ENVIRONMENTAL CONCEPT PLAN
BUCH APARTMENTS
PARCEL 126
HOWARD COUNTY, MARYLAND

GENERAL NOTES

1. THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.
2. THE EXISTING TOPOGRAPHY SHOWN HEREON IS BASED ON A TOPOGRAPHIC SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED APRIL 2013. OFFSITE TOPOGRAPHY FROM HOWARD COUNTY GIS.
3. THE PROJECT BOUNDARY IS BASED ON A BOUNDARY SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED NOVEMBER 8, 2013.
4. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 46BE AND 46BF WERE USED FOR THIS PROJECT.
5. THE SUBJECT PROPERTY IS ZONED "R-APT" IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
6. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100-YEAR FLOODPLAIN.
7. THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT.
8. WATER FOR THIS PROJECT IS TO BE PUBLIC EXTENSIONS OF CONTRACT NO. 24-4686-D.
9. SEWER FOR THIS PROJECT IS TO BE PUBLIC EXTENSIONS OF CONTRACT NO. 20-1739-D.
10. A 100 YEAR FLOODPLAIN CROSSES THE NORTHERNMOST CORNER OF THE PROJECT SITE.
11. THERE ARE 0.65 ACRES OF MODERATE SLOPE (15%-24.99%) AND 0.08 ACRES OF STEEP SLOPES (25% OR GREATER) ONSITE. (0.11 ACRES OF STEEP SLOPES PRIOR TO GRADING PROPOSED WITH SDP-15-071; AS SHOWN ON FOREST STAND DELINEATION PLAN.)
12. FOREST CONSERVATION OBLIGATIONS FOR THIS PROJECT SHALL BE ADDRESSED BY A FOREST CONSERVATION PLAN SUBMITTED WITH THE FUTURE SITE DEVELOPMENT PLAN.
13. WETLANDS AND STREAMS SHOWN ONSITE ARE BASED ON ENVIRONMENTAL REPORT BY ECO-SCIENCE PROFESSIONALS, INC. C/O MR. JOHN CANOLES, DATED AUGUST 21, 2014; UPDATED MAY 21, 2015
14. A GEOTECHNICAL INVESTIGATIONS WAS COMPLETED FOR THE SITE BY ECS MID-ATLANTIC, LLC DATED JULY 2014.
15. A NOISE STUDY SHALL BE PREPARED BY ROBERT H. VOGEL ENGINEERING AS PART OF THE FUTURE SITE DEVELOPMENT PLAN PACKAGE.
16. FOREST STAND DELINEATION PLAN PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. C/O MR. JOHN CANOLES, DATED AUGUST 2014; UPDATED MAY 2015.
17. PRICE MANOR WAY IS CLASSIFIED AS A LOCAL ROAD. THE PROPOSED STREET IS CLASSIFIED AS PRIVATE ACCESS STREETS.
18. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES ON THIS PROPERTY. THERE IS A HISTORIC STRUCTURE LOCATED ON THIS PROPERTY.
19. STORMWATER MANAGEMENT FOR THE PROJECT IS PROVIDED BY THE USE OF MICRO-SCALE PRACTICES IN ACCORDANCE WITH ENVIRONMENTAL SITE DESIGN CRITERIA. MICRO-SCALE PRACTICES INCLUDE MICRO-BIORETENTION, PERVIOUS PAVING, A GRAVEL TRENCH AND RAINWATER HARVESTING. THESE FACILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED.
20. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
21. THE LIMITS OF DISTURBANCE (LOD) SHOWN ON THE PLAN EXTENDS OFFSITE. LETTERS OF PERMISSION FOR ANY REQUIRED OFFSITE GRADING WILL BE PROVIDED AS PART OF THE FINAL PLAN/SITE DEVELOPMENT PLAN SUBMISSION WHEN FINAL GRADING WILL BE APPROVED.
22. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING AND ADDRESS THE PROJECT TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.
23. A ZONING AMENDMENT WILL BE PURSUED FOR THE BUILDING LENGTH EXCEEDING 300' AND A VARIANCE PLAN WILL BE PURSUED FOR IMPACTS TO REQUIRED SETBACKS.
24. IN ACCORDANCE WITH SECTION 16.116 (C) OF THE SUBDIVISION REGULATIONS, NECESSARY DISTURBANCES ARE REQUIRED TO UPGRADE THE EXISTING DRIVEWAY TO CURRENT STANDARDS TO PROVIDE ACCESS TO BUCH PROPERTY (REF. SDP-15-071). THIS UPGRADE ALSO INCORPORATES THE REPLACEMENT OF THE EXISTING CULVERT WITH A BOTTOMLESS BOX CULVERT TO ACCOMMODATE THE INCREASED RUNOFF FROM MAPLE LAWN AND TO PROVIDE A SAFER INGRESS AND EGRESS. THE STREAM, WETLAND AND FLOODPLAIN DISTURBANCES HAVE BEEN PERMITTED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT. THESE ENVIRONMENTAL DISTURBANCES ARE THE MINIMUM REQUIRED AND WOULD BE REQUIRED REGARDLESS OF THE CURRENTLY PROPOSED DEVELOPMENT. WALLS HAVE BEEN UTILIZED ALONG THE DRIVE AND THE LOWER AREAS OF THE SITE TO MINIMIZE AND AVOID ENVIRONMENTAL IMPACTS. THERE IS ALSO A SMALL STREAM BUFFER DISTURBANCE PROPOSED TO ACCOMMODATE STORM DRAIN OUTFALL AND RIPRAP APRON.

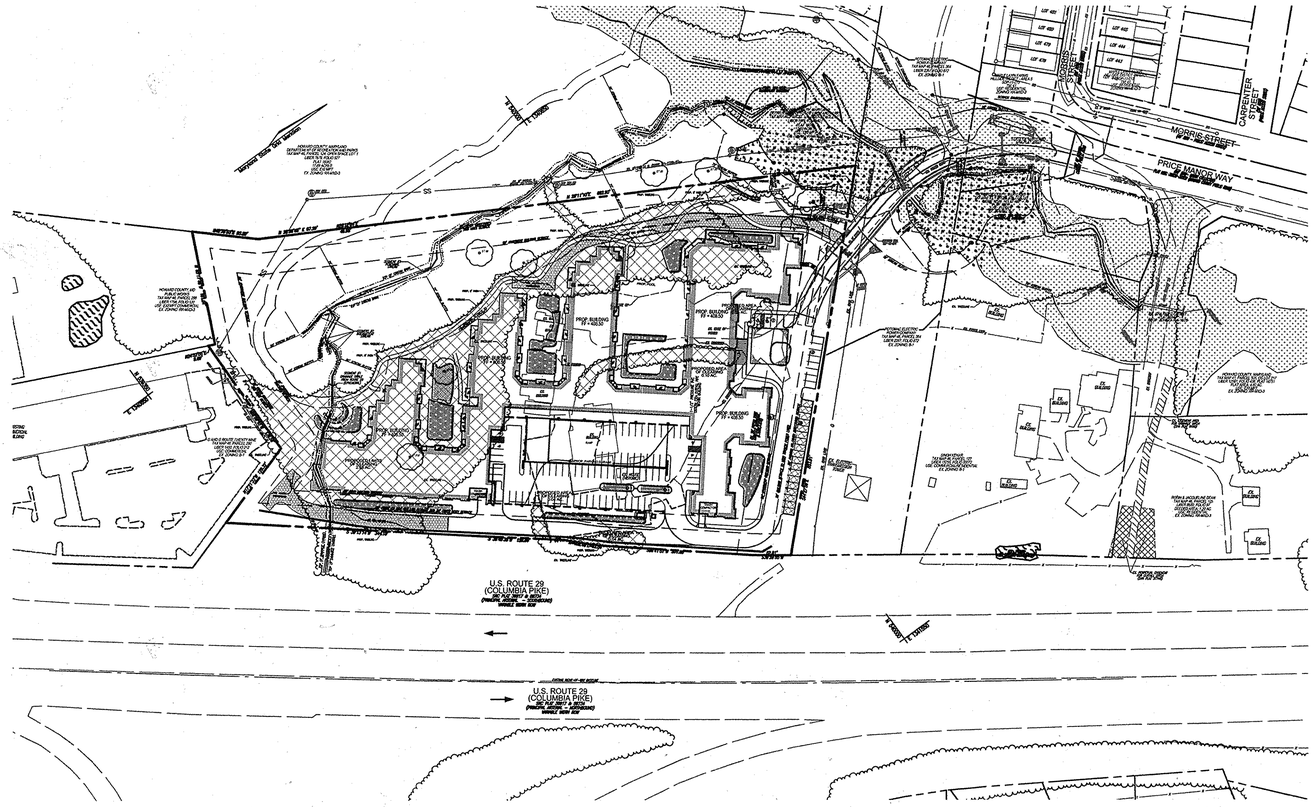
ENVIRONMENTAL SITE DESIGN NARRATIVE:

1. ALL NATURAL AREAS OF THIS SITE ARE LOCATED IN THE SOUTH AND WESTERN PORTION OF THE SITE. ON THE SOUTH AND WESTERN PART OF THE SITE IS AN EPHEMERAL STREAM (NO BUFFER) WHICH TURNS INTO AN INTERMITTENT STREAM (50' BUFFER) AND THEN BECOMES A PERRENIAL STREAM (75' BUFFER). ONLY MINOR DISTURBANCES TO THE STREAM BUFFER ARE PROPOSED FOR STORM DRAIN OUTFALL CONSTRUCTION. THE COUNTY AND STATE DO NOT REGULATE EPHEMERAL STREAMS. THERE IS ALSO WETLAND AND FLOODPLAIN LOCATED ON THE NORTH-WESTERN PORTION OF THE SITE. NO DISTURBANCE TO THE FLOODPLAIN, STREAM, WETLAND AND/OR WETLAND BUFFER IS PROPOSED. THERE IS ALSO A FOREST LOCATED ON THE WESTERN PART OF THE SITE, WHICH SHALL BE PLACED INTO A FOREST CONSERVATION EASEMENT. THESE NATURAL RESOURCES WILL REMAIN UNDISTURBED, PROTECTED AND ENHANCED. ANY IMPACTS TO THE ENVIRONMENTAL RESOURCES SHALL BE THE LEAST NECESSARY FOR THE DEVELOPMENT OF THIS PROJECT.
2. THE SITE NATURALLY SLOPES FROM EAST TO WEST. THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERNS, WITH NO DRAMATIC CHANGES TO THE NATURAL DRAINAGE.
3. THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT TO THE MAXIMUM EXTENT PRACTICABLE (MEP). THE RESULTS OF THE ENVIRONMENTAL SITE DESIGN FOR THIS PROJECT WILL REFLECT "WOODS IN GOOD CONDITION". THE ESD CONCEPT INCLUDES THE USE OF MICRO-BIORETENTION FACILITIES (M-6), PERVIOUS PAVING (A-2), A DRYWELL (M-5) AND RAIN WATER HARVESTING (M-1).
4. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE A PROPOSED SEDIMENT TRAPS, EARTH DIKES, CLEAR WATER DIKES, SUPER AND STANDARD SILT FENCE PERIMETER CONTROLS. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT DURING THE FUTURE SITE DEVELOPMENT PLAN PHASE OF THE PROJECT.
5. STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF MICRO-BIORETENTION FACILITIES (M-6), PERVIOUS PAVING (A-2), A DRYWELL (M-5) AND RAIN WATER HARVESTING (M-1). PROPOSED PRACTICES HAVE BEEN MAXIMIZED TO THE EXTENT PRACTICAL. THE CALCULATED RAINFALL TARGET (PE) FOR THIS PROJECT IS 1.99", AND THE TOTAL RUNOFF VOLUME (ESDv) REQUIRED IS 30,197 CF.
6. AT THIS CONCEPT STAGE OF DEVELOPMENT, NO DESIGN MANUAL WAIVERS ARE REQUIRED. WAIVER PETITIONS FOR ENVIRONMENTAL DISTURBANCE SHALL BE SUBMITTED UNDER SEPARATE COVER WITH THE FUTURE SITE DEVELOPMENT PLAN PHASE OF THE PROJECT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10.19.15

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/07/15



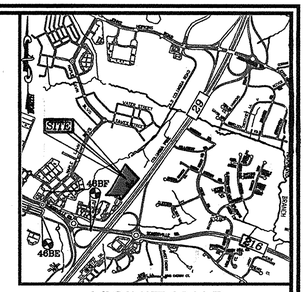
LOCATION MAP
SCALE: 1"=100'

SCALE 1"=100'
50' 0' 100'

BENCHMARKS

HOWARD COUNTY BENCHMARK - 46BE (CONC. MONUMENT)
N 538853.83 E 1338643.54 ELEV. 443.345
LOCATION: OLD COLUMBIA PIKE AT SCAGGSVILLE PARK AND RIDE

HOWARD COUNTY BENCHMARK - 46BF (CONC. MONUMENT)
N 538448.18 E 1340010.43 ELEV. 446.602
LOCATION: MD-216 AT SCAGGSVILLE NEAR RT-29 BRIDGE



VICINITY MAP
SCALE: 1"=2000'
ADC MAP COORDINATES: MAP 39, GRID C2

SHEET INDEX	
DESCRIPTION	SHEET NO.
COVER SHEET	1 OF 3
ESDv CONCEPT PLAN	2 OF 3
STORMWATER MANAGEMENT DRAINAGE AREA MAP, NOTE AND DETAILS	3 OF 3

LEGEND
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- CENTERLINE OF EXISTING STREAM
- LIMITS OF CLEARING
- 20' FIRE ACCESS

SITE ANALYSIS DATA CHART

TOTAL PROJECT AREA:	8.89 AC.
NET AREA OF PROJECT:	8.80 AC.
AREA OF WETLANDS AND WETLAND BUFFERS:	5,980 S.F. OR 0.14 AC.
AREA OF FLOODPLAIN:	0.09 AC.
AREA OF FOREST:	4.73 AC. (REFER TO FSD)
AREA OF MODERATE SLOPES (15% TO 24.99%):	0.65 AC.
AREA OF STEEP SLOPES (25% OR GREATER):	0.08 AC. (0.11 AC. PRE-EXISTING, PRIOR TO SDP-15-071 GRADING)
ERODIBLE SOILS:	0.17 AC.
LIMIT OF DISTURBED AREA:	6.47 AC.
PROPOSED USES FOR SITE AND STRUCTURES:	RESIDENTIAL - APARTMENT BUILDING
GREEN OPEN AREA:	4.61 AC. (OPEN AND ENVIRONMENTAL)
PROPOSED IMPERVIOUS AREA:	4.28 AC.
PRESENT ZONING DESIGNATION:	R-APT
DPZ FILE REFERENCES:	CONT. 20-1739-D, CONT. 24-4686-D, ECP-15-047, SDP-15-071

OWNER/DEVELOPER
BUCH LLLP
10945 PRICE MANOR WAY
LAUREL, MD 20723
301-359-3500

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

COVER SHEET

BUCH APARTMENTS
10945 PRICE MANOR WAY (FORMERLY JOHNS HOPKINS ROAD)
ZONED: R-APT
(L. 3192 / F. 384)
TAX MAP 46 BLOCK 4 — PARCEL 126
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER — 7/7/15
ROBERT H. VOGEL, PE No.16193

DESIGN BY:	RHV/GAH/EDS/DZE
DRAWN BY:	GAH/EDS/DZE
CHECKED BY:	RHV
DATE:	JUNE 2015
SCALE:	AS SHOWN
W.O. NO.:	12-50.00

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 09-27-2016

SHEET 1 OF 3

ECP-15-018

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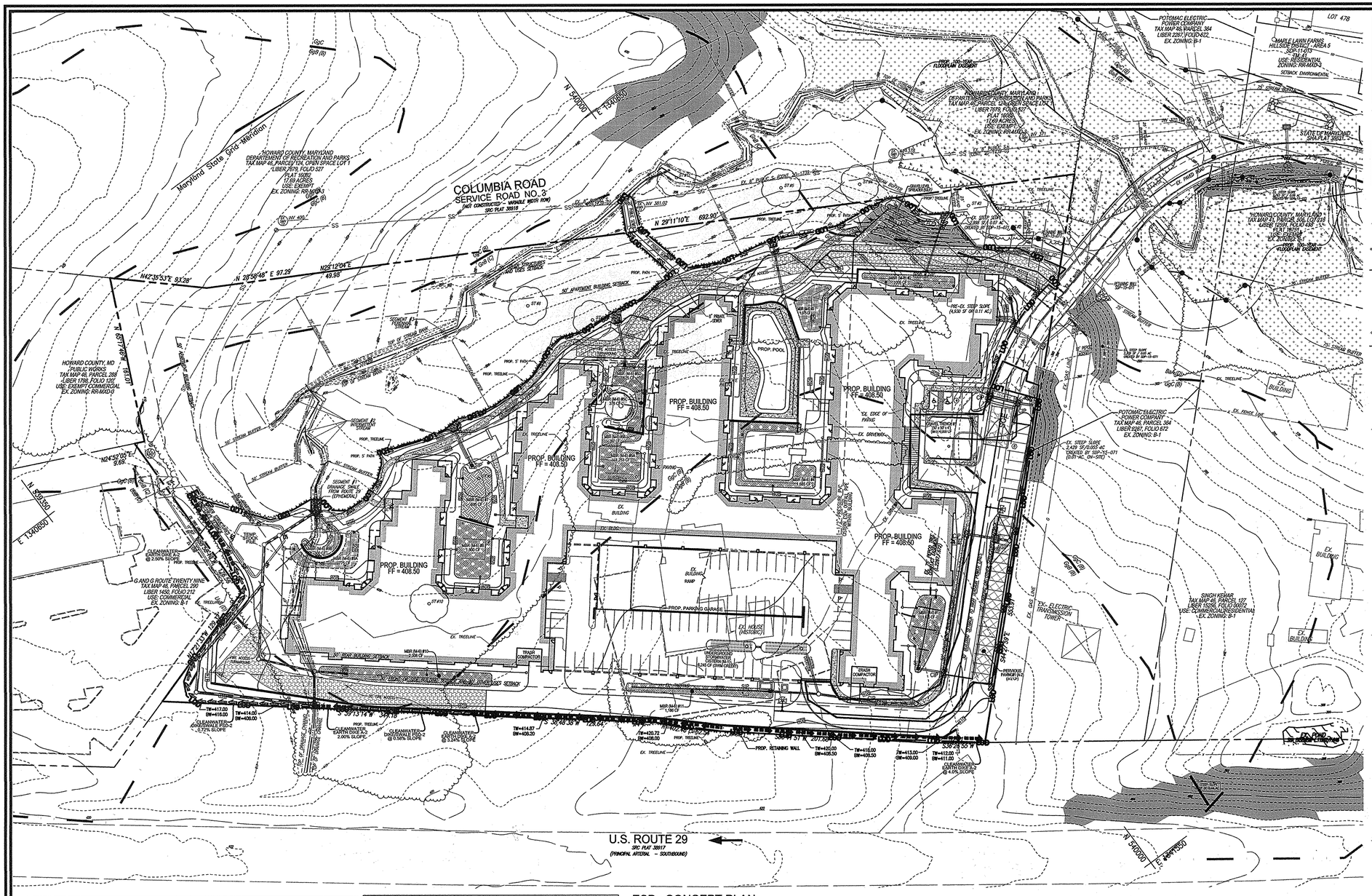


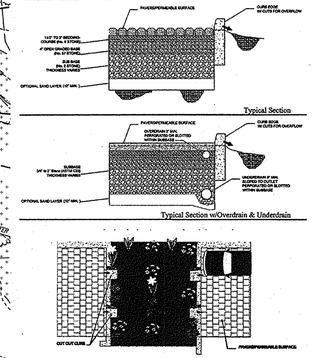
NOTE:
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 35 FEET APART.
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

NOTE:
CONTRACTOR TO PROVIDE IMMEDIATE REPAIR OF ANY EARTH DIKES INTERRUPTED DURING CONSTRUCTION.

NOTE: LOCATE STOCKPILE AS DIRECTED BY THE SEDIMENT CONTROL INSPECTOR. STOCKPILES EXCEEDING 15 FEET IN HEIGHT SHALL BE BENCHED.

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING FENCE
- EXISTING TREELINE
- PROPOSED STORMDRAIN
- PROPOSED STORMDRAIN INLET
- PROPOSED TREELINE
- PROPOSED CURB
- PROPOSED SIDEWALK
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED SILT FENCE
- PROPOSED SUPER SILT FENCE
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED COMBINATION INLET PROTECTION
- PROPOSED STANDARD INLET PROTECTION
- EXISTING FLOODPLAIN
- EXISTING WETLANDS
- PROP. 20' PUBLIC WATER AND UTILITY EASEMENT
- PROPOSED PUBLIC STORM DRAIN EASEMENT
- 20' FIRE ACCESS
- PRE-EX. STEEP SLOPES (25% OR GREATER)
- EX. STEEP SLOPES (25% OR GREATER)
- EX. MODERATE SLOPES (15%-24.99% OR GREATER)



Typical Section

Typical Section w/Overdrain & Underdrain

Permeable Pavement w/Micro-Bioretention - Plan View

PERMEABLE PAVEMENT DETAIL

NOT TO SCALE

B.4.B SPECIFICATIONS FOR PERMEABLE PAVEMENTS & REINFORCED TURF

THESE SPECIFICATIONS INCLUDE INFORMATION ON ACCEPTABLE MATERIALS FOR TYPICAL APPLICATIONS AND ARE NOT EXCLUSIVE OR LIMITING. THE DESIGNER IS RESPONSIBLE FOR DEVELOPING SPECIFICATIONS FOR INDIVIDUAL PROJECTS AND SPECIFIC CONDITIONS.

1. PERVIOUS CONCRETE SPECIFICATIONS

DESIGN THICKNESS – PERVIOUS CONCRETE APPLICATIONS SHALL BE DESIGNED SO THAT THE THICKNESS OF THE CONCRETE SLAB SHALL SUPPORT THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED. APPLICATIONS MAY BE DESIGNED USING EITHER STANDARD PAVEMENT PROCEDURES (E.G., AASHTO, ACI 325.9R, ACI 330R) OR USING STRUCTURAL VALUES DERIVED FROM FLEXIBLE PAVEMENT DESIGN PROCEDURES.

MIX & INSTALLATION – TRADITIONAL PORTLAND CEMENTS (ASTM C 150, C 1157) MAY BE USED IN PERVIOUS CONCRETE APPLICATIONS. PHOSPHOROUS ADMIXTURES MAY ALSO BE USED. MATERIALS SHOULD BE TESTED (E.G., TRIAL BATCHING) PRIOR TO CONSTRUCTION SO THAT CRITICAL PROPERTIES (E.G., SETTLING TIME, RATE OF STRENGTH DEVELOPMENT, POROSITY, PERMEABILITY) CAN BE DETERMINED.

AGGREGATE – PERVIOUS CONCRETE CONTAINS A LIMITED FINE AGGREGATE CONTENT. COMMONLY USED GRADATIONS INCLUDE ASTM C 33 NO. 67 (3/4 IN. TO NO. 4), NO. 8 (3/8 IN. TO NO.16) AND NO. 89 (3/8 IN. TO NO.50) SIEVES. SINGLE-SIZED AGGREGATE (UP TO 1 INCH) MAY ALSO BE USED.

WATER CONTENT – WATER-TO-CEMENT RATIOS BETWEEN 0.27 AND 0.30 ARE USED ROUTINELY WITH PROPER INCLUSION OF CHEMICAL ADMIXTURES. WATER QUALITY SHOULD MEET ACI 30A. AS A GENERAL RULE, POTABLE WATER SHOULD BE USED ALTHOUGH RECYCLED CONCRETE PRODUCTION WATER MEETING ASTM C 94 OR AASHTO M 157 MAY ALSO BE USED.

ADMIXTURES – CHEMICAL ADMIXTURES (E.G., RETARDERS OR HYDRATION-STABILIZERS) ARE USED TO OBTAIN SPECIAL PROPERTIES IN PERVIOUS CONCRETE. USE OF ADMIXTURES SHOULD MEET ASTM C 494 (CHEMICAL ADMIXTURES) AND ASTM C 260 (AIR ENTRAINING ADMIXTURES) AND CLOSELY FOLLOW MANUFACTURER'S RECOMMENDATIONS. BASE COURSE – THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (n=0.30).

2. PERMEABLE INTERLOCKING CONCRETE PAVEMENTS (PICP)

PAVER BLOCKS – BLOCKS SHOULD BE EITHER 3? IN. OR 4 IN. THICK, AND MEET ASTM C 936 OR CSA A231.2 REQUIREMENTS. APPLICATIONS SHOULD HAVE 20% OR MORE (40% PREFERRED) OF THE SURFACE AREA OPEN. INSTALLATION SHOULD FOLLOW MANUFACTURER'S INSTRUCTIONS, EXCEPT THAT INFILL AND BASE COURSE MATERIALS AND DIMENSIONS SPECIFIED IN THIS APPENDIX SHALL BE FOLLOWED.

INFILL MATERIALS AND LEVELING COURSE – OPENINGS SHALL BE FILLED WITH ASTM C-33 GRADED SAND OR SANDY LOAM. PICP BLOCKS SHALL BE PLACED ON A ONE-INCH THICK LEVELING COURSE OF ASTM C-33 SAND.

BASE COURSE – THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (n=0.30).

3. REINFORCED TURF

REINFORCED GRASS PAVEMENT (RGP) – WHETHER USED WITH GRASS OR GRAVEL, THE RGP THICKNESS SHALL BE AT LEAST 1-3/4" THICK WITH A LOAD CAPACITY CAPABLE OF SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED.

OWNER/DEVELOPER

BUCH LLLP
10945 PRICE MANOR WAY
LAUREL, MD 20723
301-359-3500

NO.	REVISION	DATE

SOILS LEGEND
HOWARD COUNTY SOIL MAP 23

SYMBOL	DESCRIPTION	TYPE	HYDRIC	K FACTOR	ERODIBLE
BaA	BAILE SILT LOAM, 0 TO 3 PERCENT SLOPES	D	NO	0.32	NO
CgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	NO	0.20	NO
CgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.20	NO
GnB	GLENVILLE-BAILE SILT LOAMS, 0-8 PERCENT	C	NO	0.37/0.32	YES
UuB	URBAN LAND-UDORTHENTS COMPLEX, 0-8 PERCENT	D	NO	0.28	NO

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.

SPECIMEN TREE CHART

KEY	SPECIES	SIZE	CRZ	COMMENTS
1	TULIP POPLAR	39.5	59.25	GOOD CONDITION
2	TULIP POPLAR	32	48	FAIR CONDITION, VINE COVERED
3	TULIP POPLAR	34	51	GOOD CONDITION
4	RED OAK	30	45	GOOD CONDITION
5	BLACK OAK	31.5	47.25	GOOD CONDITION
6	TULIP POPLAR	34	51	GOOD CONDITION
7	WHITE OAK	34.5	51.75	GOOD CONDITION
8	TULIP POPLAR	35	52.5	GOOD CONDITION
9	TULIP POPLAR	32	48	GOOD CONDITION
10	TULIP POPLAR	35	52.5	POOR CONDITION, SIGNIFICANT LIMB DIEBACK
11	TULIP POPLAR	34	51	GOOD CONDITION

ESDv CONCEPT PLAN

SCALE: 1"=50'

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

1. THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING OR COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE.
3. THE OWNER SHALL USE DEICERS IN MODERATION. DEICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.
4. THE OWNER SHALL ENSURE SNOW PLOWING IS PERFORMED CAREFULLY WITH BLADES SET ONE INCH ABOVE THE SURFACE. PLOWED SNOW PILES AND SNOWMELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

SEDIMENT CONTROL NOTES:

1. EITHER PERMANENT OR TEMPORARY STABILIZATION IS TO BE APPLIED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR REGARDLESS OF DAYS/DATES IN THE STANDARD SEDIMENT CONTROL NOTES AND/OR SEEDING SPECIFICATIONS.
2. ALL AREAS OF DISTURBANCE TO BE STABILIZED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND/OR BY THE SEDIMENT CONTROL INSPECTOR, WHICHEVER IS MORE STRINGENT.

SCALE 1"=50'
25' 0' 50'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/19/15

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/07/15

ENVIRONMENTAL SITE DESIGN PRACTICE

DRAINAGE AREA #	AREA TREATED	FACILITY NUMBER	PERMEABLE PAVEMENT A-2	ADD UNDER PAVE A-2	PERVIOUS SIDEWALK A-2	LANDSCAPE INFILTRATION (M-3)	GRAVEL TRENCH (M-5)	CISTERN (M-1)	MICRO BIO RETENTION (M-6)	TOTAL ESDv VOLUME
A	12841	MBR #1	0	0	0	0	0	0	1635	1635
B	21502	TRENCH #1	0	0	0	0	4000	0	0	4000
C	7512	MBR #2	0	0	0	0	0	0	1005	1005
D-1	8159	MBR #3	0	0	0	0	0	0	1075	1075
D-2	19003	MBR #4	0	0	0	0	0	0	1685	1685
E-1	10130	MBR #5	0	0	0	0	0	0	1001	1001
E-2	13735	MBR #6	0	0	0	0	0	0	1650	1650
F-1	10757	MBR #7	0	0	0	0	0	0	695	695
F-2	12256	MBR #8	0	0	0	0	0	0	1800	1800
G-1	7833	MBR #9	0	0	0	0	0	0	775	775
G-2	3660	MBR #10	0	0	0	0	0	0	300	300
H	23210	MBR #11	0	0	0	0	0	0	2008	2008
I	39348	CISTERN #1	0	0	0	0	0	6245	0	6245
J	10883	MBR #12	0	0	0	0	0	0	1186	1186
K	2916	PERV PAV #1	572	0	0	0	0	0	0	572
		TOTALS:	572	0	0	0	4000	6245	14815	25632

TOTAL ESDv PROVIDED (CF): 25,632

TOTAL AREA 203746 SF
4.68 AC

Buch Apartments
Pe= 1.99
ESDv=(Pe)(RvA)/12
Rv=0.05+0.009i
V min=1.0" rainfall (1.0cRvA)/12
Vmax= 1yr rainfall=2.6" (2.6cRvA)/12

DA	% IMPERV	Rv	DA	ESDv REQ.	MINIMUM VOLUME	MAXIMUM VOLUME	VOLUME PROVIDED *	ESDv FACILITY TYPE
A	61	0.60	0.29	1283	643	1672	1635	MBR (M-6)
B	90	0.86	0.49	3077	1542	4010	4000	GRAVEL TRENCH (M-5)
C	78	0.75	0.17	942	472	1228	1005	MBR (M-6)
D-1	65	0.63	0.19	858	430	1119	1075	MBR (M-6)
D-2	71	0.69	0.44	2171	1088	2829	1685	MBR (M-6)
E-1	69	0.67	0.23	1133	568	1476	1001	MBR (M-6)
E-2	75	0.73	0.32	1659	832	2162	1650	MBR (M-6)
F-1	67	0.65	0.25	1171	587	1526	695	MBR (M-6)
F-2	70	0.68	0.28	1381	692	1800	1800	MBR (M-6)
G-1	61	0.60	0.18	786	394	1024	775	MBR (M-6)
G-2	52	0.52	0.08	315	158	410	300	MBR (M-6)
H	72	0.70	0.53	2685	1346	3499	2008	MBR (M-6)
I	100	0.95	0.90	6215	3115	8099	6245	CISTERN (M-1)
J	53	0.53	0.25	955	479	1244	1186	MBR (M-6)
K	100	0.95	0.07	461	231	600	572	PERV. PAVING (A-2)

TOTAL ESDv BY SUBAREA 25089 25632

*Micro-bioretentions utilized in each subarea at the rate of 75%.

ENVIRONMENTAL CONCEPT PLAN

ESDv CONCEPT PLAN

BUCH APARTMENTS

10945 PRICE MANOR WAY (FORMERLY JOHNS HOPKINS ROAD)
ZONED: R-APT
(L. 3192 / F. 394)

TAX MAP 46 BLOCK 4 — PARCEL 126
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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

STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 16193 — REGISTERED PROFESSIONAL ENGINEER — 7/1/15

ROBERT H. VOGEL, PE No.16193

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: 09-27-2016

DESIGN BY:	RHV/GAH/EDS/DZE
DRAWN BY:	GAH/EDS/DZE
CHECKED BY:	RHV
DATE:	JUNE 2015
SCALE:	AS SHOWN
W.O. NO.:	12-50.00

SHEET 2 OF 3

ECP-15-018

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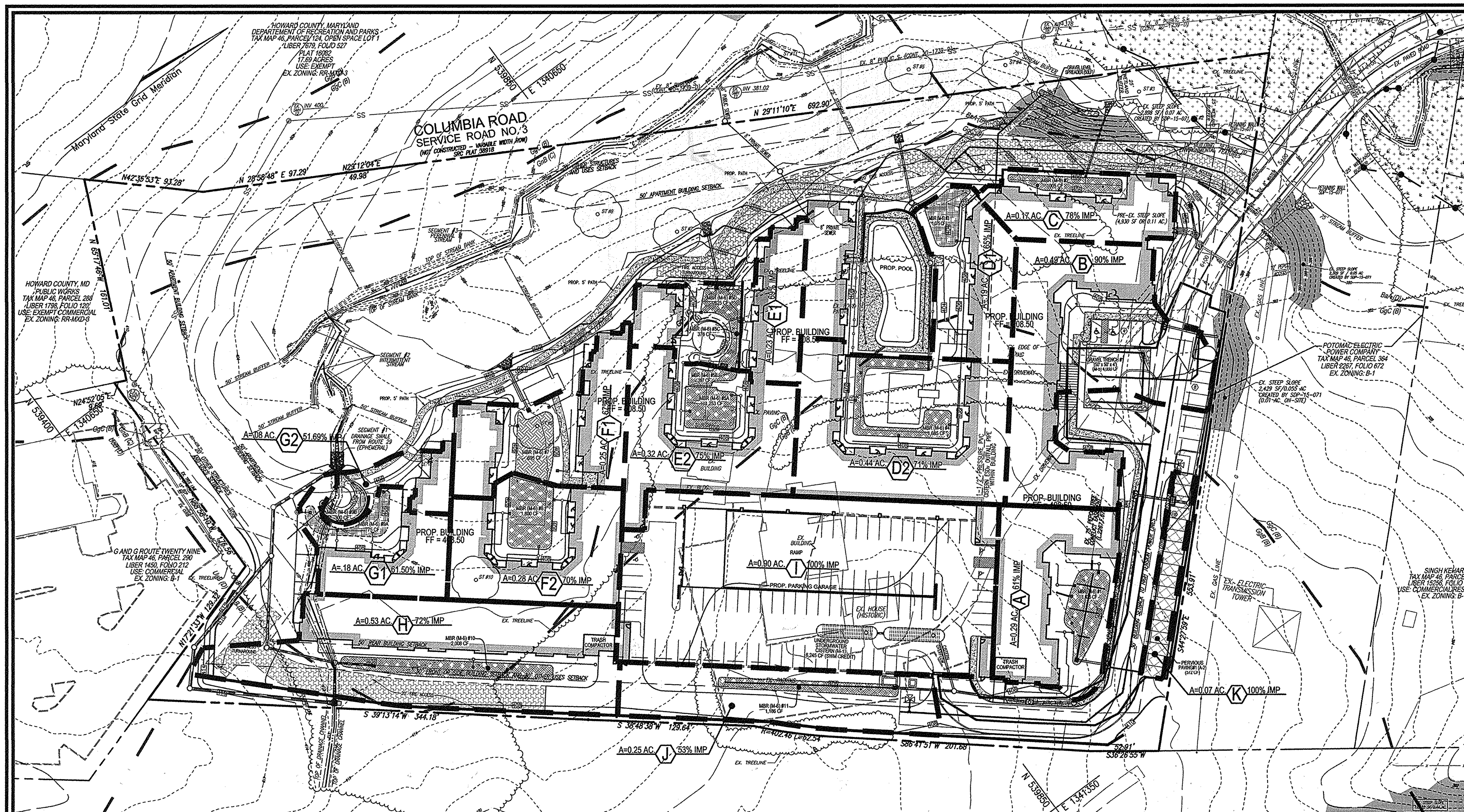


SWM DRAINAGE AREA MAP

SCALE: 1"=50'

LEGEND:

Symbol	Description
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING UTILITY POLE
	EXISTING LIGHT POLE
	EXISTING MAILBOX
	EXISTING SIGN
SMH 2	EXISTING SANITARY MANHOLE
SS	EXISTING SANITARY LINE
CO	EXISTING CLEANOUT
FH	EXISTING FIRE HYDRANT
W	EXISTING WATER LINE
//	EXISTING FENCE
	EXISTING TREELINE
	PROPOSED STORMDRAIN
	PROPOSED STORMDRAIN INLET
	PROPOSED TREELINE
	PROPOSED CURB
	PROPOSED SIDEWALK
	PROP. MICRO BIORETENTION AREA
	DRAINAGE DIVIDE
	PRE-EX. STEEP SLOPES (25% OR GREATER)
	EX. STEEP SLOPES (25% OR GREATER)
	EX. MODERATE SLOPES (15%-24.99% OR GREATER)

(M-1) RAINWATER HARVESTING (CISTERNS AND RAIN BARRELS)

CONSTRUCTION CRITERIA:
THE FOLLOWING SHOULD BE ADDRESSED DURING CONSTRUCTION OF PROJECTS WITH RAINWATER HARVESTING SYSTEMS:

SITE DISTURBANCE:
UNDERGROUND STORAGE TANKS SHALL BE PLACED ON OR IN NATIVE SOILS. IF PLACEMENT ON FILL MATERIAL IS NECESSARY, A GEOTECHNICAL ANALYSIS MAY BE REQUIRED BY THE APPROVING AUTHORITY.

STORAGE TANKS:
A. STORAGE TANKS SHALL BE DESIGNED TO BE WATERTIGHT AND ALL MATERIALS SHOULD BE SEALED WITH A WATER SAFE, NON-TOXIC SUBSTANCE.
B. STORAGE TANKS SHALL BE PROTECTED FROM DIRECT SUNLIGHT AND SHALL BE OPAQUE TO PREVENT THE GROWTH OF ALGAE.
C. THE TOP OF UNDERGROUND TANKS SHALL BE BENEATH THE FROST LINE.
D. CISTERNS MAY BE ORDERED FROM A MANUFACTURER OR CONSTRUCTED ON-SITE. TYPICAL MATERIALS USED TO CONSTRUCT CISTERNS ARE FIBERGLASS, WOOD, METAL, OR REINFORCED CONCRETE.
E. RAIN BARRELS CAN BE PURCHASED OR CUSTOM MADE FROM LARGE, PLASTIC (E.G., 55-GALLON) DRUMS

INSPECTION:
PRIOR TO OPERATION, CERTIFICATION SHALL BE REQUIRED THAT THE CONSTRUCTED SYSTEM MEETS THE CONDITIONS SPECIFIED ON THE APPROVED PLANS. ADDITIONALLY, CERTIFICATION REGARDING THE WATER TIGHTNESS OF THE UNDERGROUND STORAGE TANK SHALL BE REQUIRED AFTER ITS INSTALLATION.

MAINTENANCE CRITERIA:
THE FOLLOWING ITEMS SHOULD BE ADDRESSED TO ENSURE PROPER MAINTENANCE AND LONG-TERM PERFORMANCE OF RAINWATER HARVESTING SYSTEMS:

A. PRIVATELY OWNED PRACTICES SHALL HAVE A MAINTENANCE PLAN AND SHALL BE PROTECTED BY EASEMENT, DEED RESTRICTION, ORDINANCE, OR OTHER LEGAL MEASURES PREVENTING ITS NEGLECT, ADVERSE ALTERATION, AND REMOVAL.
B. ACCESS SHALL BE PROVIDED FOR CLEANING, INSPECTION, AND MAINTENANCE IN ALL CISTERNS. A DRAIN PLUG SHALL ALSO BE PROVIDED TO ALLOW THE SYSTEM TO BE COMPLETELY EMPTIED IF NEEDED.
C. LEAF SCREENS, GUTTERS, AND DOWNSPOUTS SHOULD BE CLEANED TO PREVENT CLOGGING. BUILT-UP DEBRIS CAN ALSO FOSTER BACTERIAL GROWTH IN GUTTERS AND DOWNSPOUTS.
D. STORAGE TANK LIDS AND MOSQUITO SCREENS SHOULD BE INSPECTED AND CLEANED.
E. DAMAGED COMPONENTS SHOULD BE REPLACED AS NEEDED.
F. TO AVOID FREEZING OF COMPONENTS, ABOVE GROUND SYSTEMS SHOULD BE DISCONNECTED, DRAINED, AND CLEANED AT THE START OF THE WINTER SEASON.
G. UNDERGROUND SYSTEM CONNECTIONS SHOULD BE CHECKED FOR FROZEN LINES AND ICE BLOCKAGES DURING WINTER.
H. INDOOR SYSTEMS MAY REQUIRE MORE SPECIFIC MAINTENANCE.

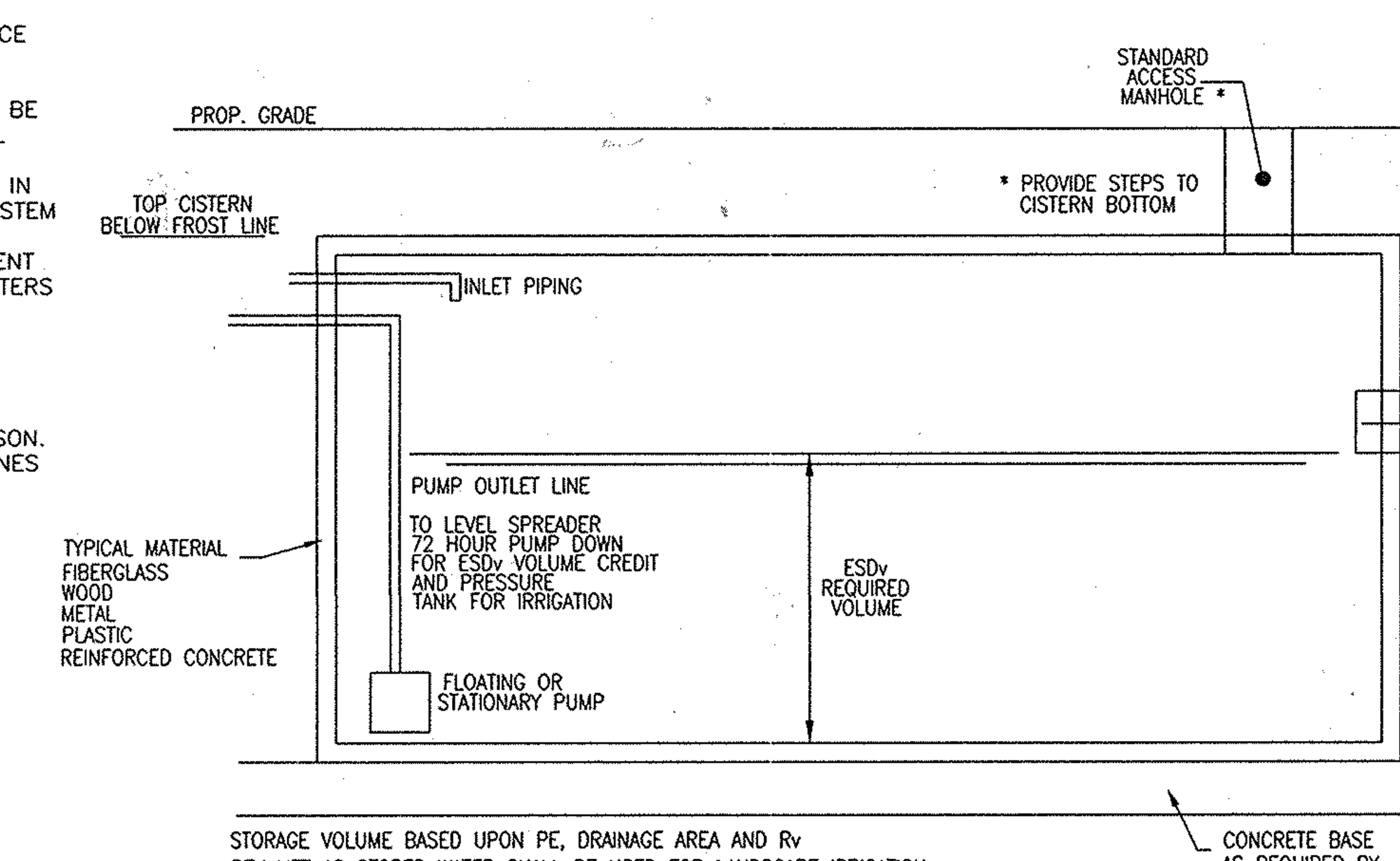
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 10.19.15
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 7/01/15
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED RAINWATER HARVESTING (M-1)

1. EMPTY BARRELS ON A MONTHLY BASIS AND CLEAN BARREL WITH A HOSE.
2. VERIFY INTEGRITY OF LEAF SCREENS, GUTTERS, DOWNSPOUTS, SPIGOTS, AND MOSQUITO SCREENS. CLEAN AND REMOVE ANY DEBRIS.
3. DAMAGED COMPONENTS SHALL BE REPLACED AS NEEDED.
4. TO AVOID FREEZING, BARREL SHOULD BE EITHER DISCONNECTED OR ALLOWED TO DRAIN BY BOTTOM SPIGOT DURING THE WINTER SEASON.



STORAGE VOLUME BASED UPON PE, DRAINAGE AREA AND Rv
REV MET AS STORED WATER SHALL BE USED FOR LANDSCAPE IRRIGATION

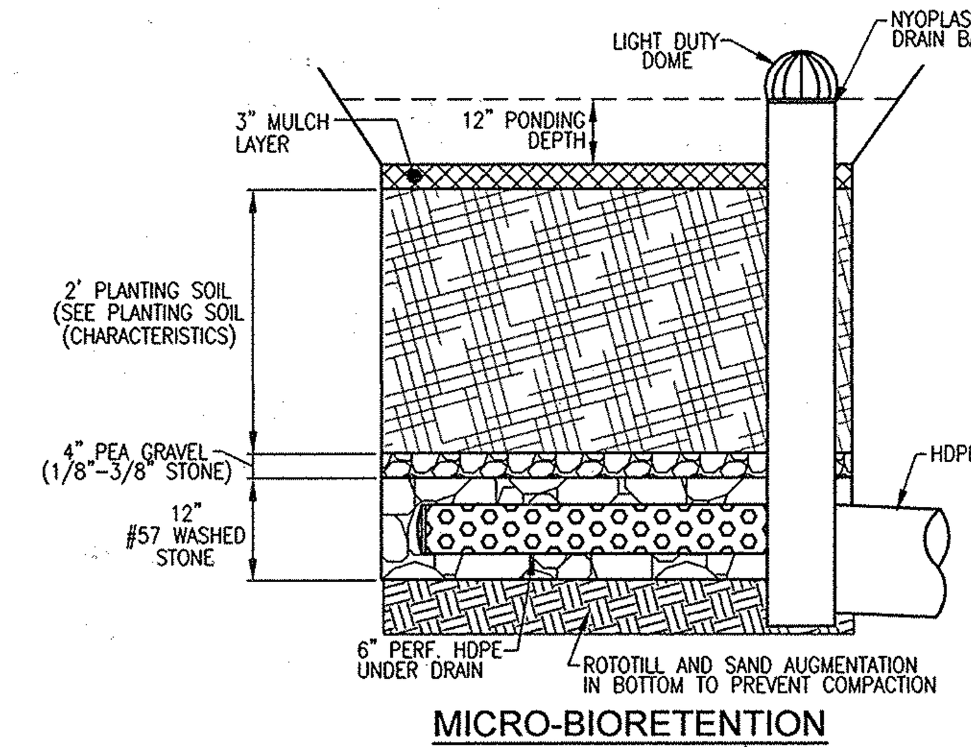
CISTERN - RAIN HARVESTING SYSTEM OR EQUIVALENT
TYP. CISTERN DETAIL

NOT TO SCALE

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

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

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2' to 4' deep]	loamy sand (60 - 65%) & compost (35 – 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with ¼-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f'_c = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) *not using previously approved State or local standards* requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone **(AASHTO)** #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



MICRO-BIORETENTION

NOT TO SCALE

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

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

2. FILTERING MEDIA OR PLANTING SOIL
THE SOIL SHALL BE A UNIFORM 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 15.08.01.05. THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:
* SOIL COMPONENT – LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).
* ORGANIC CONTEN – 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 (30%), COARSE SAND (30%), AND COMPOST (40%).
* CLAY CONTENT – MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
* PH RANGE – SHOULD BE BETWEEN 5.5 – 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.

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

3. 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 LOADER, 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 REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENION 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.

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

5. PLANT INSTALLATION
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.
ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH 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. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.
GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME 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 DEFEATS, 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.

6. UNDERDRAINS
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:
* PIPE – SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTMF 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HDPE).
* 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. 4 OR 4x4) 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 OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,0000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.
* A 4" LAYER OF PEA 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".

THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

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

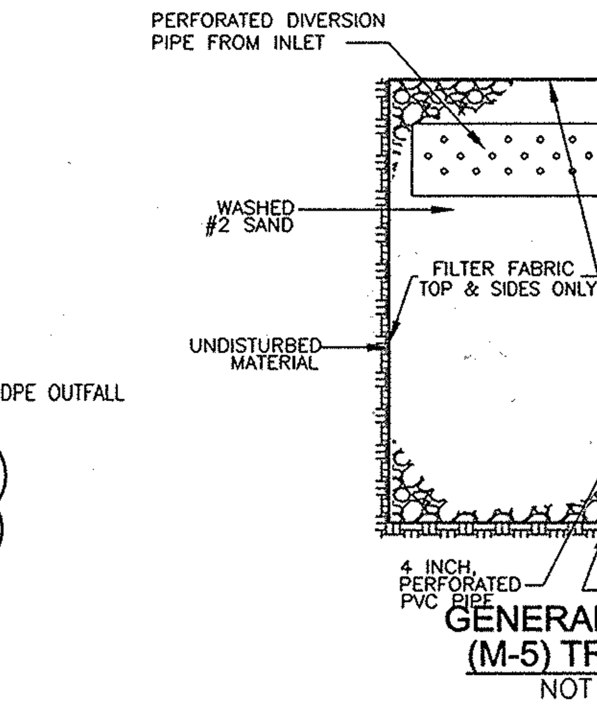
OPERATION AND MAINTENANCE SCHEDULE FOR LANSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)

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

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

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

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



GENERAL INFILTRATION (M-5) TRENCH DETAIL

NOT TO SCALE

APPENDIX B.2. CONSTRUCTION SPECIFICATIONS FOR INFILTRATION PRACTICES
B.2.A INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS

AN INFILTRATION TRENCH MAY NOT RECEIVE RUN-OFF UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA TO THE INFILTRATION TRENCH

1. HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH OT MINIMIZE COMPACTION OF THE SOIL.

2. EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DEMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FABRIC PUNCTURING OR TEARING OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE SIDE WALLS OF THE TRENCH SHALL BE ROUGHENED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.

3. A CLASS "C" GEOTEXTILE OR BETTER (SEE SECTION 24.0 , MATERIAL SPECIFICATIONS, 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MDE, 1994) SHALL INTERFACE BETWEEN THE TRENCH SIDE WALLS AND BETWEEN THE STONE RESERVOIR AND GRAVEL FILTER LAYERS. A PARTIAL LIST OF NON-WOVEN FILTER FABRICS THAT MEET THE CLASS "C" CRITERIA FOLLOWS. ANY ALTERNATIVE FILTER FABRIC MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.

AMOCO 4552	CARTHAGE FX-80S
GEOLON N70	MIRAFI 180-N
WEBTEC N07	

THE WIDTH OF THE GEOTEXTILE MUST INCLUDE SUFFICIENT MATERIAL TO CONFORM TO TRENCH PERIMETER IRREGULARITIES AND FOR A 6-INCH MINIMUM TOP OVERLAP. THE FILTER FABRIC SHALL BE TUCKED UNDER THE SAND LAYER ON THE BOTTOM OF THE INFILTRATION TRENCH FOR A DISTANCE OF 6 TO 12 INCHES. STONES OR OTHER ANCHORING OBJECTS SHOULD BE PLACED ON THE FABRIC AT THE EDGE OF THE TRENCH TO KEEP THE TRENCH OPEN DURING WINDY PERIODS. WHEN OVERLAPS ARE REQUIRED BETWEEN ROLLS, THE UPHILL SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SHINGLED EFFECT.

4. IF A 6 INCH SAND FILTER LAYER IS PLACED ON THE BOTTOM OF THE INFILTRATION TRENCH, THE SAND FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET AASHTO-M-43, SIZE NO. 9 OR NO. 10. ANY ALTERNATIVE SAND GRADATION MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.

5. THE STONE AGGREGATE SHOULD BE PLACED IN A MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES. THE GRAVEL (ROUNDED "BANK RUN" GRAVEL IS PREFERRED) FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET ON OF THE FOLLOWING AASHTO-M-43, SIZE NO. 2 OR NO. 3.

6. FOLLOWING THE STONE AGGREGATE PLACEMENT, THE FILTER FABRIC SHALL BE FOLDED OVER THE STONE AGGREGATE TO FORM A 6-INCH MINIMUM LONGITUDINAL LAP. THE DESIRED FILL SOIL OR STONE AGGREGATE SHALL BE PLACED OVER THE LAP AT SUFFICIENT INTERVALS TO MAINTAIN THE LAP DURING SUBSEQUENT BACKFILLING.

7. CARE SHALL BE EXERCISED TO PREVENT NATURAL OR FILL SOILS FROM INTERMIXING WITH THE STONE AGGREGATE. ALL CONTAMINATED STONE AGGREGATE SHALL BE REMOVED AND REPLACED WITH UNCONTAMINATED STONE AGGREGATE.

8. VOIDS MAY OCCUR BETWEEN THE FAVRIC AND THE EXCAVATION SIDES SHALL BE AVOIDED. REMOVING BOULDERS OR OTHER OBSTACLES FROM THE TRENCH WALLS IS ONE SOURCE OF SUCH VOIDS. THEREFORE, NATURAL SOILS SHOULD BE PLACED IN THESE VOIDS AT THE MOST CONVENIENT TIME DURING CONSTRUCTION TO ENSURE FABRIC CONFORMITY TO THE EXCAVATION SIDES.

9. VERTICALLY EXCAVATED WALLS MAY BE DIFFICULT TO MAINTAIN IN AREAS WHERE SOIL MOISTURE IS HIGH OR WHERE SOFT COHESIVE OR COHESIONLESS SOILS ARE DOMINANT. THESE CONDITIONS MAY REQUIRE LAYING BACK OF THE SIDE SLOPE TO MAINTAIN STABILITY.

10. PVC DISTRIBUTION PIPES ASHALL BE SCHEDULE 40 AND MEET ASTM-D-1785. ALL FITTINGS SHALL MEET ASTM-D-2729. PERFORATIONS SHALL BE 3/8 INCH IN DIAMETER. A PERFORATED PIPE SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. THE END OF THE PVC PIPE SHALL BE CAPPED. NOTE: PVC PIPE WITH A WALL THICKNESS CLASSIFICATION OF SDR-35 MEETING ASTM-D-3034 IS AN ACCEPTABLE SUBSTITUTE FOR THE SCHEDULE 40 PIPE.

11. THE OBSERVATION WELL IS TO CONSIST OF 6-INCH DIAMETER PERFORATED PVC SCHEDULE 40 PIPE (M 278 OR F758, TYPE PS 28) WITH A CAP SET 6 INCHES ABOVE GROUND LEVEL AND IS TO BE LOCATED NEAR THE LONGITUDINAL CENTER F THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RIBS TO PREVENT ROTATION WHEN REMOVING THE CAP. THE SCREW TOP LID SHALL BE A CLEANOUT WITH A LOCKING MECHANISM OR SPECIAL BOLT TO DISCOURAGE VANDALISM. THE DEPTH TO THE INVERT SHALL BE MARKED ON THE LID. THE PIPE SHALL BE PLACED VERTICALLY WITHIN THE GRAVEL PORTION OF THE INFILTRATION TRENCH AND A COP PROVIDED AT THE BOTTOM OF THE PIPE. THE BOTTOM OF THE CAP SHALL REST ON THE INFILTRATION TRENCH BOTTOM.

12. CORRUGATED METAL DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, AND SHALL BE ALUMINIZED IN ACCORDANCE WITH AASHTO-M-274. ALUMINIZED PIPE CONTACT WITH CONCRETE SHALL BE COATED WITH AND INERT COMPOUND CAPABLE OF PREVENTING THE DELETERIOUS EFFECT OF THE ALUMINUM ON THE CONCRETE. PERFORATED DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, CLASS 2 AND SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. AN ALUMINIZED METAL PLATE SHALL BE WELDED TO THE END OF THE PIPE.

13. IF A DISTRIBUTION STRUCTURE WITH A WET WELLIS USED, A 4-INCH DRAIN PIPE SHALL BE PROVIDED AT OPPOSITE ENDS OF THE INFILTRATION TRENCH DISTRIBUTION STRUCTURE. TWO (2) CUBIC FEET OF POROUS BACKFILL MEETING AASHTO-M-43, SIZE NO. 57 SHALL BE PROVIDED AT EACH DRAIN.

14. IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER INFILTRATION TRENCHES (M-5)

1. THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.

2. WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.

3. A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.

4. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE xxx 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.

OWNER/DEVELOPER

BUCH LLLP
10945 PRICE MANOR WAY
LAUREL, MD 20723
301-359-3500

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

STORMWATER MANAGEMENT DRAINAGE AREA MAP

BUCH APARTMENTS

10945 PRICE MANOR WAY (FORMERLY JOHNS HOPKINS ROAD)
ZONED: R-APT
(L. 3192 / F. 394)

TAX MAP 46 BLOCK 4 — PARCEL 126
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
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FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV/GAH/EDS/DZE
DRAWN BY: GAH/EDS/DZE
CHECKED BY: RHV
DATE: JUNE 2015
SCALE: AS SHOWN
W.O. NO.: 12-50.00

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: 09-27-2016

SHEET 3 OF 3

ECP-15-018

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