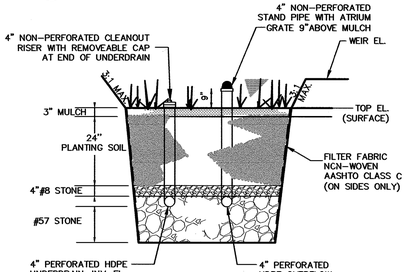
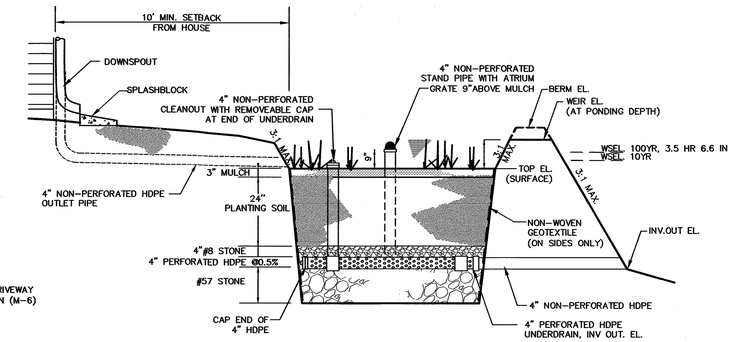
LEGEND

- SSF — SILT FENCE
- LOD — LIMIT OF DISTURBANCE
- DRAINAGE AREA
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- OUTLET PIPE
- ROOF LEADER
- 15% ≤ SLOPES < 25%
- IMPERVIOUS ROOF & DRIVEWAY TO MICRO-BIORETENTION (M-6)
- MICRO-BIORETENTION (M-6)
- EX. TREE OR ST-# SPECIMEN TREE
- B1 — BORING LOCATION



TYPICAL MICRO-BIORETENTION SECTION

NTS



NOTE– THE ENTIRE DRAINAGE AREA MUST BE FULLY STABILIZED BEFORE RUNOFF CAN BE DIRECTED TO THE FACILITY.

TYPICAL MICRO-BIORETENTION PROFILE

NTS

MICRO-BIORETENTION (M-6) DESIGN DATA

FACILITY	TOP EL. (SURFACE)	WEIR EL. (PONDING)	BERM EL.	INV.IN (ELEV.)	INV.OUT (ELEV.)	SURFACE AREA (S.F.)	PONDING AREA (S.F.)	PONDING DEPTH (IN.)	GRAVEL DEPTH (IN.) BELOW UNDERDRAIN
MB-1	418	419	419.5	415.08	414.80	276.0	489.0	12.0	12.0

MICRO-BIORETENTION OUTLET WEIR SECTION

NTS

THE WEIR EQUATION
WEIR FLOW = Q = CLH ^ (3/2)
H = HEAD = HYDRAULIC DEPTH = AW/LWS

AW = WETTED AREA
L = LWS = LENGTH OF THE WATER SURFACE

LWS = W+2SSD

W = BOTTOM WIDTH
SSD = SIDESLOPE X DEPTH (ACTUAL)
C = 2.7 – 3.0 (CHOW 1959)
(C INCREASES WITH DEPTH FOR A GIVEN BREADTH OF WEIR)
Q = C * LWS * (AW/LWS) ^ (3/2)
SS = 3 (TRUE FOR 3:1 SLOPES)

OUTLET WEIR SECTION FLOW CALCULATION

ELEV	C	LWS DEPTH (D)	W	W+2SSD	AW	H	Q (CFS)
419	2.7	0	8	8	0	0	0
419.08	2.72	0.08	8	8.48	0.66	0.08	0.50
419.13	2.74	0.13	8	8.78	1.09	0.12	1.05
419.17	2.76	0.17	8	9.02	1.45	0.16	1.60
419.19	2.78	0.19	8	9.14	1.63	0.18	1.91
419.22	2.8	0.22	8	9.32	1.91	0.20	2.41
419.25	2.85	0.25	8	9.5	2.19	0.23	2.99
419.5	2.9	0.50	8	11	4.75	0.43	9.05

SWM PRACTICES SCHEDULE

IDENTIFIER	PROPOSED PRACTICE	REQ'D ESDv	PROVIDED ESDv
MB-1	(M-6) MICRO-BIORETENTION	430 C.F.	488 C.F.

NOTE: ESD VOLUME INCLUDES VOLUME IN PONDING PLUS VOLUME IN GRAVEL I.E. 378 C.F. IN PONDING PLUS 110 C.F. IN GRAVEL = 488 C.F.

NOTE: ALL ROOF LEADERS TO BE DIRECTED TOWARDS THE MICRO-BIORETENTION FACILITY.

DIVERSION FENCE, GRASS SWALE SHEAR STRESS

SHEAR STRESS = 62.4 LBS/CU.FT. * (Aw/Pw)*(S)

CALCULATE FOR 10 YEAR, "C" SOILS	"C" FACTOR	DIVERSION (C-9)	"C" FACTOR	SWALE NO.1
DA (ACRES)		1.44		1.80
TC (MIN)		30		30
I (IN/HR)		3.75		3.75
IMP SF	0.86	8541	0.86	12284
GRASS SF	0.19	54396	0.19	66271
TOTAL SF		62937		78555
WTD C	0.28		0.29	
Q (CFS)		1.52		1.99
Aw (SF)		0.66		1.71
Pw (FT)		4.33		7.52
S (FT/FT)		0.10		0.10
SHEAR LBS/SF		0.58		1.42

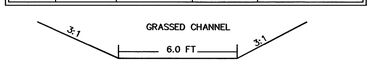
THE DIVERSION (2.4 FT FLOW WIDTH ON PLASTIC) AND THE GRASSED SWALE (SWALE NO.1) ARE STABLE FOR CALCULATED FLOW AND SHEAR FORCE.

TR-20 STORM ANALYSIS SUMMARY

DESIGN STORM	PRE-DEVELOPMENT Q PEAK	POST-DEVELOPMENT Q PEAK	POND VOLUME REQUIRED
24-HOUR 100 YR STORM	14.6 CFS	14.2 CFS	449 CU.FT.
24-HOUR 10 YR STORM	6.5 CFS	6.3 CFS	419 CU.FT.
3.55-HOUR 6.6 IN STORM	15.9 CFS	15.6 CFS	454 CU.FT.

TR-20 STORM ANALYSIS WS ELEVATIONS

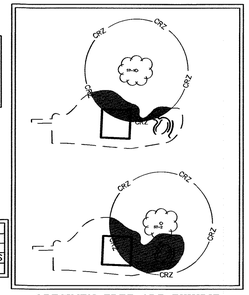
FACILITY	TOP EL. (SURFACE)	WSEL 100 YR (ELEV.)	WSEL 10 YR (ELEV.)	WSEL 3.55 HR, 6.6 IN (ELEV.)
MB-1	418.00	419.14	419.08	419.15



SECTION: SWALE NO.1

CHANNEL CAPACITY: GRASS SWALE (SWALE NO.1)

SIDE SLOPE:	BOTTOM WIDTH:	SIDE SLOPE:	N 0.15 BASED ON GRASS				
3	8						
DEPTH	AW	PW	AW/PW^2/3	S FT/FT	S^0.5	V FPS	Q CFS
0.25	1.71	7.52	0.3726	0.1	0.3162	1.17	2.00



SPECIMEN TREE CRZ EXHIBIT

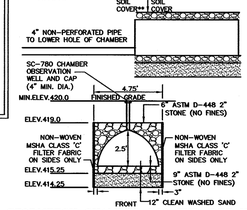
1" = 100 FT

SPECIMEN TREE LIST

SPECIMEN #	SPECIES	COMMON NAME	DBH (INCHES)	CONDITION	STATUS
ST-1	FAGUS SYLVATICA	COMMON BEECH	48	GOOD/MULTI-TRUNK	7.6% DISTURBANCE
ST-2	ACER RUBRUM	RED MAPLE	48	DEAD OR DYING	27.7% DISTURBANCE

TR-55 CALCULATED VOLUME TO CONTROL THE
100-YR STORM = 1756 CU.FT. REQUIRED
VOLUME MB-1 = 488 CU.FT. POND AND GRAVEL
VOLUME TC-780 = 1370 CU.FT. (INCL. ADDL.STONE)
VOLUME PROVIDED = 1858 CU.FT.

SC-780 STORMTECH CHAMBER
STORAGE DEPTH: 3.75' (45")
CHAMBER STORAGE: 45.9 CF
STONE STORAGE: 32.5 CF
TOTAL STORAGE: 78.4 CF PER CHAMBER
STONE DIMENSIONS: 7.1' (L) x 4.75' (W) x 3.75' (H) (PER SECTION)



STORMTECH CHAMBER 780 TYP. DETAIL

NOT TO SCALE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 12.15.21

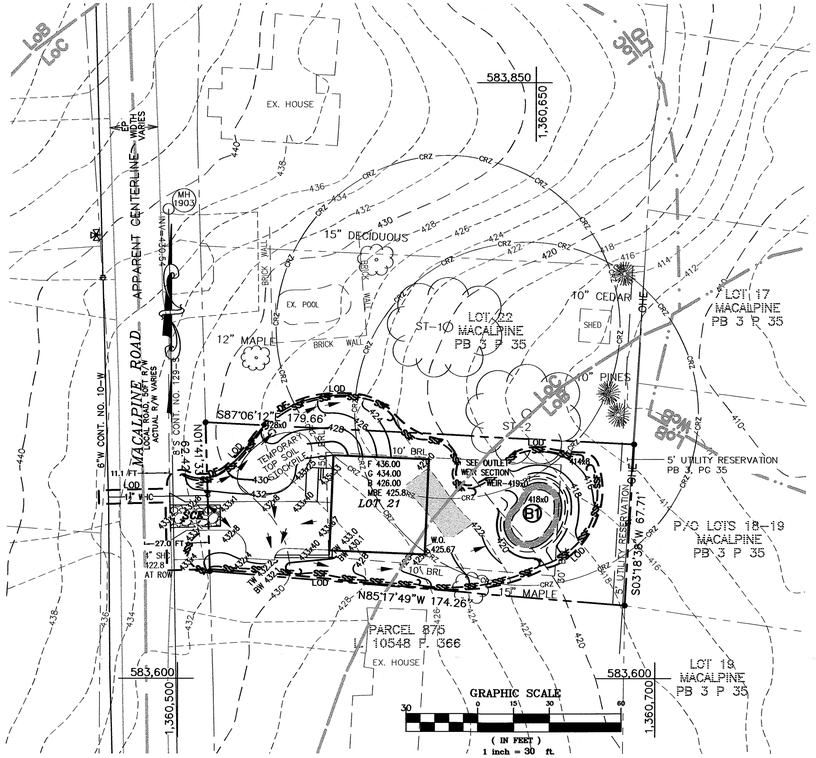
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 12/10/21

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. 34027, EXP DATE 01/16/2023

MICHAEL G. KRETSCH, P.E. — 11/29/2021 DATE:

DEVELOPER

SCOTT HARBINSON
9055 MEADOWVALE COURT
ELLICOTT CITY MD 21042
410-530-6925



SOIL DESCRIPTION:

SYMBOL	RATING	NAME	K FACTOR	MAP NO.	COMMENTS
LoB	(C)	LEGORE MONTALTO URBAN LAND COMPLEX 0-8% SLOPES	0.64	13	
LoC	(C)	LEGORE MONTALTO URBAN LAND COMPLEX 8-16% SLOPES	0.64	13	

STAGE STORAGE FOR TR-20 ANALYSIS

Depth (in)	Depth(ft)	Area (sf)	Incr.vol (cf)	Sum.vol(cf)	Elev (ft)
0	0.00	276		*	418
3	0.25	324	75.000	75.000	418.25
6	0.50	375	87.375	162.375	418.50
9	0.75	430	100.625	263.000	418.75
12	1.00	489	114.875	377.875	419.00
13	1.08	509	41.582	419.457	419.08
	1.13	520	21.429	440.885	419.13
14	1.17	530	21.864	462.750	419.17
	1.19	534	12.414	475.163	419.19
	1.22	544	16.170	491.333	419.22
15	1.25	551	130.000	621.333	419.25
18	1.50	617	146.000	767.333	419.50

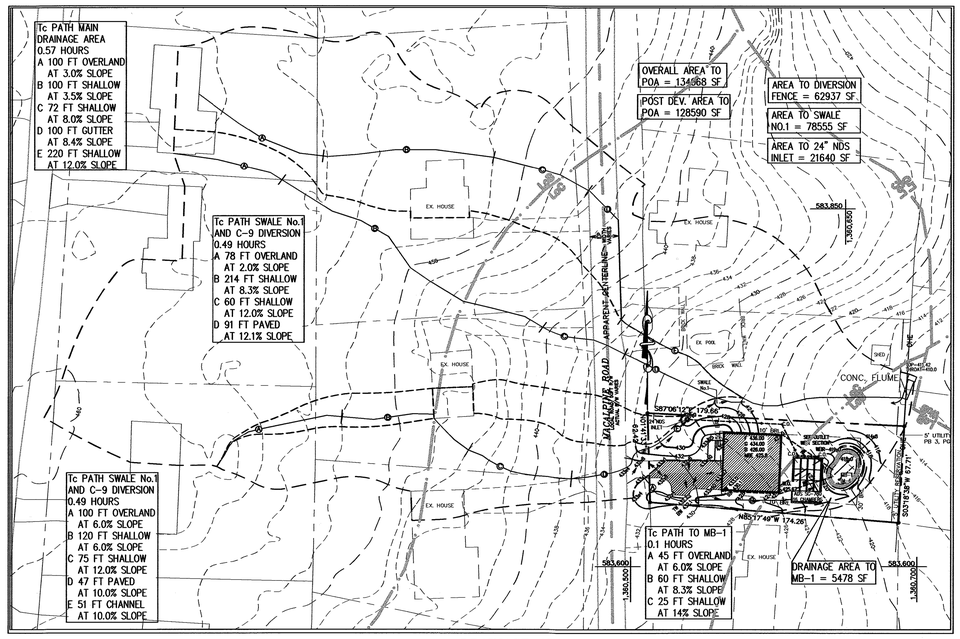
*VOLUMES DO NOT INCLUDE 110 CF IN GRAVEL FOR TR-20 ANALYSIS

BORING RESULTS:

ON OCT 9TH 2021, GE&T CONSULTANTS UTILIZED A SIMCO EARTHPROBE 200 GEOPROBE TO BORE ONE (1) SOIL BORING TO A DEPTH OF 9 FT BELOW THE EXISTING SITE GRADE AT THE LOCATION SHOWN ON THIS DRAWING. BORING WAS STAKED BY MILDENBERG, BOENDER & ASSOC., INC. 10/08/2021.

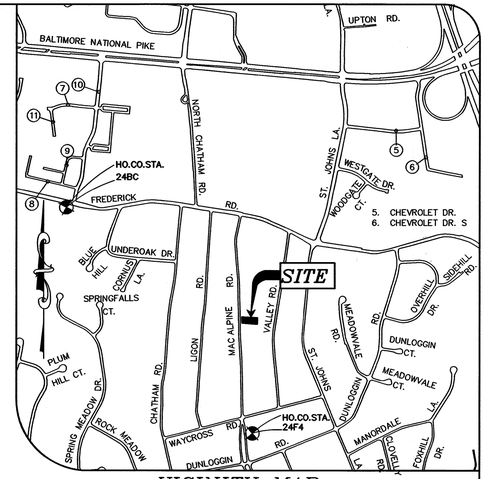
BORING NO.	DEPTH TO GROUNDWATER (FT)	DEPTH TO REFUSAL (FT)	BORING DEPTH (FT)
B-1	N/A	N/A	9.0

ALL DEPTHS ARE BELOW EXISTING SITE GRADES



DRAINAGE AREA MAP

SCALE: 1"=50'



VICINITY MAP

SCALE: 1"=1000'

ADC MAP 20, GRID E-8

GENERAL NOTES:

1. SUBJECT PROPERTY ZONED "R-20" PER THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARD AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
3. SITE ANALYSIS DATA:

   ADDRESS: 3649 MACALPINE RD ELLICOTT CITY 21042
   LOCATION : TAX MAP: 24 – PARCEL : 216 – GRID 11 LOT 21 OF MACALPINE, PB 3, PG 35 (LEGAL LOT OF RECORD AS OF 1946)
   ZONING : R-20
   ELECTION DISTRICT : SECOND
   DEED REFERENCE : 16944/ 00337
   AREA OF TRACT : 0.264 ACRES
   PROPOSED USE: SFD.
   TOTAL NUMBER OF LOTS: 1
4. COORDINATES BASED ON NAD'83 MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 24F4 AND 24BC

   STA. No. 24F4 N 582,298.642 E 1,360,571.016 EL. 386.118
   STA. No. 24BC N 585,058.416 E 1,358,312.354 EL. 364.798
5. BOUNDARY AND TOPOGRAPHIC INFORMATION IS BASED ON FIELD RUN MONUMENTED SURVEY BY MILDENBERG BOENDER & ASSOC. IN MARCH 2020
6. NO STREAM, WETLANDS OR FLOODPLAIN EXIST ON SITE.
7. NO CEMETERIES OR HISTORIC STRUCTURES EXIST ON SITE.
8. PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT. WATER AND SEWER ARE PUBLIC. WATER CONTRACT 10-W) AND SEWER CONTRACT (129-S) .
9. STORMWATER MANAGEMENT REQUIREMENTS WILL BE SATISFIED VIA PRIVATELY OWNED AND MAINTAINED MICRO-BIORETENTION (M-6) FACILITY.
10. PROJECT IS EXEMPT FROM FOREST CONSERVATION REQUIREMENTS IN ACCORDANCE WITH SECTION SEC. 16.1202(B)(1)(i): EXEMPTIONS TO REQUIREMENT FOR FOREST CONSERVATION PLANS:

    (1) EXEMPTIONS NOT REQUIRING A DECLARATION OF INTENT. THE FOLLOWING DEVELOPMENT IS EXEMPT FROM THE REQUIREMENT OF THIS SUBTITLE: (I) A SUBDIVISION, SITE DEVELOPMENT OR GRADING PERMIT FOR DEVELOPMENT ON LAND WHICH IS LESS THAN 40,000 SQUARE FEET;
11. OFFSITE (LOT 22) GRADING AGREEMENT AND DRAINAGE AGREEMENT WILL BE RECORDED WITH THE SDP PHASE OF THIS PROJECT.
12. SITE DISTANCE WILL BE ADDRESSED IN THE SDP PHASE.

SITE ANALYSIS DATA:

1.	AREA OF THE SITE	= 0.264 AC ± (11,486 S.F.)
2.	AREA OF WETLANDS AND ITS BUFFERS	= 0.00 AC ± (NONE)
3.	AREA OF FLOODPLAIN	= 0.00 AC ± (NONE)
4.	AREA OF EXISTING FOREST	= 0.00 AC ± (NONE)
5.	AREA OF STREAM BUFFER	= 0.00 AC ± (NONE)
6.	AREA OF STEEP 15% ≤ SLOPES < 25%	= 0.01 AC ± (359 S.F.)
7.	AREA OF STEEP SLOPES ≥ 25%	= 0.00 AC ± (NONE)
8.	NET BUILDABLE AREA	= 0.264 AC ± (11,486 S.F.)
9.	LIMIT OF DISTURBANCE AREA	= 0.239 AC ± (10,401 S.F.)
10.	GREEN OPEN AREA (PERVIOUS)	= 0.197 AC ± (8,603 S.F.)
11.	PROPOSED IMPERVIOUS AREA	= 0.066 AC ± (2,883 S.F.)
12.	AREA OF ERODIBLE SOILS	= 0.264 AC ± (11,486 S.F.)

ESD NARRATIVE

1. THE PROPERTY DOES NOT CONTAIN ANY ENVIRONMENTAL FEATURES. THE SITE SLOPES FROM WEST TO EAST. AN EXISTING CONCRETE FLUME AND INLET EXIST ON THE ADJACENT (LOT 22) PROPERTY AND PROVIDE EGRESS FOR STORM FLOWS.
2. THE IMPROVEMENTS AND DEVELOPED AREA WILL MAINTAIN THE EXISTING DRAINAGE PATTERNS AS CLOSELY AS POSSIBLE. NO IMPACT IS PROPOSED THAT WOULD ALTER ANY NATURAL FLOW PATTERNS.
3. MICRO-BIORETENTION (M-6) WILL PROVIDE THE ENTIRE REQUIRED STORMWATER QUALITY TREATMENT FOR THE DRIVEWAY AND THE HOUSE. IN ADDITION, FLOW THAT CROSSES THE FRONT PORTION OF THE DRIVEWAY AND WOULD BYPASS THE MICRO-BIORETENTION IS DIRECTED TO STORMTECH CHAMBERS WHERE THE FIRST FLUSH PLUS ADDITIONAL VOLUME WILL BE CONTAINED.
4. THE REQUIRED EROSION AND SEDIMENT CONTROL MEASURES WILL BE IN ACCORDANCE WITH THE LATEST MDE STANDARDS AND SPECIFICATIONS UTILIZING SUPER SILT FENCES. NO SEDIMENT TRAPS OR BASINS ARE REQUIRED.
5. 2000 MARYLAND STORMWATER DESIGN MANUAL TABLE 5.2, (PAGE 5.10) "SUMMARY OF SITE DEVELOPMENT STRATEGIES" WAS UTILIZED TO THE EXTENT ALLOWABLE BY THE CURRENT HOWARD COUNTY ZONING AND LAND DEVELOPMENT REGULATIONS.
6. IN DESIGNING THIS PROJECT, IT WAS PLANNED TO MINIMIZE IMPERVIOUS AREAS, AND UTILIZE ESD MEASURES TO THE MEP.
7. STORM WATER MANAGEMENT HAS BEEN PROVIDED FOR THE 10 YEAR AND 100 YEAR 24-HOUR STORMS, AS WELL AS THE 3.55 HOUR 6.6 INCH STORM AS REQUIRED FOR THE TIBER WATERSHED. THIS HAS BEEN ACCOMPLISHED BY ALLOWING THE FLOWS FROM THIS DEVELOPMENT TO EXIT QUICKLY, PROVIDING SEPARATION OF PEAK FLOWS, AND A LOWER OVERALL COMBINED PEAK FLOW. ADDITIONALLY, FLOW VOLUME DETERMINED FROM COMPARING THE PRE AND POST DEVELOPMENT IS DIRECTED TO STORMTECH CHAMBERS FOR UNDERGROUND STORAGE. LASTLY, THE DOWNSTREAM PROPERTY HAS INSTALLED A SWALE TO HANDLE THE FLOWS FROM THE UPSTREAM BASIN.

project 20-004 | date NOV 2021
illustration MGK | engineering MGK | approval SAA
scale AS SHOWN

no.	description / revisions	date
		MAY 2020

MACALPINE ROAD PROPERTY

LOT 21 OF MACALPINE SUBDIVISION
TAX MAP: 24 – PARCEL : 216 – GRID 11 LOT 21 OF RECORD AS OF 1946
SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ENVIROMENTAL CONCEPT PLAN

MILDENBERG, BOENDER & ASSOC., INC.
Engineers Planners Surveyors
7350-B Grace Drive, Columbia, Maryland 21044
(410) 997-0296 Tel. (410) 997-0298 Fax.

1 OF 1

ECP-20-046