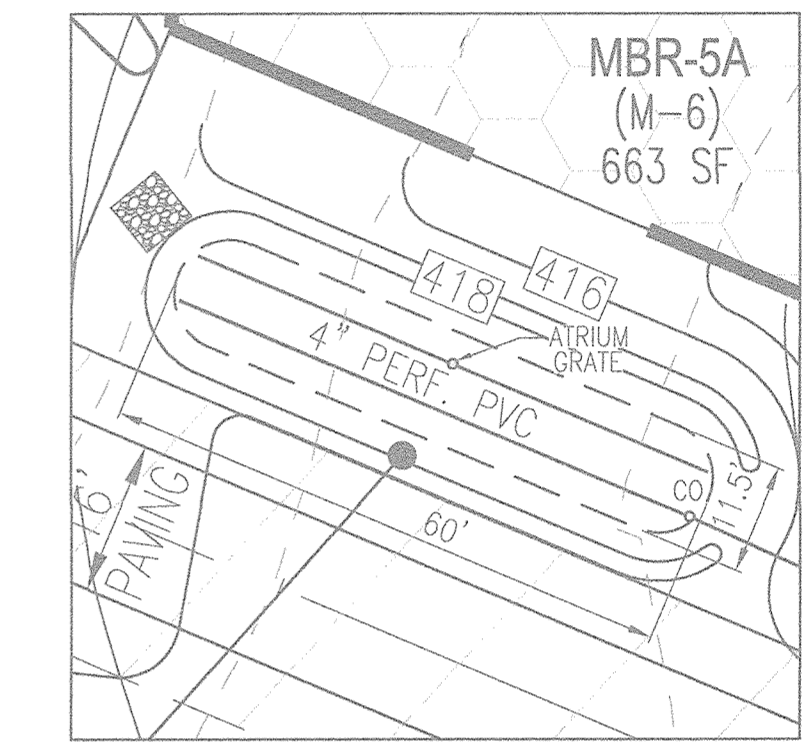
1. TABLE A.4 IS TAKEN FROM THE "2000 MARYLAND STORMWATER MANUAL, VOLUME II - APPENDIX A."
2. CONTRACTOR SHALL BE FAMILIAR WITH APPENDIX B.4.C "CONSTRUCTION SPECIFICATIONS" AND TABLE B.4.1 "MATERIAL SPECIFICATIONS". IN ADDITION, THE "2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II - APPENDIX A, OFFERS ADDITIONAL HELPFUL INFORMATION."
3. NO TREES SHALL BE PLANTED WITHIN A MICRO-BIORETENTION FACILITY. USE ONLY SHRUB OR HERBACEOUS SPECIES.
4. ABOVE TABLE A.4 IS FOR INFORMATIONAL PURPOSES ONLY. LANDSCAPE CONTRACTOR SHALL INSTALL PLANTINGS SPECIFIED IN THE PLANTING SCHEDULES SHOWN HEREON. CHOOSE FROM THE ABOVE TABLE OR USE APPROVED EQUAL SPECIES WHICH ARE TOLERANT TO FLUCTUATING WATER LEVELS. IF SUBSTITUTIONS ARE CHOSEN, APPROVAL FROM THE ENGINEER IS REQUIRED.
5. PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THIS FINAL PLAN.



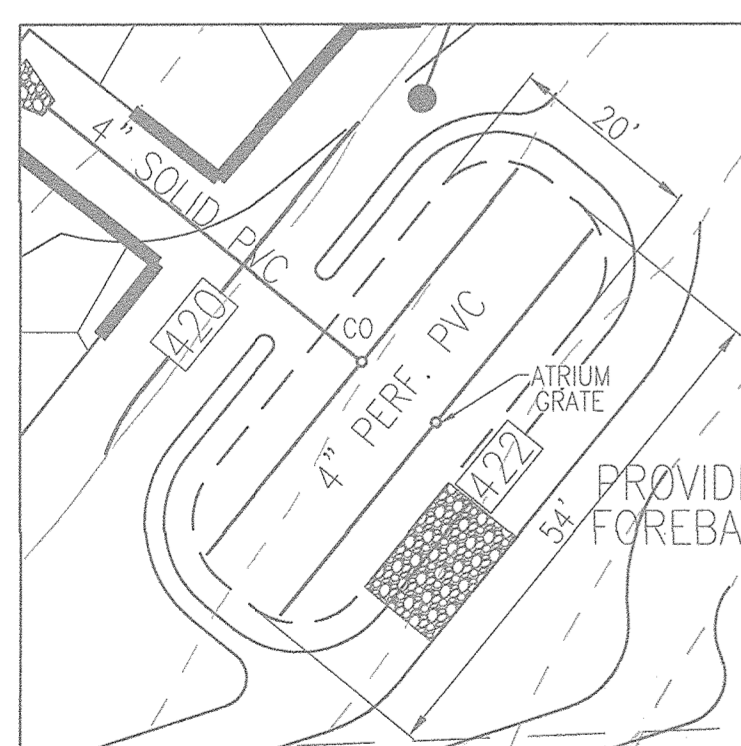
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SCALE: 1"=20'



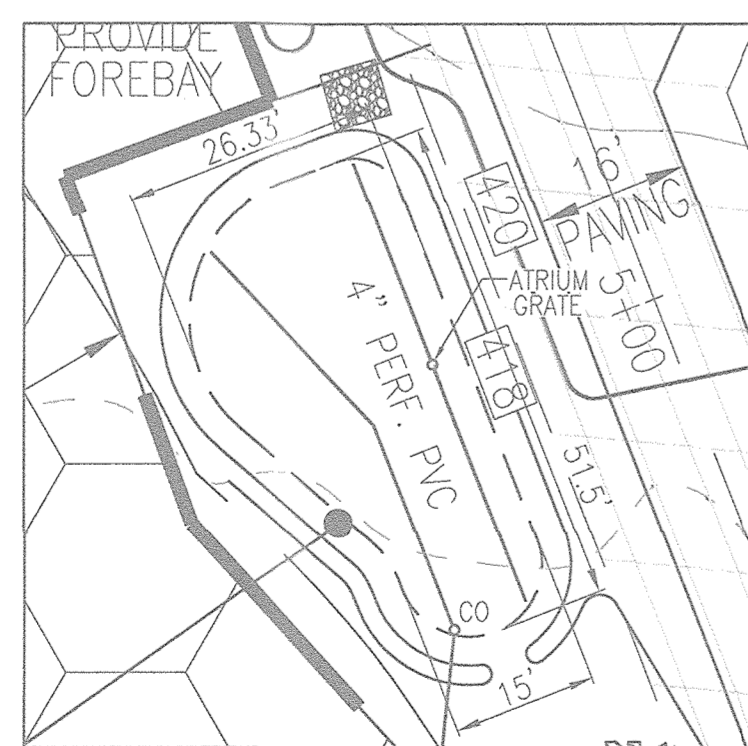
MBR-1B DESIGN DETAIL (1,165 SF)  
SCALE: 1"=20'



MBR-5A DESIGN DETAIL (663 SF)  
SCALE: 1"=20'



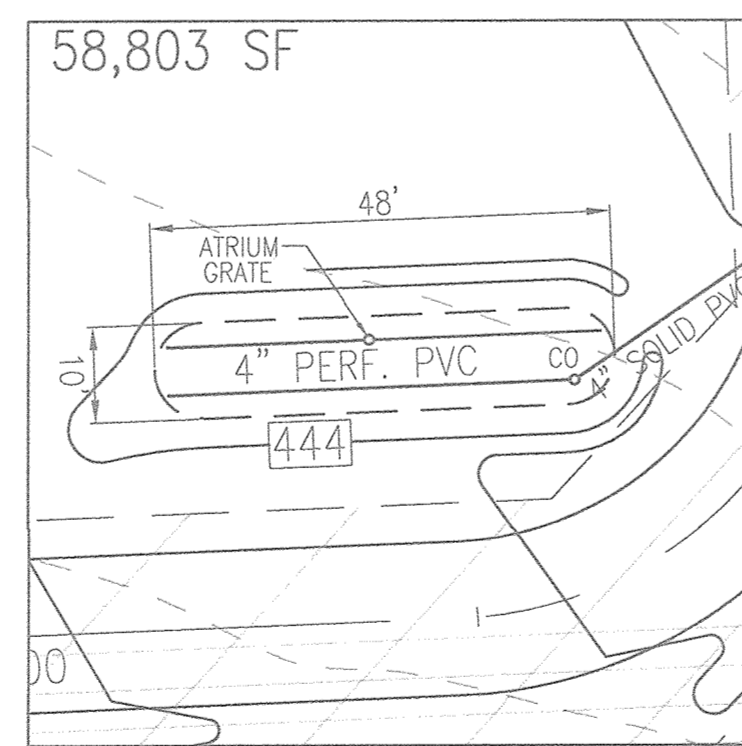
MBR-5B DESIGN DETAIL (1,025 SF)  
SCALE: 1"=20'



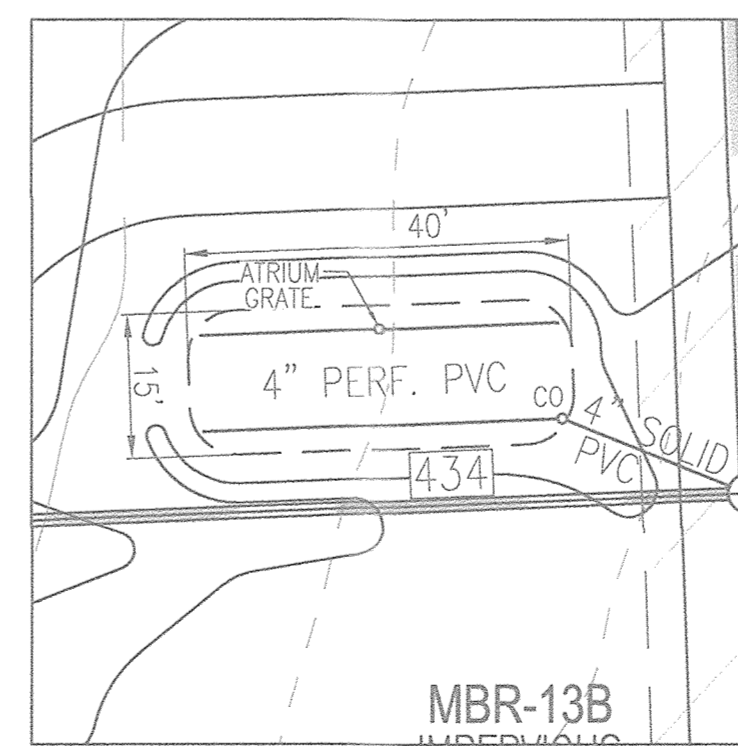
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SCALE: 1"=20'



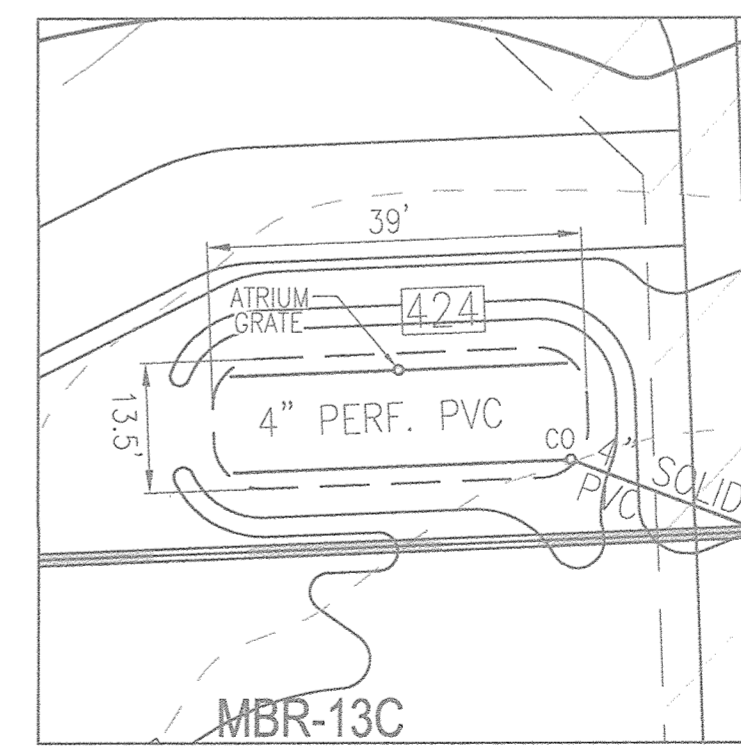
MBR-8B DESIGN DETAIL (604 SF)  
SCALE: 1"=20'



MBR-13A DESIGN DETAIL (458 SF)  
SCALE: 1"=20'



MBR-13B DESIGN DETAIL (578 SF)  
SCALE: 1"=20'

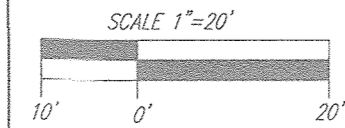


MBR-13C DESIGN DETAIL (505 SF)  
SCALE: 1"=20'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/27/2018  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 1/10/19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE



NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 MBR DESIGN AND PLANTING DETAILS  
 THE ESTATES AT RIVER HILL  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B'-'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L 4772 / F 265  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110 TEL: 410.461.7666  
 ELLICOTT CITY, MD 21043 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE  
 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. 18183 EXPIRATION DATE: 09-27-2020

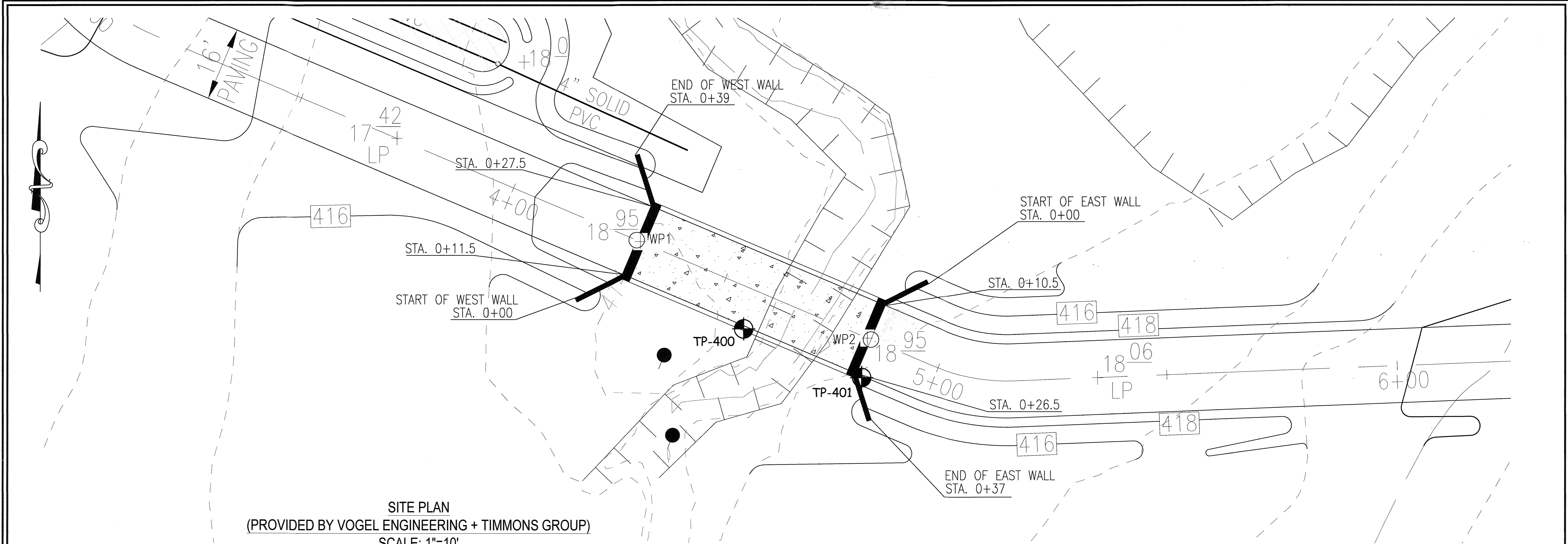
DESIGN BY: RHY  
 DRAWN BY: JMR  
 CHECKED BY: RHY  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

OWNER: ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

DEVELOPER: TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

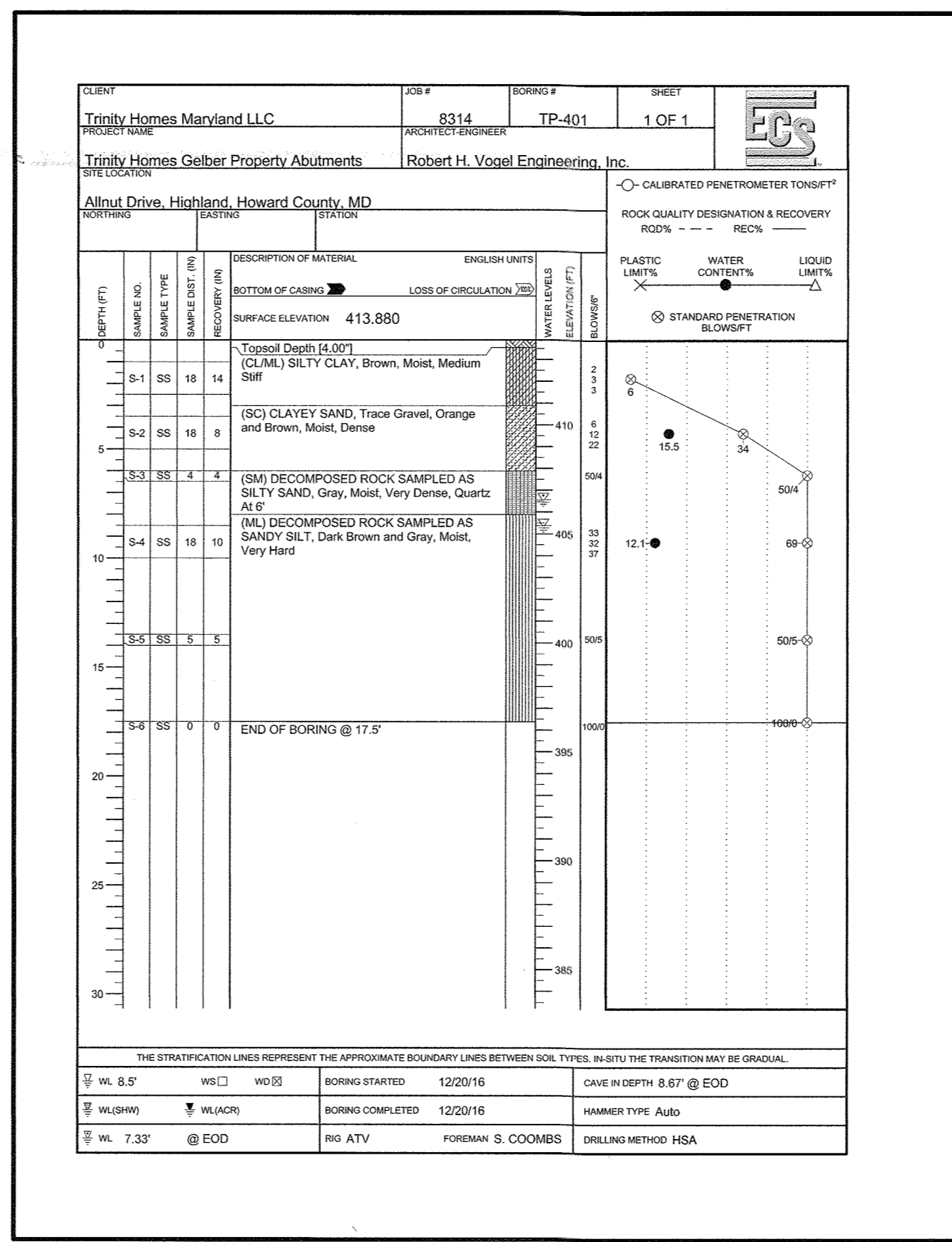
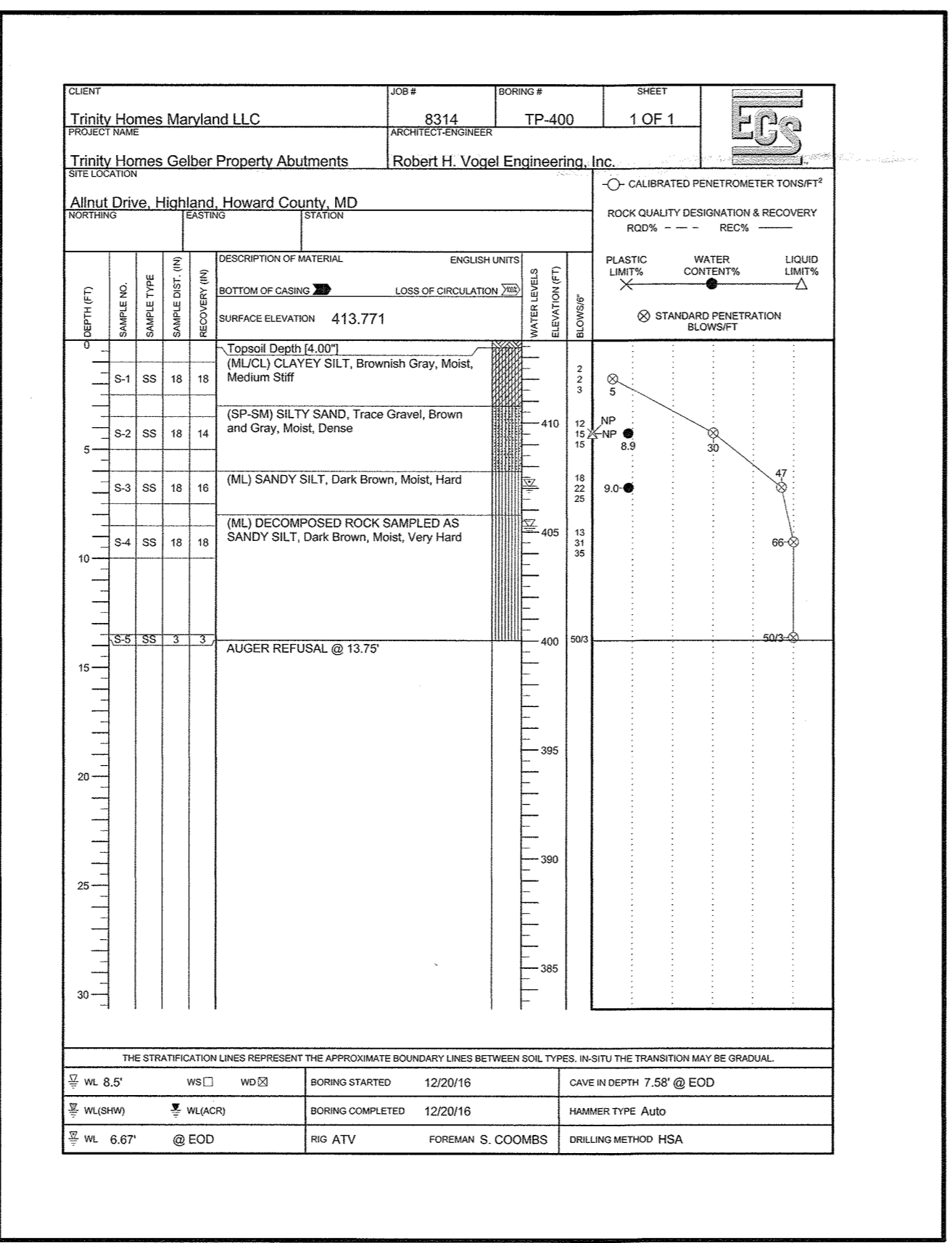
24 OF 30





**SITE PLAN**  
 (PROVIDED BY VOGEL ENGINEERING + TIMMONS GROUP)  
 SCALE: 1"=10'

WORKING POINTS SCHEDULE			
POINT NO.	ROAD STA.	NORTHING	EASTING
WP1	4+29.00	556877.79	1323680.17
WP2	4+84.21	556856.29	1323731.02



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Chad Adams*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION 4  
 DATE: 12-2-18  
*Ventura D. ...*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19  
 DIRECTOR: *2/18*

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFALL, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

**FINAL ROAD CONSTRUCTION PLAN**  
**VEHICULAR BRIDGE - GENERAL PLAN**  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L. 4772 / F. 285  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**ECS**

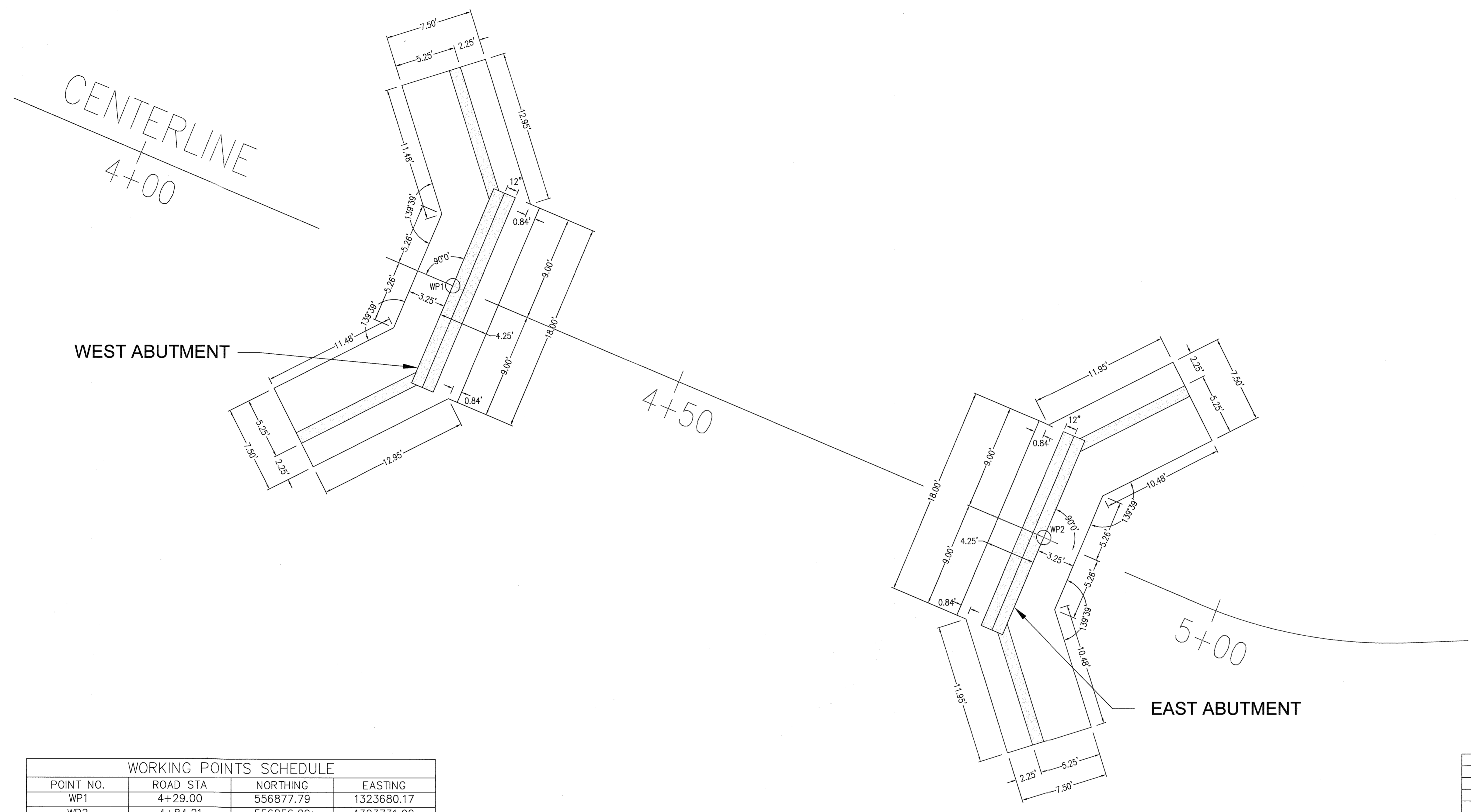
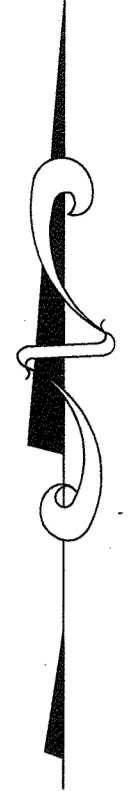
1340 CHARWOOD ROAD  
 SUITE B  
 HANOVER, MARYLAND 21076  
 PHONE: (410) 859-4300  
 FAX: (410) 859-4324

**PROFESSIONAL CERTIFICATE**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS  
 WERE PREPARED OR APPROVED BY ME AND  
 THAT I AM A FULLY LICENSED PROFESSIONAL  
 ENGINEER UNDER THE LAWS OF THE STATE  
 OF MARYLAND, LICENSE NO. 29553  
 EXPIRATION DATE: 12-31-2019

DESIGN BY: \_\_\_\_\_ DMA  
 DRAWN BY: \_\_\_\_\_ DMA  
 CHECKED BY: \_\_\_\_\_ HMA  
 DATE: \_\_\_\_\_ NOVEMBER 2018  
 SCALE: \_\_\_\_\_ AS SHOWN  
 W.O. NO.: \_\_\_\_\_ 8314

25 SHEET OF 30

HASAN M. ABOUMATAR, P.E.



WORKING POINTS SCHEDULE			
POINT NO.	ROAD STA	NORTHING	EASTING
WP1	4+29.00	556877.79	1323680.17
WP2	4+84.21	556856.29	1323731.02

GEOMETRIC FOOTING LAYOUT  
SCALE: 1"=5'

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
**VEHICULAR BRIDGE - GEOMETRIC LAYOUT**  
 THE ESTATES AT RIVER HILL  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
 A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389 ZONED: RR-DEO  
 TAX MAP: 34 GRID: 23 L: 4772 / F: 265  
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**EGS**  
 1340 CHARWOOD ROAD  
 SUITE B  
 HANOVER, MARYLAND 21076  
 PHONE: (410) 859-4300  
 FAX: (410) 859-4324

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 12.2.18  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 1-10-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*[Signature]*  
 DIRECTOR DATE

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
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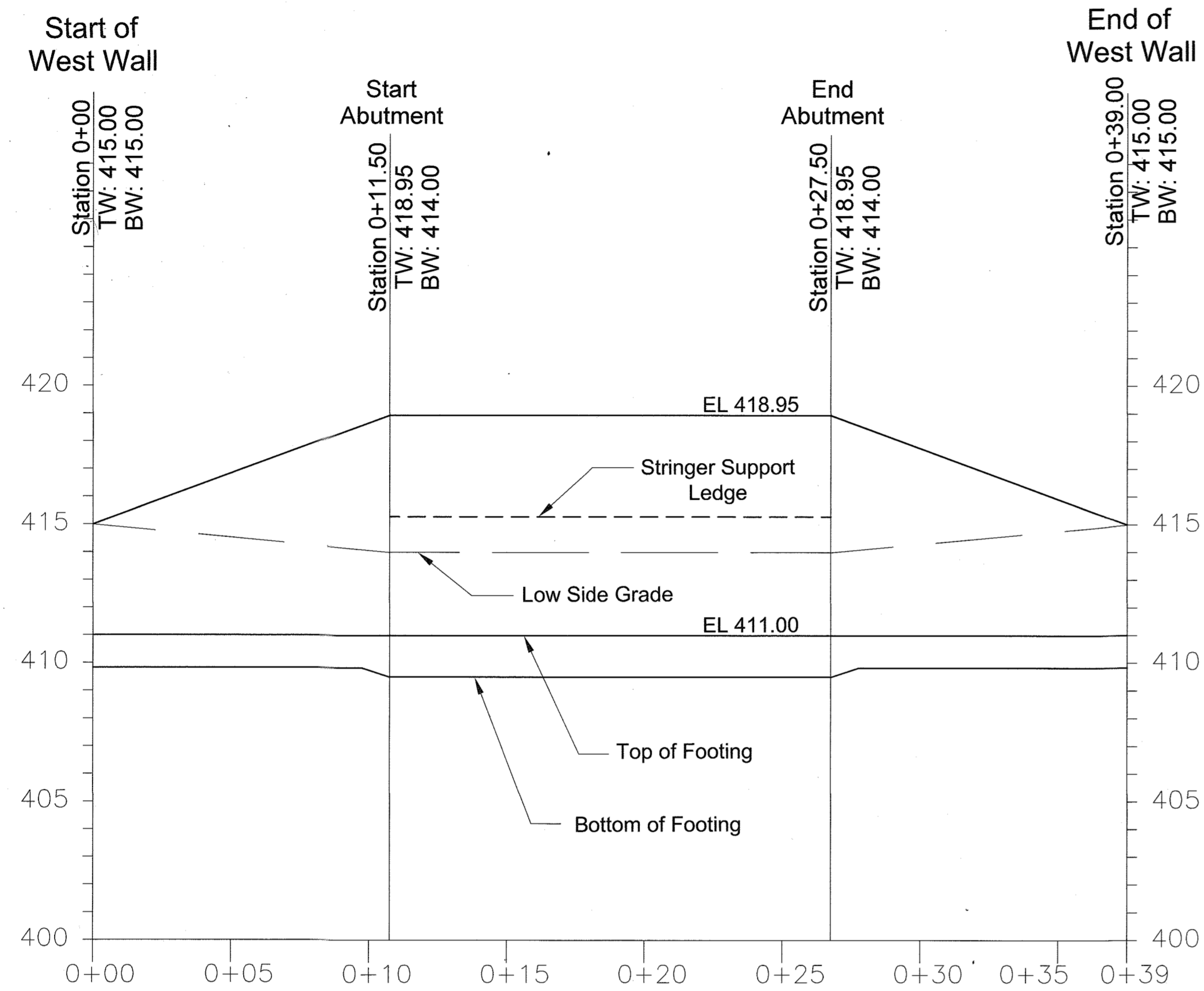
DESIGN BY: DMA  
 DRAWN BY: DMA  
 CHECKED BY: HMA  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 8314

PROFESSIONAL CERTIFICATE

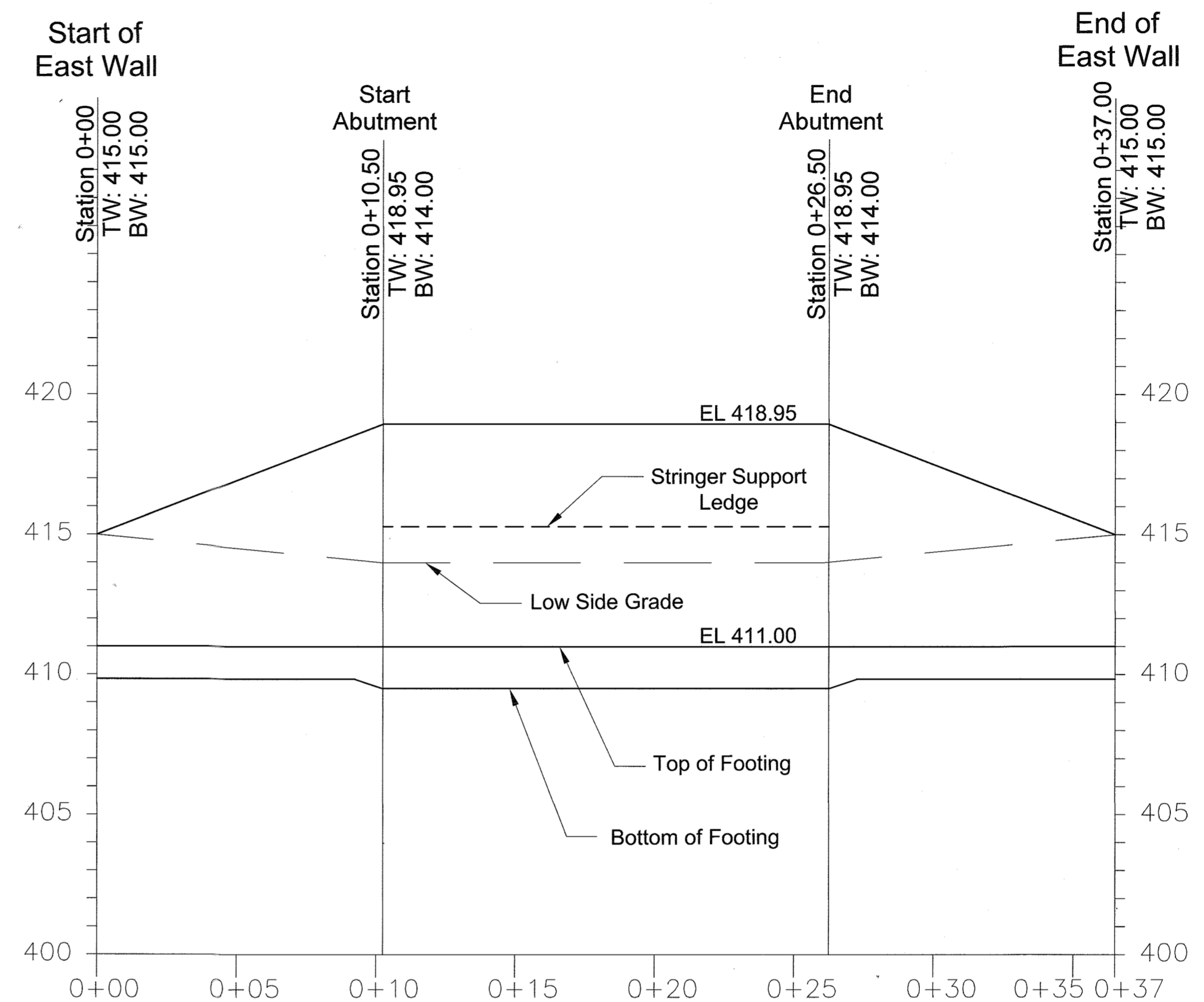
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 29553, EXPIRATION DATE: 12-31-2018.

*[Signature]*  
 HASAN M. ABOUMATAR, P.E.

26 SHEET OF 30



**WEST WALL PROFILE**  
SCALE: 1"=4'

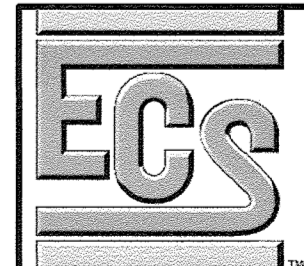


**EAST WALL PROFILE**  
SCALE: 1"=4'

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**VEHICULAR BRIDGE - PROFILES**  
**THE ESTATES AT RIVER HILL**  
LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
A RE-SUBDIVISION OF THE "GREENE PROPERTY", LOT 1

PARCEL: 389      TAX MAP: 34 GRID: 23      5TH ELECTION DISTRICT      ZONED: RR-DEO L 4772 / F. 368      HOWARD COUNTY, MARYLAND



1340 CHARWOOD ROAD  
SUITE B  
HANOVER, MARYLAND 21076  
PHONE: (410) 859-4300  
FAX: (410) 859-4324

**PROFESSIONAL CERTIFICATE**

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DESIGN BY: \_\_\_\_\_ DMA  
DRAWN BY: \_\_\_\_\_ DMA  
CHECKED BY: \_\_\_\_\_ HMA  
DATE: \_\_\_\_\_ NOVEMBER 2018  
SCALE: \_\_\_\_\_ AS SHOWN  
W.O. NO.: \_\_\_\_\_ 8314

HASAN M. ABOUMATAR, P.E.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

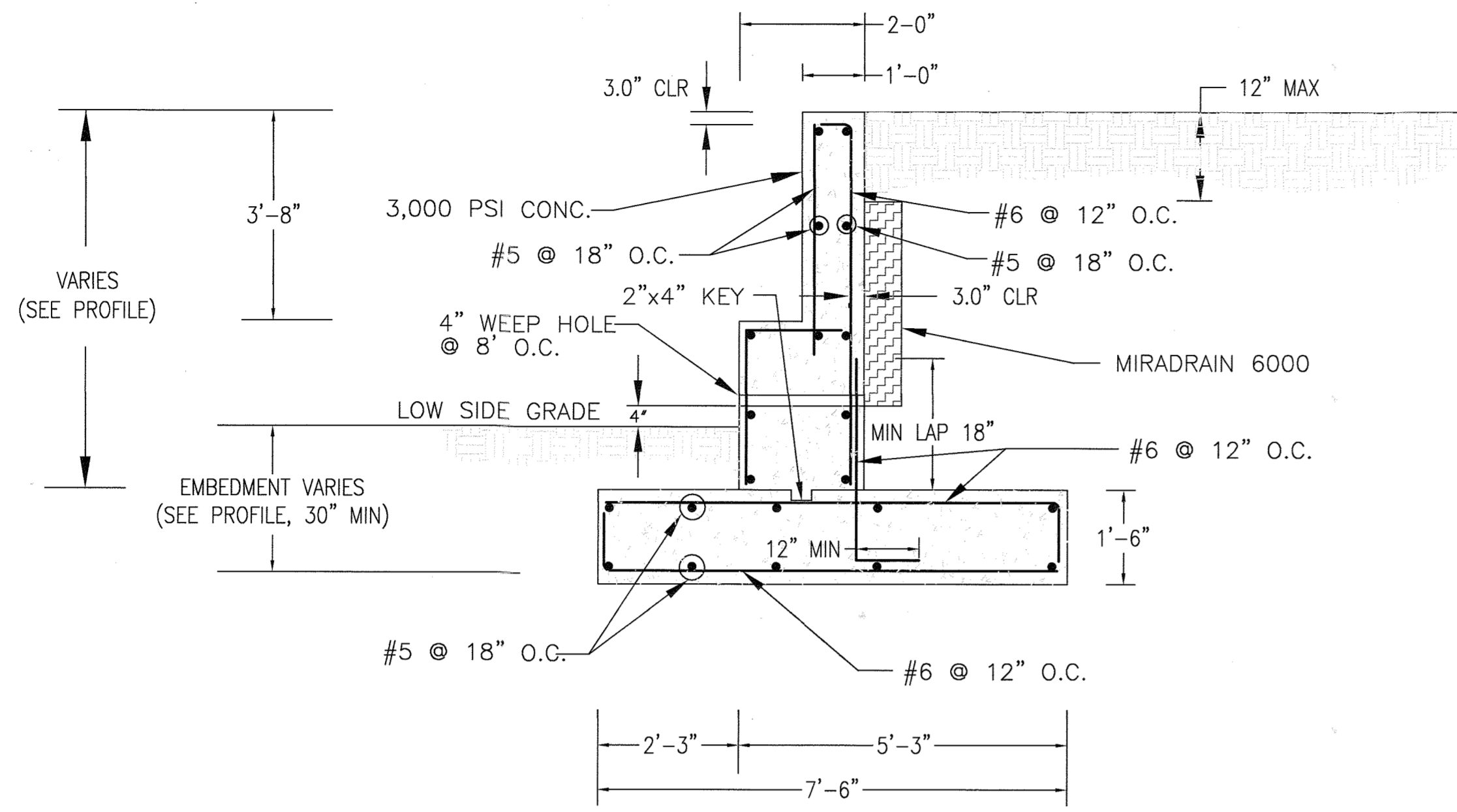
*[Signature]*      12-2-18  
CHIEF, DEVELOPMENT ENGINEERING DIVISION      DATE

*[Signature]*      1-10-19  
CHIEF, DIVISION OF LAND DEVELOPMENT      DATE

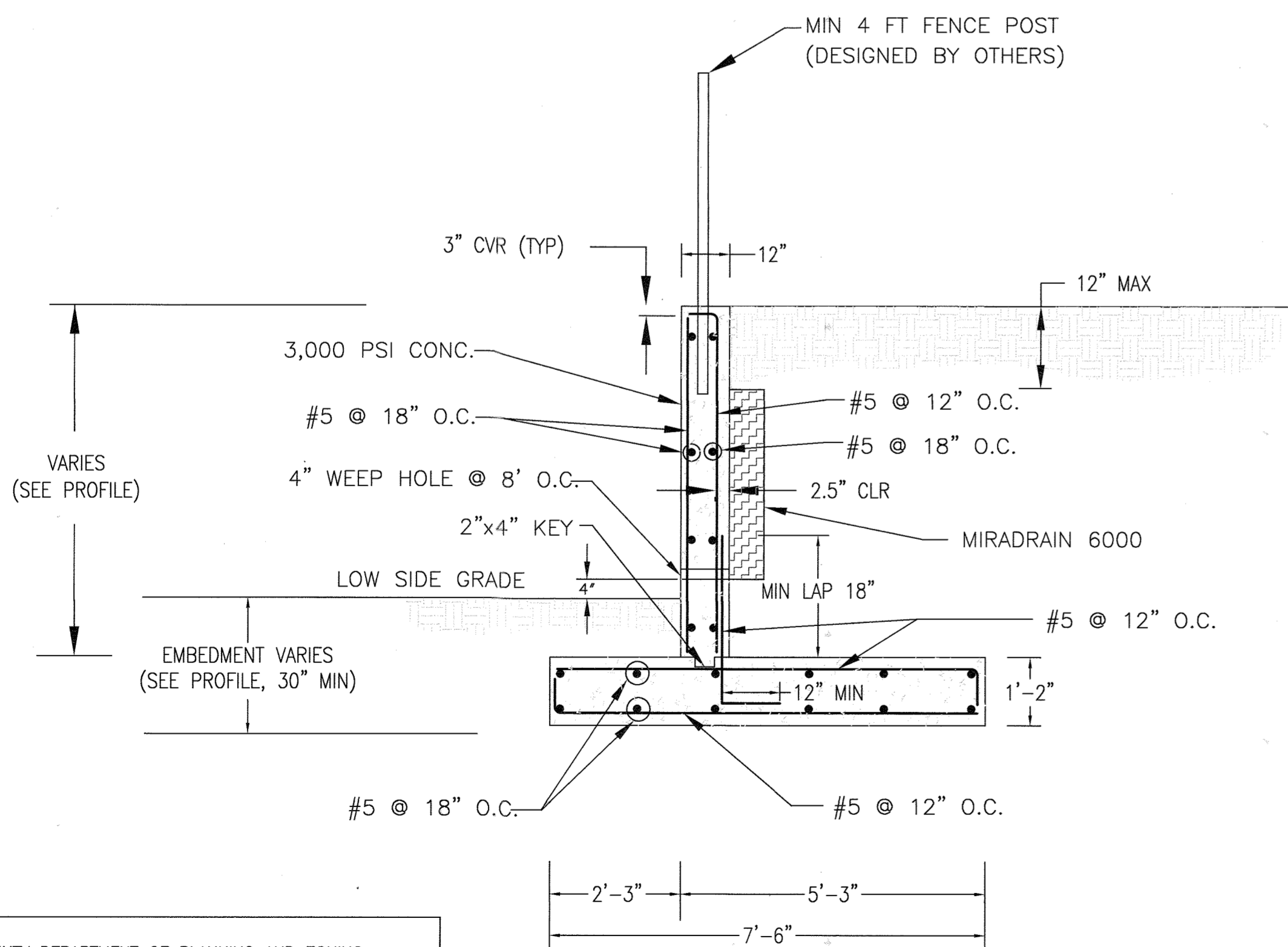
*[Signature]*      N/A      DATE

**OWNER**  
ESTATES AT RIVER HILL, LLC  
MICHAEL PFAU, MEMBER  
3675 PARK AVE., SUITE 301  
ELLCOTT CITY, MD 21043  
(410) 480-0023

**DEVELOPER**  
TRINITY HOMES MARYLAND, LLC  
3675 PARK AVE., SUITE 301  
ELLCOTT CITY, MD 21043  
(410) 480-0023



TYPICAL ABUTMENT DETAIL  
(NOT TO SCALE)



TYPICAL WINGWALL DETAIL  
(NOT TO SCALE)

Abutment and Wing Wall Specifications and Guidelines

Part 1: General

1.01 Description

- A. Abutment and wing walls must be constructed under the supervision of a Maryland Registered Professional Engineer.
- B. Work includes preparation of foundation soils, furnishing all materials, and installing all materials to the lines and grades shown on the construction drawings.

1.02 Codes and Standards

- A. International Building Code - 2015, International Code Council, Inc.
- B. ACI Manual of Concrete Practice - Parts 1 Through 5 - 2001
- C. Manual of Standard Practice - Concrete Steel Reinforcing Institute
- D. American Society for Testing and Materials

1.03 Damage, Storage, and Handling

- A. The Contractor shall check the materials upon delivery to assure that the proper materials have been received.
- B. The Contractor shall properly handle and store the materials to prevent damage to the materials. Damaged materials shall not be incorporated into the wall.

1.04 Quality Assurance

- A. The Owner shall engage a qualified testing agency to provide observation and testing services as described below.
- B. Concrete Placement
  - 1. The agency shall inspect the formwork and reinforcing steel placement for compliance with the contract documents. Reinforcing steel should be inspected for correct size, quantity, and spacing.
  - 2. Fresh concrete shall be sampled in accordance with ASTM C 172, and tested for slump, air entrainment, and temperature.
  - 3. Test cylinders shall be molded in accordance with ASTM C 31. Four test cylinders shall be molded for each day's pour, or for every 50 cubic yards of concrete placed, whichever is greater.
- C. Fill Placement
  - 1. All soil fills shall be tested in accordance with ASTM D 2922.
  - 2. A minimum of one compaction test per lift should be made per 2,500 square feet of fill lift area, but not fewer than two tests per lift should be made.
  - 3. The elevations and locations of the field density tests should be clearly identified at the time of fill placement and compaction.

Part 2: Materials

2.01 Concrete

- A. Concrete shall conform to Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials
- B. Concrete shall have a minimum 28-day compressive strength of 3,000 psi.
- C. Concrete shall have a slump range of 2 to 5 inches and shall be air entrained to  $\pm 1\%$  by volume.
- D. Concrete shall have a minimum density of 145 pcf and a maximum water-to-cement ratio of 0.45

2.02 Steel Reinforcement

- A. Steel reinforcing shall conform to ASTM A-615, Grade 60.
- B. Submit shop drawings at least 15 business days before date reviewed submittals will be needed. Shop drawings shall bear the contractor's stamp of approval which shall constitute that he has verified all field measurements, construction criteria, materials, and similar data, and has checked each drawing for completeness, coordination, and compliance with contract documents.

2.03 Soil Backfill

- A. Material should consist of soil classified as SM or more granular, in accordance with ASTM D 2487.
- B. Material should have no particle larger than 2.5 inches and shall contain no more than 30 percent, by weight, passing the U.S. No. 200 sieve.
- C. Materials should have a Liquid Limit less than 40, and a Plasticity Index less than 20.
- D. Material should have a minimum friction angle of 30 degrees.
- E. The Contractor should submit samples of the proposed backfill soils to the Geotechnical Engineer of Record for approval prior to their use.

2.04 Drainage Board

- A. Drainage board used behind the walls shall consist of Miradrain 6000.

Part 3: Construction

3.01 General

- A. All existing underground utilities shall be properly marked, and relocated if necessary, prior to construction.
- B. All proposed underground utilities or structures in the general wall area shall be completely installed prior to the construction of the wall.
- C. Protect all existing and/or new structures from damage by construction equipment. Immediately repair any damage that may occur.

3.02 Foundation

- A. The wall foundation shall be excavated to the grades and lines as shown on the construction drawings. Contractor should take care not to disturb foundation soils beyond the lines and grades shown. The foundation shall be poured against undisturbed soils.
- B. The foundation shall bear at the minimum embedment depths indicated, as measured from the final grade at the front of the wall.
- C. The foundation subgrade soils shall be tested by a qualified representative of the Geotechnical Engineer to verify the availability of the design bearing pressure of 4,000 psf.
- D. If unsuitable soils are encountered at design foundation levels, the unsuitable soils shall be removed and the over-excavated areas shall be replaced with compacted structural fill.

3.03 Steel Reinforcement

- A. All steel reinforcing shall have a minimum clear cover of 3 inches unless otherwise noted on the contract documents.
- B. Where applicable, splices for reinforcing steel shall be made by contact tension lap splices.
- C. Welding and field-bending of reinforcing steel is not permitted.
- D. Furnish all accessories, chairs, space bars, supports, etc. necessary to secure reinforcing.

3.04 Cast-in-Place Concrete

- A. Footing Concrete
  - 1. The vertical faces of the footing and key excavation may be used as forms for placement of foundation concrete.
  - 2. Foundation concrete, or protective mud mats, should be placed the same day that the foundation subgrade is approved.
  - 3. Provide concrete protection against freezing during placement and for 5 days thereafter.

B. Wall Concrete

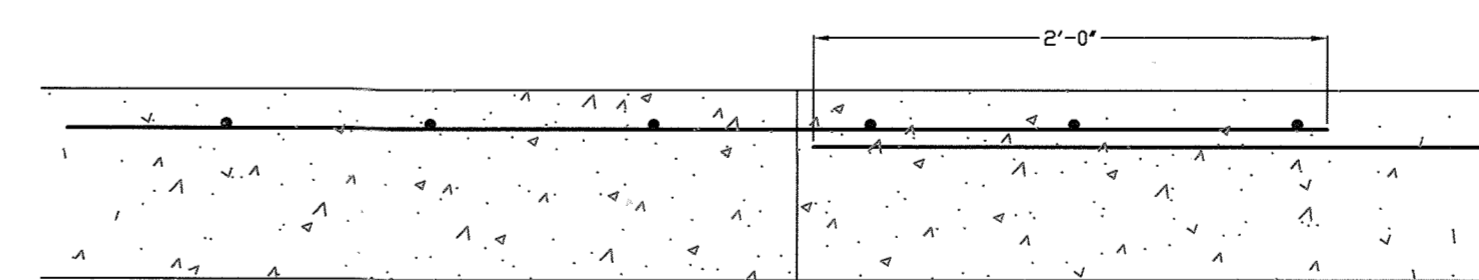
- 1. Furnish and erect concrete forms to the lines and grades shown on the construction drawings.
- 2. Make stops in concrete pours using vertical bulkheads.
- 3. All reinforcing shall be continuous through joints and bulkheads.
- 4. Chamfer exposed concrete corners 3/4" by 3/4" minimum.
- 5. Provide 4" diameter weep holes every 8 feet along the bottom of the wall and at wall ends. The weep holes should be formed in place prior to concrete placement by using PVC pipe. Weep hole locations must not interfere with steel reinforcing, and shall be no greater than 4 inches above final grade at the front of the wall.
- 6. Where a fence is required, it is recommended that the fence posts be installed during wall concrete placement. The fence posts shall have a minimum of 24 inches of embedment into the wall, and be located along the center of the wall. Alternatively, provide 4 inch diameter by 24 inch deep post holes at the designated fence post locations along the centerline of the wall. The post holes should be formed in place prior to concrete placement by using PVC pipe.

3.05 Backfilling

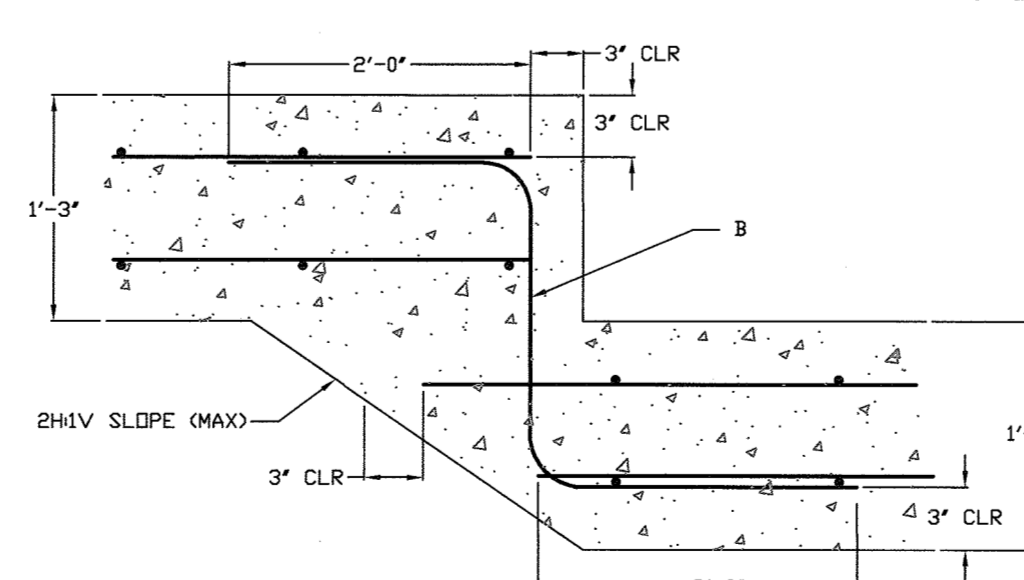
- A. All soil backfill shall conform to the material requirements of section 2.03.
- B. Backfill shall be moisture conditioned to within 2 percentage points of the optimum moisture content, as determined in accordance with ASTM D-698.
- C. Backfill shall be placed in loose lifts, not exceeding 8 inches in thickness, and then compacted to at least 95 percent of the maximum dry density, as determined in accordance with ASTM D-698.
- D. Backfilling shall not occur against the wall until the wall concrete has attained at least 75 percent of the 28-day design strength, and no earlier than 3 days after placement.
- E. Where feasible, maintain equal grades on each side of the wall during backfilling to prevent overturning and lateral movements. When the grade differential at the wall exceeds 12 inches, only hand-operated compaction equipment shall be allowed.
- F. Drainage boards shall be placed against the wall, extending from the weep hole up within 12 inches of final grade at the top of the wall.

3.06 Finish

- A. Final grades at the wall shall be established by the Contractor in the field.
- B. Final grades shall be stabilized and seeded per the approved civil plans unless noted otherwise on the site grading plans.
- C. Install a 4 ft fence at the top of the wall. If fence posts are installed subsequent to wall construction, the fence posts shall be grouted into the PVC post holes using 3,000 psi non-shrink grout.



CONSTRUCTION JOINT  
NTS



FOOTING STEP  
NTS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-18  
  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19  
 DIRECTOR: N/A

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARYLAND, LLC  
 3875 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**

**VEHICULAR BRIDGE - SECTIONS & DETAILS**

**THE ESTATES AT RIVER HILL**

LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A',  
AND NON-BUILDABLE PRESERVATION PARCELS 'B' - 'H'  
A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT  
 ZONED: RR-DEO  
 L: 4772 / F: 765  
 HOWARD COUNTY, MARYLAND

1340 CHARWOOD ROAD  
SUITE B  
HANOVER, MARYLAND 21076  
PHONE: (410) 859-4300  
FAX: (410) 859-4324

**PROFESSIONAL CERTIFICATE**

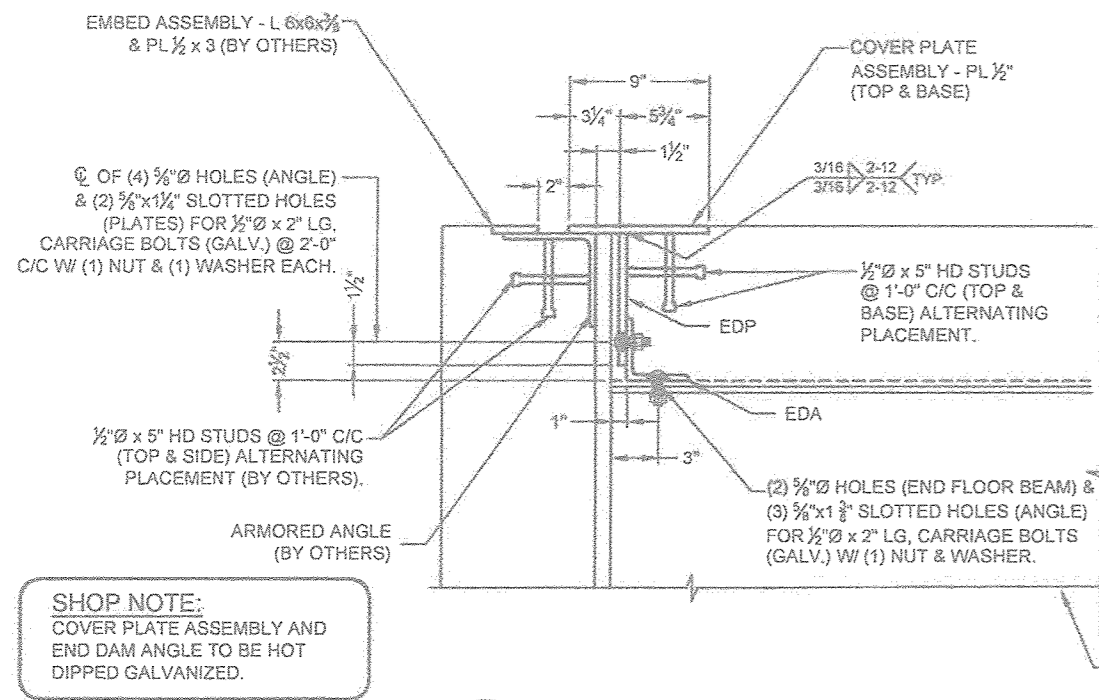
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 29553 EXPIRATION DATE: 12-31-2018

DESIGN BY: DMA  
 DRAWN BY: DMA  
 CHECKED BY: HMA  
 DATE: NOVEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 8314

28 SHEET OF 30

HASAN M. ABOUMATAR, P.E.

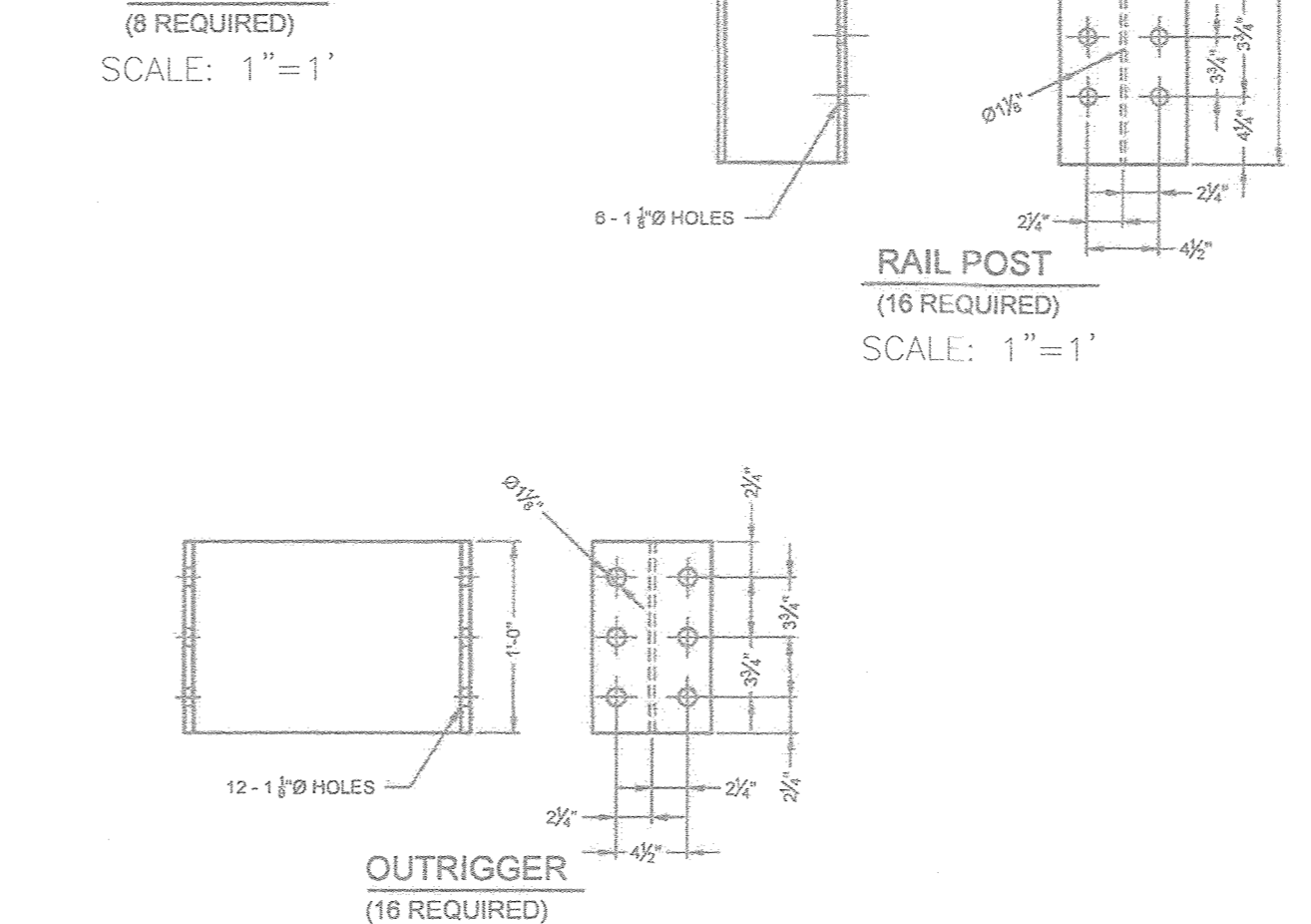
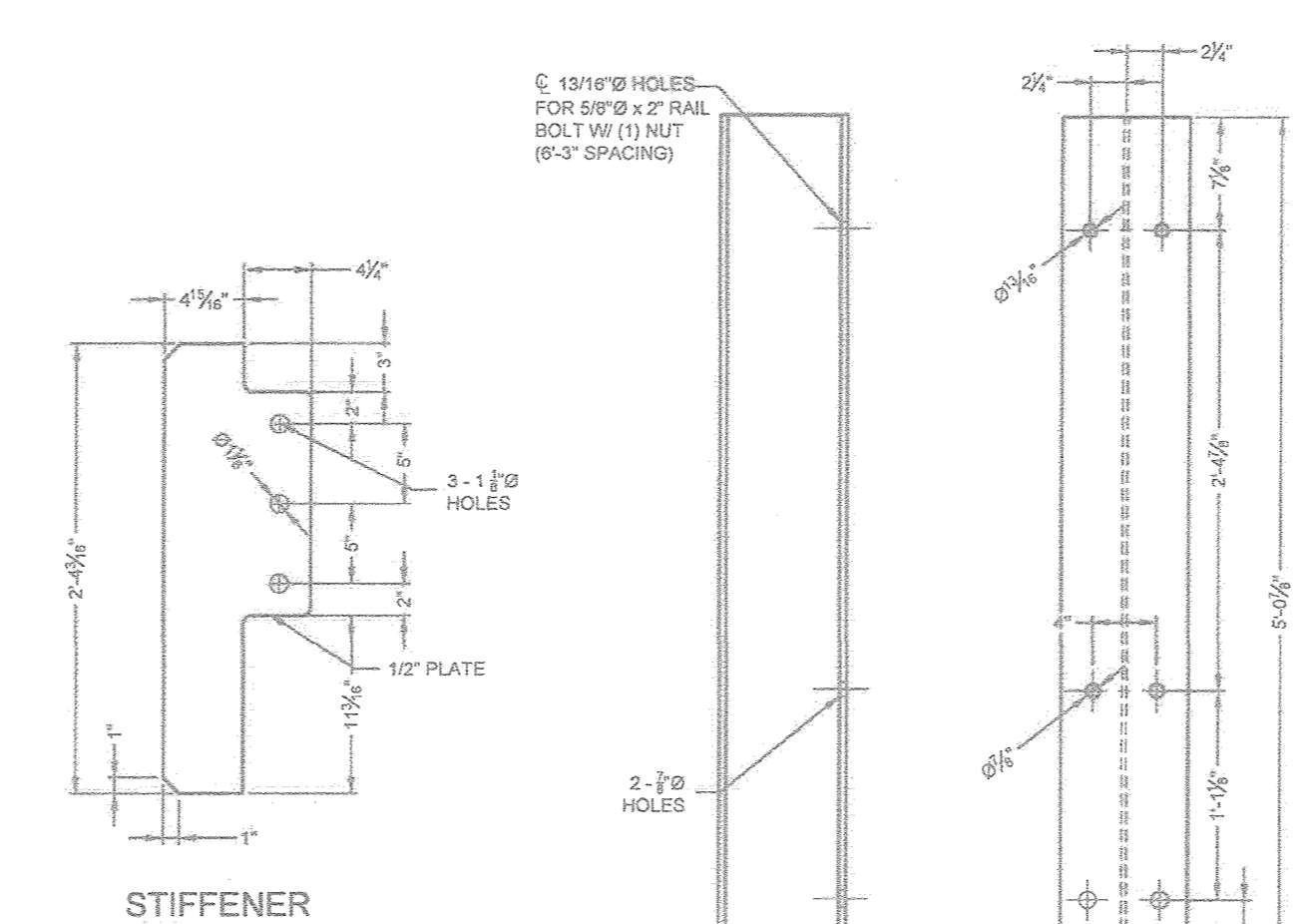
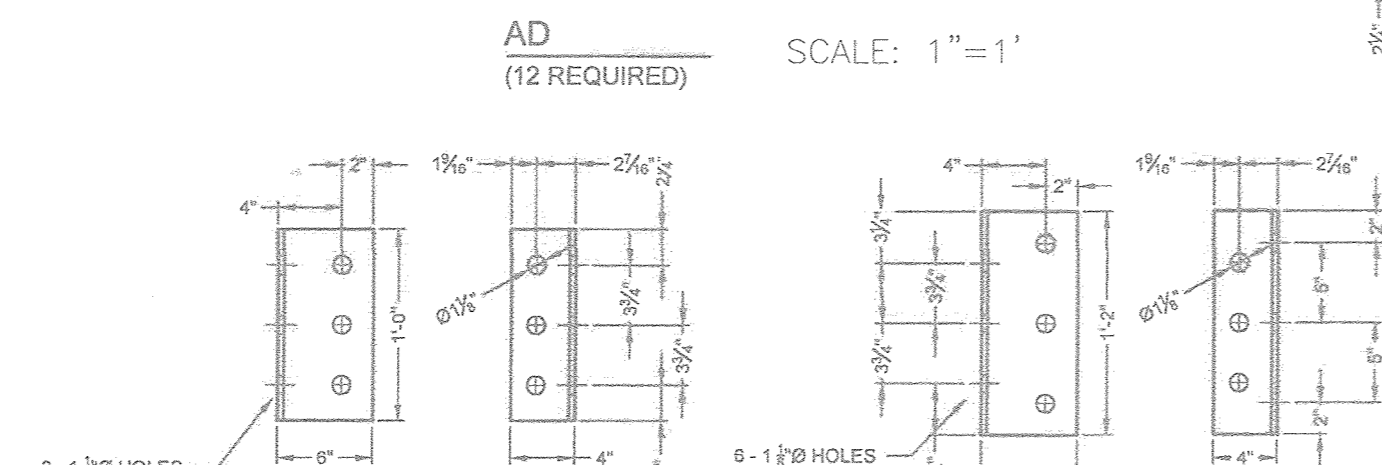
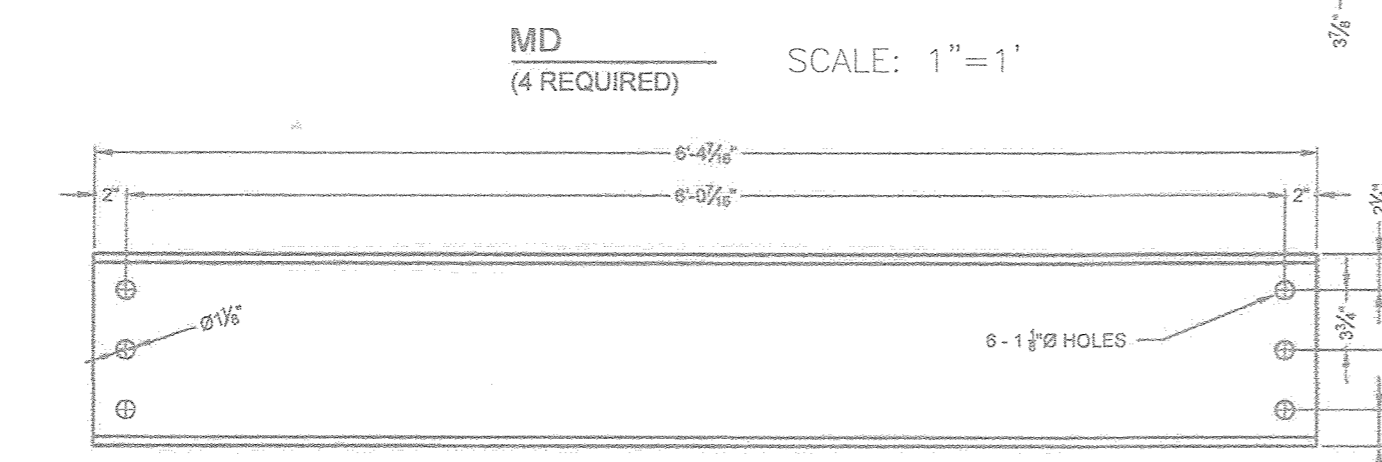
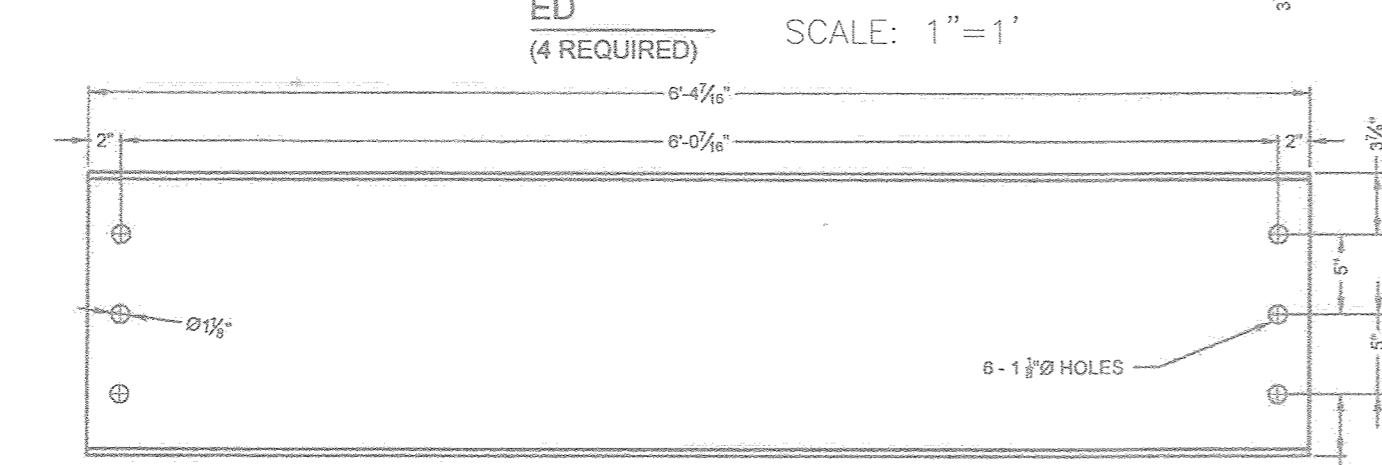
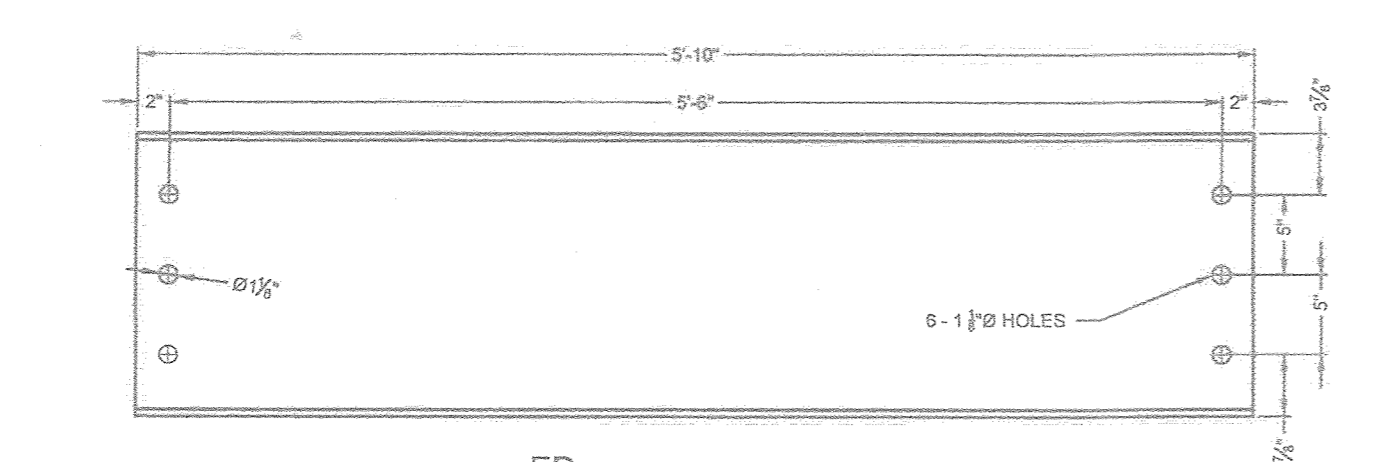
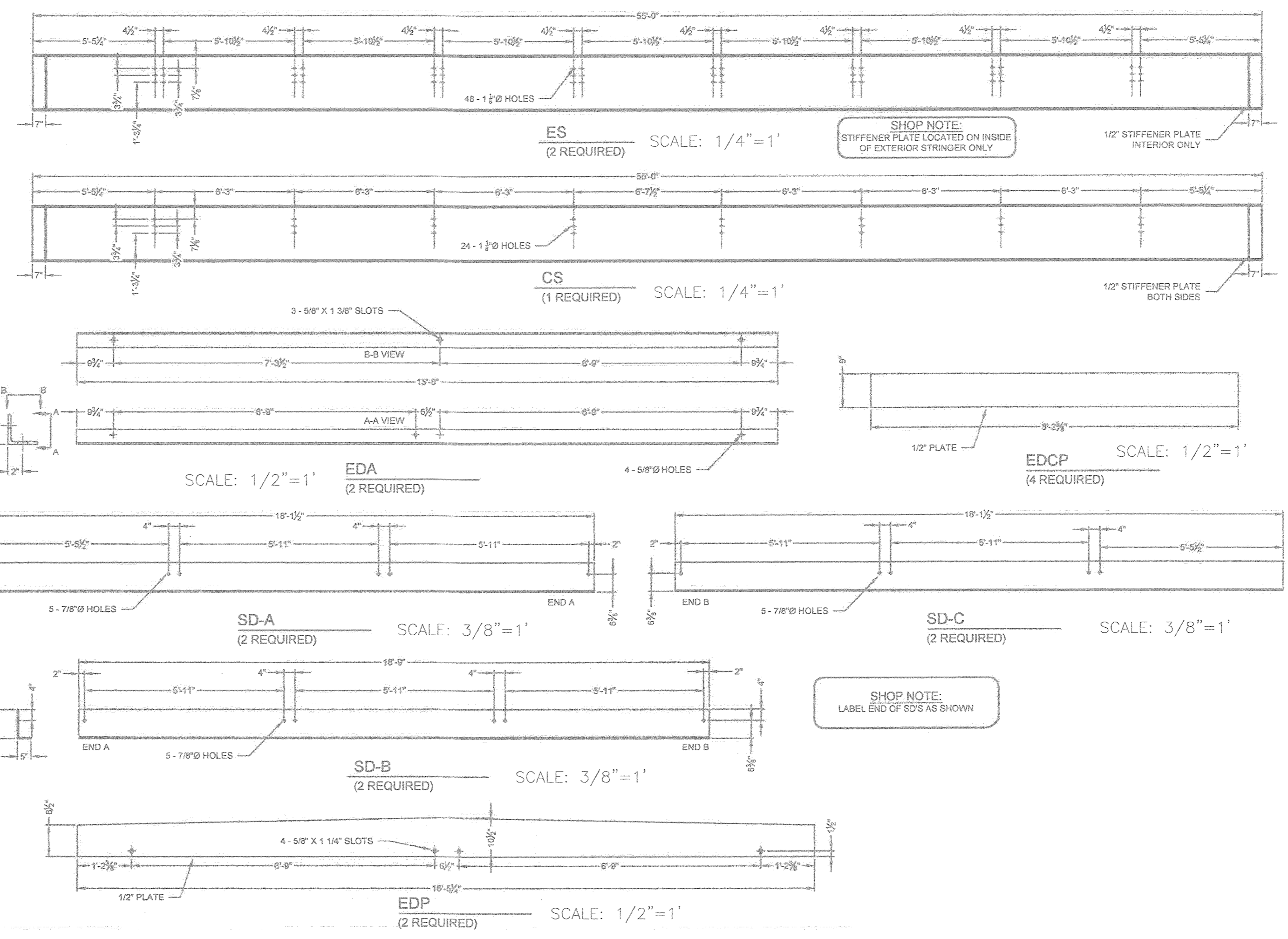
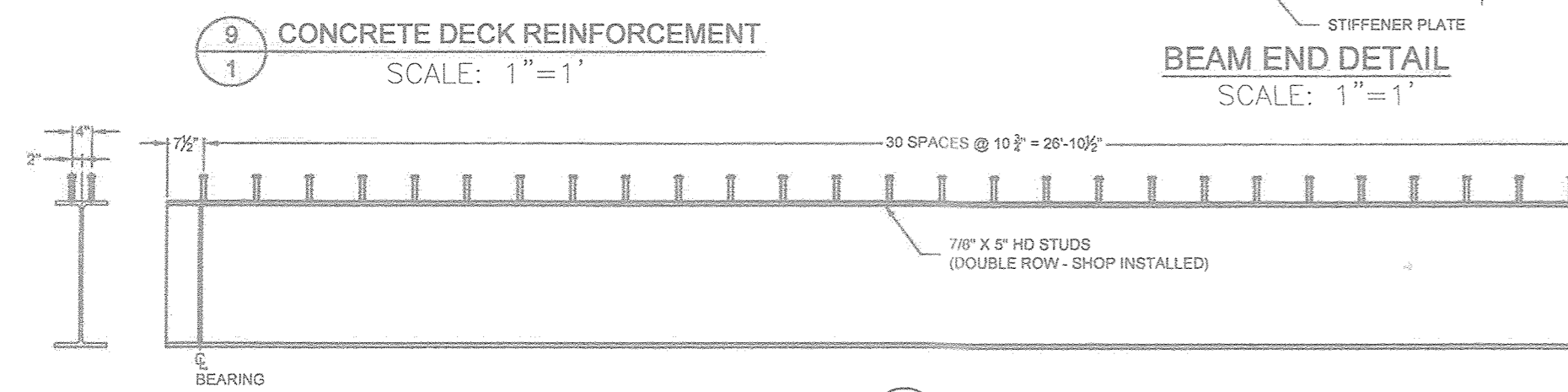
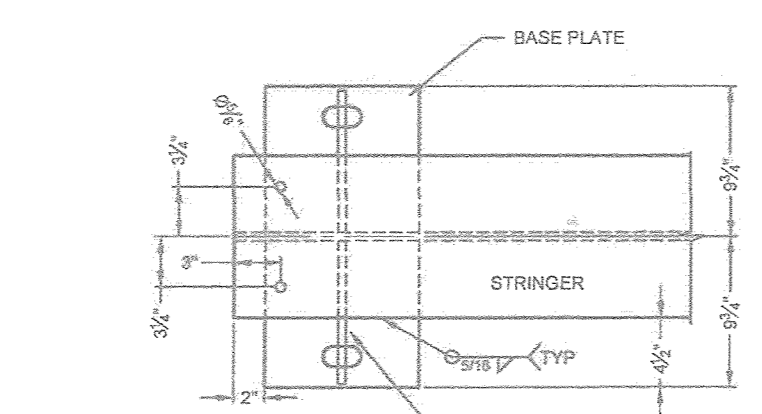
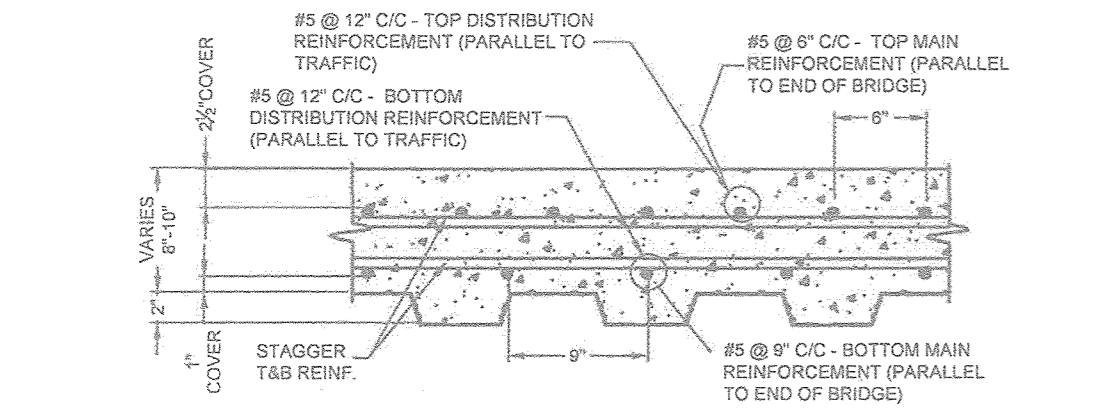
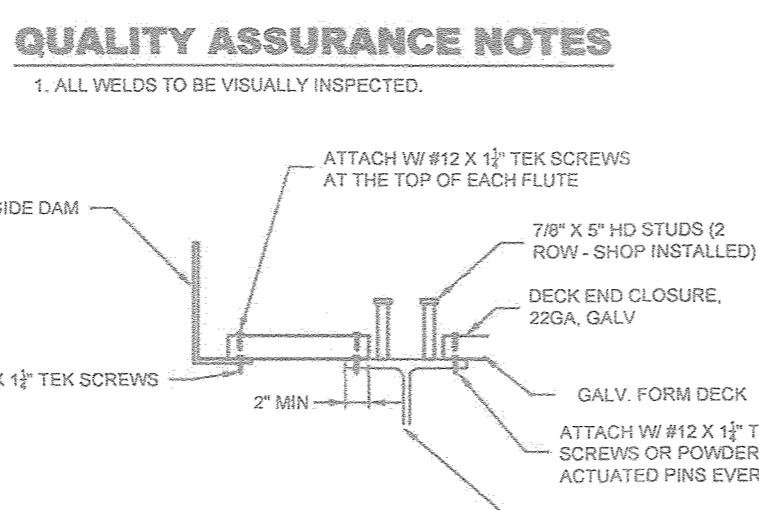




**GALVANIZING NOTE:**  
 COVER PLATE ASSEMBLY AND END DAM ANGLE ONLY: HOT DIPPED GALVANIZED PER THE FOLLOWING:  
 A. ANY FLAT SURFACES WHICH SHALL BE IN CONTACT WITH OTHER FLAT SURFACES AFTER FABRICATION SHALL BE CLEANED, REMOVING ANY GREASE, OIL OR OTHER FOREIGN MATTER, PRIOR TO WELDING (IF OVER 16 SQUARE INCHES IN AREA).  
 B. AFTER WELDING, BRUSH BLAST ONLY TO REMOVE ANY EXCESS WELD RESIDUE AND OBTAINING.  
 C. MATERIAL SHALL BE IMMERSED IN AN ACD BATH TO REMOVE SURFACE RUST AND MILL SCALE TO PROVIDE A CHEMICALLY CLEAN METALLIC SURFACE AND THEN HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.

**SHOP NOTE:**  
 APPLY ZINC RICH PRIMER TO THE TOP OF THE END OF THE STRINGER THAT WILL BE IN CONTACT WITH END DAM ANGLE.

**FORM DECK INSTALLATION**  
 1. USE CARE TO AVOID DAMAGING THE INSTALLED FORM DECK FROM STACKING MATERIALS, DROPPING EQUIPMENT, OR HEAVY CONSTRUCTION TRAFFIC.  
 2. UNLESS OTHERWISE NOTED, ALL FORM DECK IS TO BE ATTACHED TO THE STRINGERS WITH #12 X 1 1/2 SELF-DRILLING FASTENERS OR 1/2" X 1" POWER ACTUATED FASTENERS. SELF-DRILLING SCREWS SHALL BE INSTALLED AS FOLLOWS:  
 - ALONG STRINGERS AND SIDE DAMS, EVERY OTHER FLUTE.  
 - ALONG SIDELAPS, SPACED AT 30" C. MAX.  
 3. FORM DECK SHALL BEAR AT A MINIMUM OF 2" ON ALL SUPPORTS.  
 4. CONCRETE SHALL NOT BE DUMPED ON FORM DECK TO A DEPTH GREATER THAN 12" ABOVE TOP OF FORM.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/27/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-18

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 1-10-19

**OWNER**  
 ESTATES AT RIVER HILL, LLC  
 MICHAEL PFAU, MEMBER  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

**DEVELOPER**  
 TRINITY HOMES MARY LAND, LLC  
 3675 PARK AVE., SUITE 301  
 ELLICOTT CITY, MD 21043  
 (410) 480-0023

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 BRIDGE DESIGN NOTES AND DETAILS  
**THE ESTATES AT RIVER HILL**  
 LOTS 1-15, BUILDABLE PRESERVATION PARCEL 'A'  
 AND NON-BUILDABLE PRESERVATION PARCELS 'B', 'H'  
 A RE-SUBDIVISION OF THE 'GREENE PROPERTY', LOT 1

PARCEL: 389  
 TAX MAP: 34 GRID: 23  
 5TH ELECTION DISTRICT

ZONED: RR-DEO  
 L. 4772 / F. 265  
 HOWARD COUNTY, MARYLAND

**CONTECH**  
 ENGINEERED SOLUTIONS LLC  
 www.conteches.com  
 1021 Shira Highway 28 North, Annapolis, MD 21408  
 410-528-2547 202-463-7900 202-463-7671 FAX

**CONTINENTAL**  
 BRIDGE

PROFESSIONAL CERTIFICATE  
 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. 288999, EXPIRATION DATE: 04-30-2019

DESIGN BY: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 DATE: SEPTEMBER 2018  
 SCALE: AS SHOWN  
 W.O. NO.: 15-39

30 SHEET OF 30