



MATCHLINE SEE SHEET 3

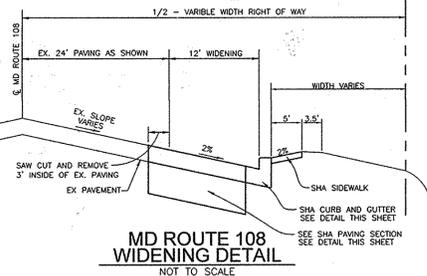
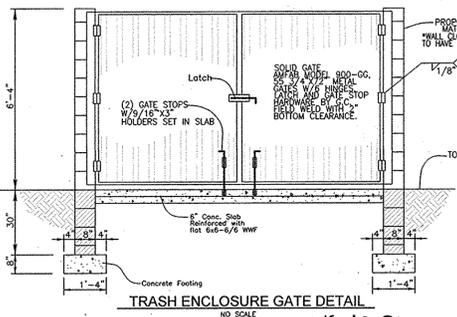
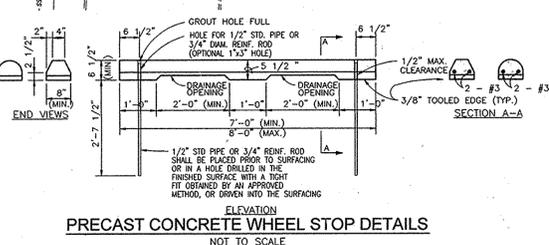
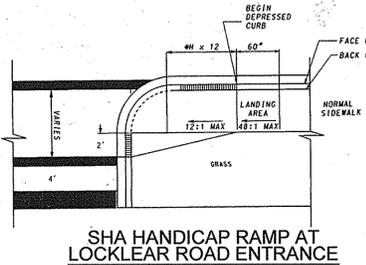
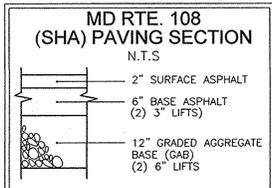
AAK SNOWDEN LLC  
C/O ABRAMS DEVELOPMENT GROUP  
TM 37 P488  
PARCEL B-3  
SECTION 1 / AREA 1  
PLAT# 14126  
ZONED: NT-E.C. COMMERCIAL  
COLUMBIA ROUTE 108 COMMERCIAL  
OFFICE BUILDING  
USE: COMMERCIAL

5890 WATERLOO ROAD  
PROP. BUILDING A  
ONE STORY  
13,300 SF  
FF=399.65

WATERLOO ELEMENTARY SCHOOL  
TM 37 P. 489  
ZONED: R-20  
USE: INSTITUTIONAL

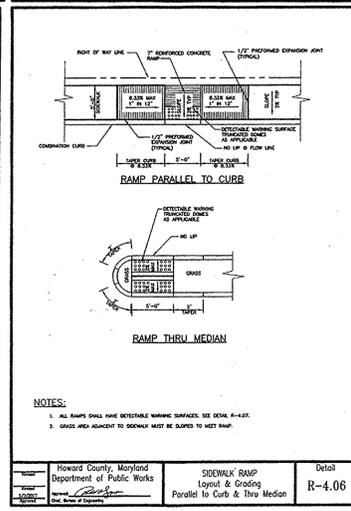
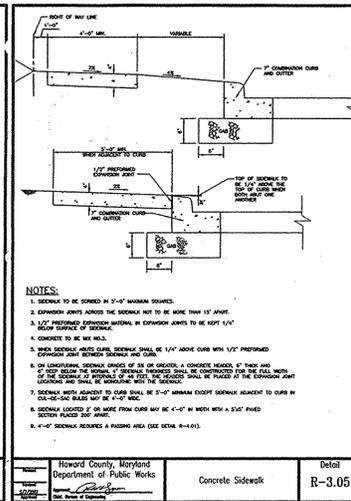
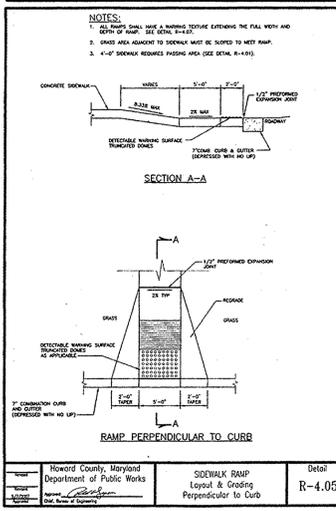
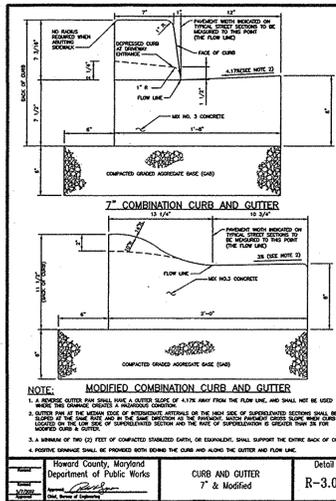
PLAN VIEW  
SCALE: 1"=30'

WATERLOO ROAD  
MD ROUTE 108  
MINOR ARTERIAL  
VARIABLE WIDTH ROW  
(STATE ROAD)



NOTICE TO CONTRACTOR (SHA WORK):  
ALL ITEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT VERSION OF THE REFERENCED STANDARD AT THE TIME OF CONSTRUCTION. THE BOOK OF STANDARDS MAY BE ACCESSED AT THE FOLLOWING ADDRESS:  
<http://apps.roads.maryland.gov/businesswithshabizstds/peccs/tesmanualsdtpub/publicationonline/ohdbookstd/index.asp>

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
[Signature] 12-2-14  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
[Signature] 12-03-14  
CHIEF, DIVISION OF LAND DEVELOPMENT  
[Signature] 12/3/14  
DIRECTOR



LEGEND: Table listing symbols for existing and proposed contours, elevations, curbs, utilities, trees, and zoning lines.

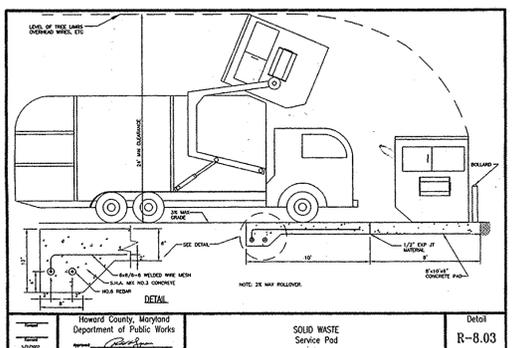
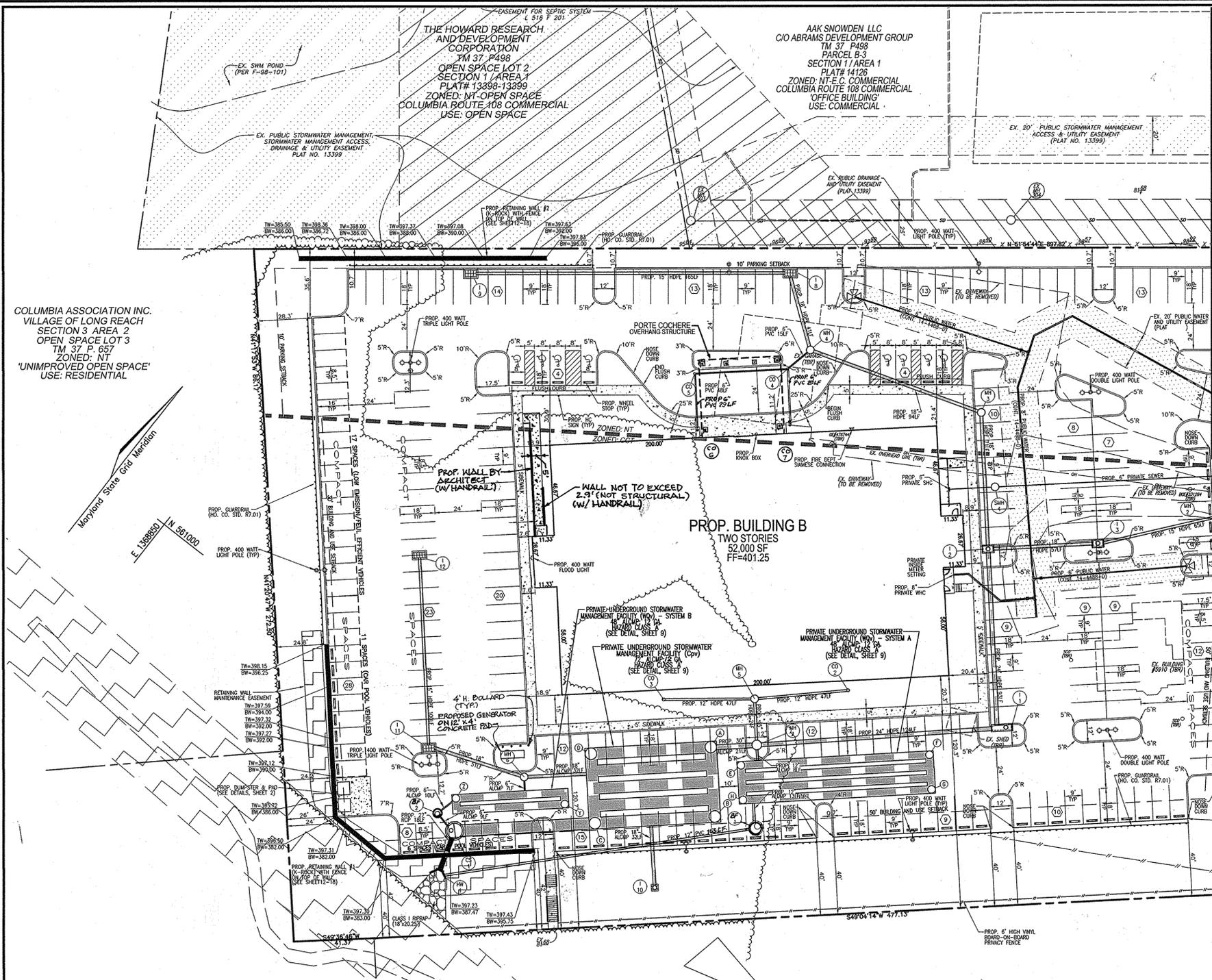


Table with 4 columns: SECTION, ROAD AND STREET CLASSIFICATION, CULVERT BEARING RATIO (GSP), and various surface elevations.

OWNER/DEVELOPER  
WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

REVISED SITE DEVELOPMENT PLAN  
SITE LAYOUT PLAN  
WATERLOO CROSSING  
MEDICAL AND OFFICE BUILDING  
PARCEL A  
GREEN BUILDING  
TAX MAP 37, BLOCK 7 & 8  
6TH ELECTION DISTRICT  
ROBERT H. VOGEL ENGINEERING, INC.  
8407 MAIN STREET  
ELLICOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.8961  
PROFESSIONAL CERTIFICATE  
DESIGN BY: DZ/RHV  
DRAWN BY: DZ/JR  
CHECKED BY: RHV  
DATE: OCTOBER 2014  
SCALE: AS SHOWN  
W.O. NO.: 05-52  
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: 06-27-2016  
2 SHEET OF 18



MATCHLINE SEE SHEET 2

**McGraw-Hill Construction Information**

**LEGEND:**

---	EXISTING CONTOUR
- - - -	PROPOSED CONTOUR
+	EXISTING SPOT ELEVATION
+	EXISTING CURB AND GUTTER
+	PROPOSED 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
+	PROPOSED STORM DRAIN
+	PROPOSED STORM DRAIN INLET
+	EXISTING TREES (FIELD LOCATED)
+	EXISTING TREELINE (FIELD LOCATED)
+	PROPOSED TREELINE
+	EXISTING FENCE
+	PROPERTY LINE
+	RIGHT-OF-WAY LINE
+	SOILS BOUNDARY
+	PROPOSED SIDEWALK
+	ZONING LINE

**ORDERING INFORMATION**

**PRODUCT SPECIFICATIONS**

**ACCESSORIES**

**TECHNICAL INFORMATION**

**PHOTOMETRICS**

**MOUNTING OPTIONS**

**OWNER/DEVELOPER**

WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

WATERLOO LAND NO. 2, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

**REVISIONS**

NO.	REVISION	DATE
5	RELOCATE GENERATOR & REMOVE PARKING SPACE ISLAND 04/15/15	
4	REMOVE PLANT & REMOVE STEPS AND ADD SIDEWALK TO BLDG 3 & ADD GENERATOR 04/15/15	
1	REVISE PLAN FOR BROTHERS ADD RAMP & STAIRS TO BUILDING A SEAR DWYERS 01/24/12	

**SITE DEVELOPMENT PLAN**  
**SITE LAYOUT PLAN;**  
**WATERLOO CROSSING**  
MEDICAL AND OFFICE BUILDING  
PARCEL A  
GREEN BUILDING

TAX MAP 37, BLOCK 7 & 8  
5TH ELECTION DISTRICT

PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

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

**PROFESSIONAL CERTIFICATE**

DESIGN BY: DZ/RHV  
CHECKED BY: DZ  
DRAWN BY: RHV  
DATE: AUGUST 2012  
SCALE: AS SHOWN  
W.O. NO.: 05-52

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. 16193. EXPIRES: 08-27-2012

3 SHEET OF 18

HOWARD COUNTY METROPOLITAN COMMISSION  
DEPARTMENT OF PUBLIC WORKS  
TM 37 P. 549  
ZONED: NT  
'REPAIR FACILITIES AND TRAINING CENTER'  
USE: EXEMPT COMMERCIAL

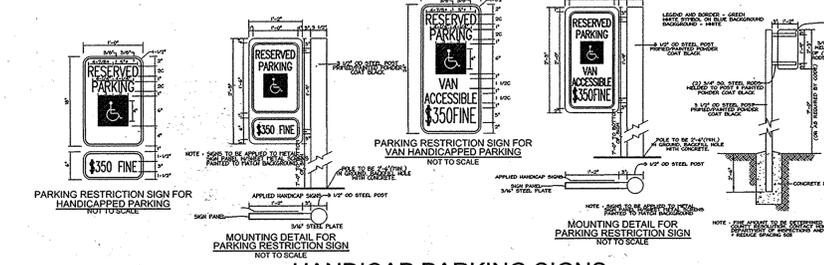
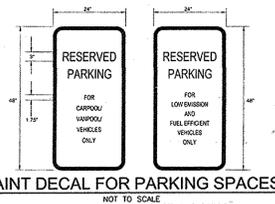
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 8/14/12  
DATE: 9/27/12  
DATE: 5-27-10

WATERLOO ELEMENTARY SCHOOL  
TM 37 P. 489  
ZONED: R-20  
USE: INSTITUTIONAL

PLAN VIEW  
SCALE: 1"=30'

E. 138980' N 561000



NO AS-BUILT INFORMATION THIS SHEET

AS-BUILT 5/5/2016

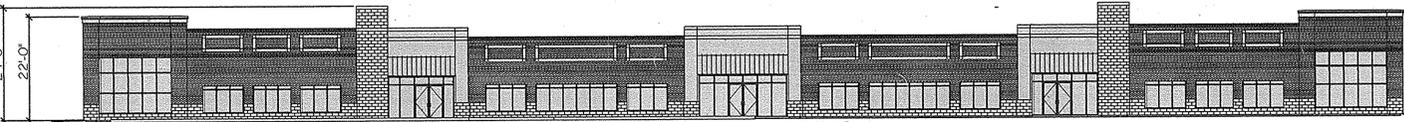
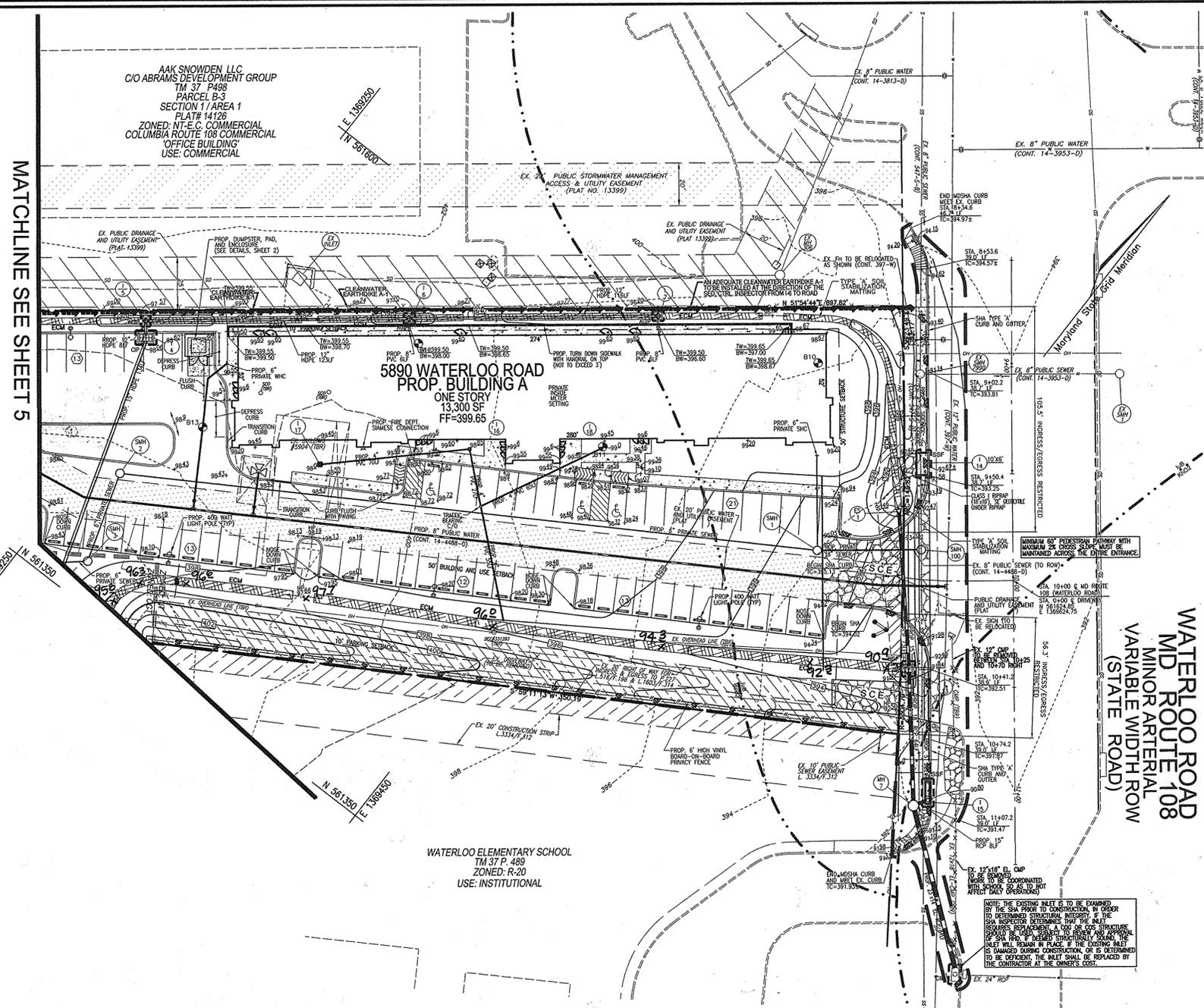
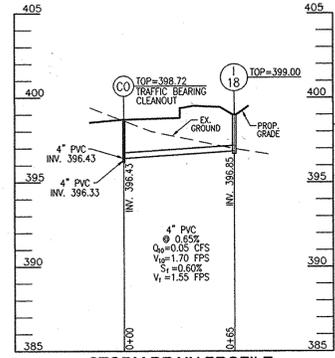
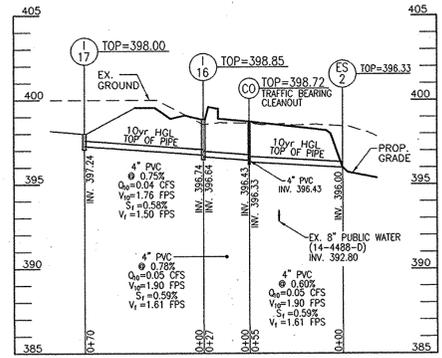
SDP-07-102

**LEGEND:**

- EXISTING CONTOUR
- - - - - PROPOSED CONTOUR
- + 402.88 PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- PROPOSED UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- EXISTING TREES (FIELD LOCATED)
- EXISTING TREELINE (FIELD LOCATED)
- PROP. TREELINE
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- MIB2 SOILS BOUNDARY
- MID3
- PROPOSED SIDEWALK
- SILT FENCE
- SUPER SILT FENCE
- LIMIT OF DISTURBANCE
- CIP CURB INLET PROTECTION
- AGIP AT GRADE INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE
- EROSION CONTROL MATTING
- NT ZONING LINE
- CCT

**STRUCTURE SCHEDULE**

NO.	TYPE	LOCATION	TOP ELEV.	INV. ELEV.	COMMENTS
119	YARD INLET	N 5115.13 W 1388.50	398.85	396.43	NO. CO. STD. D-4.11
120	YARD INLET	N 5115.13 W 1388.50	398.85	396.43	NO. CO. STD. D-4.11
121	YARD INLET	N 5115.13 W 1388.50	398.85	396.43	NO. CO. STD. D-4.11
122	CLEANOUT	N 5115.13 W 1388.50	398.85	396.43	NO. CO. STD. D-4.11
123	4" PVC END SECTION	N 5115.13 W 1388.50	398.85	396.43	NO. CO. STD. D-4.11



**OWNER/DEVELOPER**  
 WATERLOO LAND NO. 1, LLC      WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE      301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609      RALEIGH, NC 27609  
 (919) 789-9289      (919) 789-9289

NO.	REVISION	DATE
5	RELOCATE GENERATOR; REMOVE PARKING SPACE ISLAND	07-15
4	REVISE PLAN TO REMOVE STEPS AND ADD SIDEWALK TO BLDG 'B', ADD GENERATOR	04/01/15
3	REVISE PLAN TO MODIFY BUILDING A TO REFLECT MODIFICATION BY THE ARCHITECT	09-19-14
2	REVISE PLAN TO SHOW REVISED BUILDING A AND REVISIONS REQUIRED	07-09-13
OF SHA; LANDSCAPE REVISIONS		

**REVISED SITE DEVELOPMENT PLAN**  
**SITE GRADING, SEDIMENT AND EROSION CONTROL PLAN**  
**WATERLOO CROSSING**  
 MEDICAL AND OFFICE BUILDING  
 PARCEL 227 & 548  
 6TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

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

**PROFESSIONAL CERTIFICATE**  
 DESIGN BY: DZ/RHV  
 DRAWN BY: DZ/JR  
 CHECKED BY: RHY  
 DATE: OCTOBER 2014  
 SCALE: AS SHOWN  
 W.O. NO.: 05-52

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: 08-27-2016

4 SHEET OF 18

**NOTICE TO CONTRACTOR (SHA WORK):**  
 ALL ITEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT VERSION OF THE REFERENCED STANDARD AT THE TIME OF CONSTRUCTION. THE BOOK OF STANDARDS MAY BE ACCESSED AT THE FOLLOWING ADDRESS:  
<http://apps.roads.maryland.gov/businesswithsha/bizstds.aspx?desmanuallstpubpublicationsonline/ohdbookstd/index.asp>

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

Chief, Development Engineering Division      12.2.14  
 Chief, Division of Land Development      12.03.14  
 Director      12/2/14

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

Signature of Developer      11/2/14

**BY THE ENGINEER:**  
 I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

Signature of Engineer      11/2/14

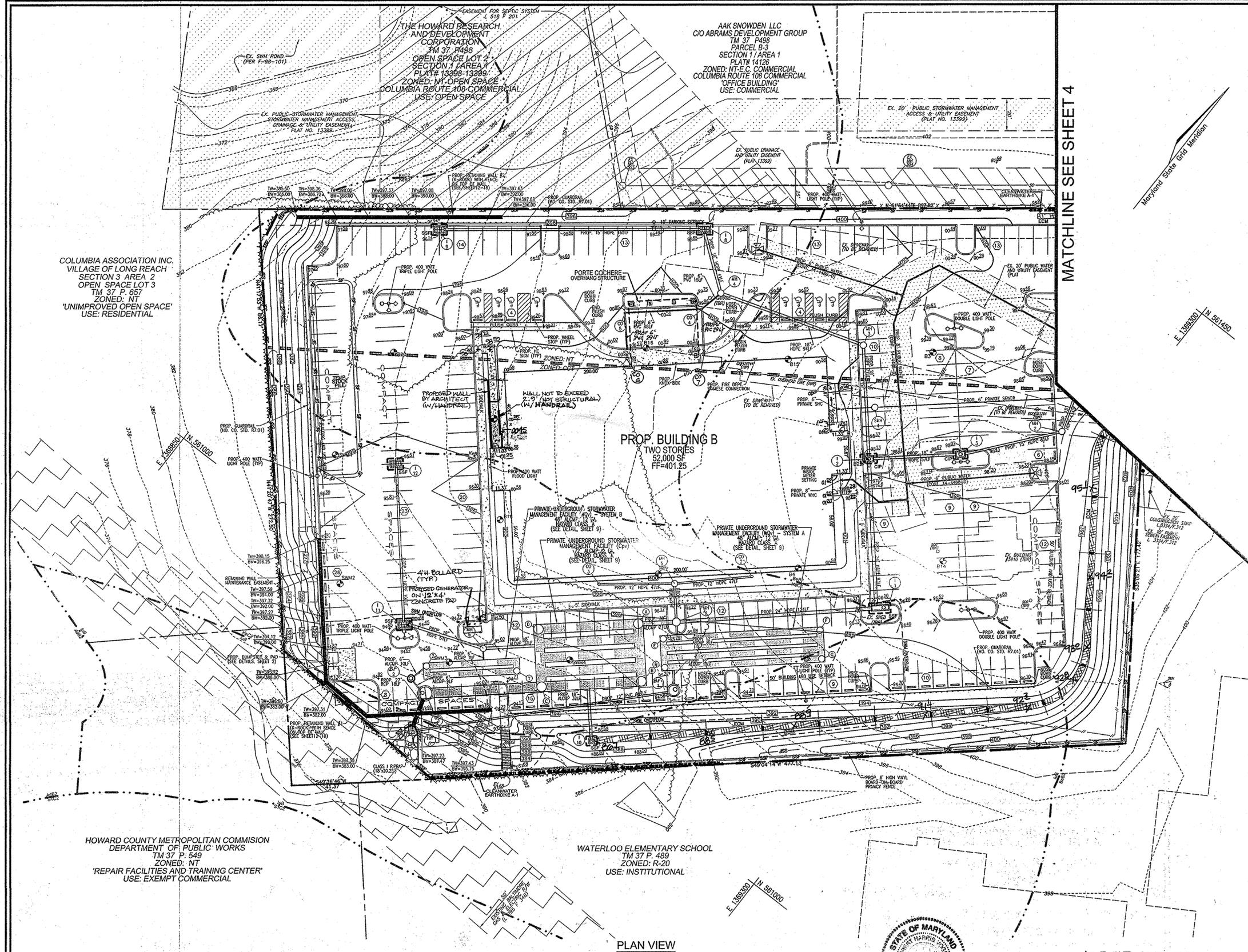
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Signature of Howard S.C.D.      11/25/14



**AS-BUILT CERTIFICATION**  
 I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE AS-BUILT PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

Signature of Robert H. Vogel      11/25/16  
 Robert H. Vogel      P.E. NO.      5/5/2016      DATE



MATCHLINE SEE SHEET 4

**LEGEND:**

	EXISTING CONTOUR
	PROPOSED CONTOUR
	EXISTING SPOT ELEVATION
	PROPOSED SPOT ELEVATION
	EXISTING CURB AND GUTTER
	PROPOSED 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
	PROPOSED STORM DRAIN
	PROPOSED STORM DRAIN INLET
	EXISTING TREES (FIELD LOCATED)
	EXISTING TREE LINE (FIELD LOCATED)
	PROP. TREE LINE
	EXISTING FENCE
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	SOILS BOUNDARY
	PROPOSED SIDEWALK
	SILT FENCE
	SUPER SILT FENCE
	LIMIT OF DISTURBANCE
	CURB INLET PROTECTION
	AT GRADE INLET PROTECTION
	STABILIZED CONSTRUCTION ENTRANCE
	EROSION CONTROL MATTING

**OWNER/DEVELOPER**  
 WATERLOO LAND NO. 1, LLC  
 301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609  
 (919) 789-9289

WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609  
 (919) 789-9289

NO.	REVISION	DATE
5	RELOCATE GENERATOR, REMOVE PARKING SPACE ISLAND B, T-15	04/07/15
4	REVISE PLAN TO REMOVE STEPS AND ADD SIDEWALK TO BUILDING B, ADD GENERATOR	04/07/15
1	REVISE PLAN FOR BAY FILTERS, ADD RAMP & STAIRS TO BUILDING A STAIR TOWERS	09/24/12

**SITE DEVELOPMENT PLAN**  
**SITE GRADING, SEDIMENT AND EROSION CONTROL PLAN**  
**WATERLOO CROSSING**  
 MEDICAL AND OFFICE BUILDING  
 PARCEL  
 TAX MAP 37, BLOCK 7 & 8 GREEN BUILDING PARCEL 227 & 548  
 6TH 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: 410.461.8911

	DESIGN BY: DZ/RHV	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. EXPIRATION DATE: 09-27-2012
	DRAWN BY: DZ	
	CHECKED BY: RHV	
	DATE: AUGUST 2012	
SCALE: AS SHOWN	W.O. NO.: 05-52	5 SHEET OF 18

**AS-BUILT CERTIFICATION**  
 I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE 'AS-BUILT' PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.  
 Robert H. Vogel 16193 5/5/2016  
 PE NO DATE

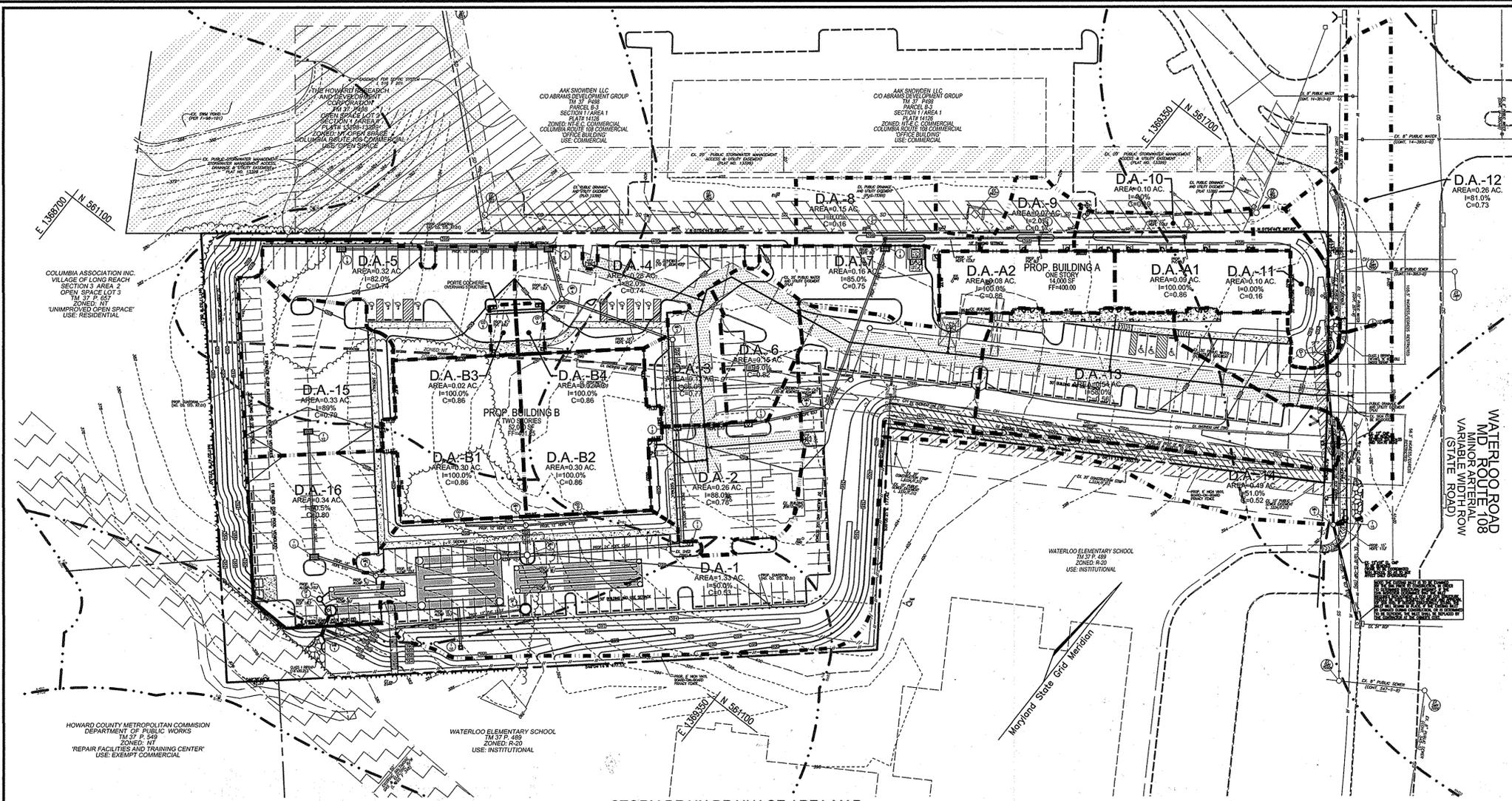


THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
 John L. Roberts 8/2/12  
 HOWARD S.C.D. DATE

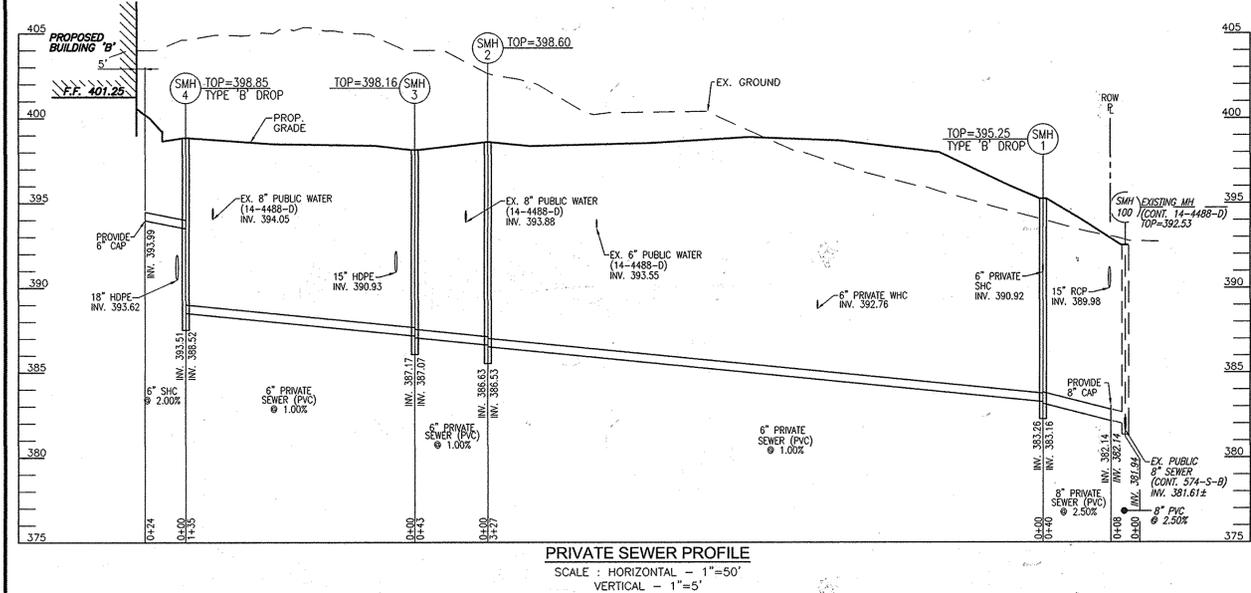
PLAN VIEW  
 SCALE: 1"=30'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING CHIEF, DEVELOPMENT ENGINEERING DIVISION 8/14/12 DATE	BY THE DEVELOPER: "I WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT." Signature of Developer 8-2-12 DATE	BY THE ENGINEER: "I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT." Signature of Engineer 8/2/12 DATE
---	--	---

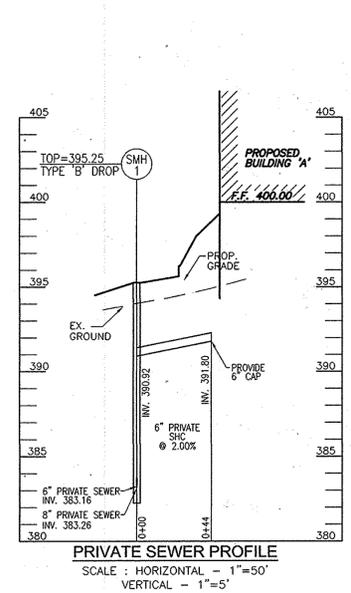




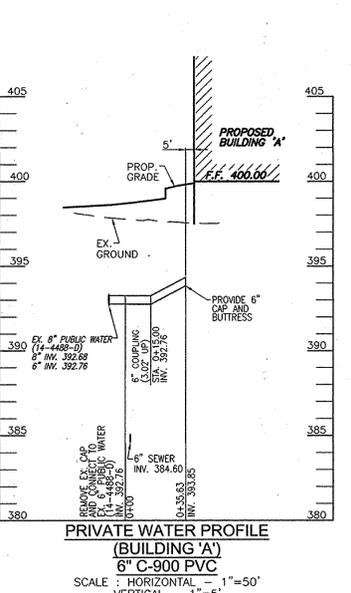
STORM DRAIN DRAINAGE AREA MAP  
SCALE: 1"=50'



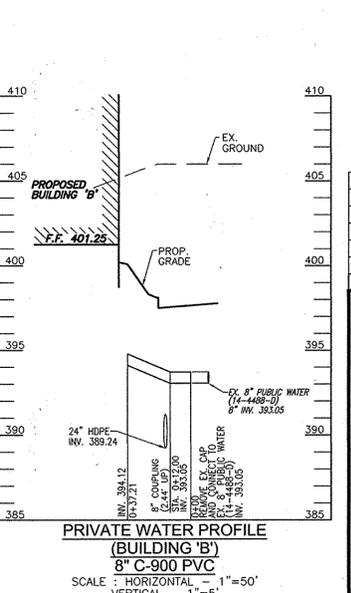
PRIVATE SEWER PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



PRIVATE SEWER PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



PRIVATE WATER PROFILE  
(BUILDING 'A')  
6" C-900 PVC  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



PRIVATE WATER PROFILE  
(BUILDING 'B')  
8" C-900 PVC  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

OWNER/DEVELOPER  
WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

WATERLOO LAND NO. 2, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
STORM DRAIN DRAINAGE AREA MAP;  
SOILS MAP; AND UTILITY PROFILES  
WATERLOO CROSSING  
MEDICAL AND OFFICE BUILDING  
PARCEL A  
GREEN BUILDING  
TAX MAP 37, BLOCK 7 & 8  
6TH ELECTION DISTRICT

PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL**  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET  
ELLIOTT 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. 18193, EXPIRATION DATE 09-27-2012.

DESIGN BY: DZ/RHV  
DRAWN BY: DZ  
CHECKED BY: RHV  
DATE: AUGUST 2012  
SCALE: AS SHOWN  
W.O. NO.: 05-52

7 SHEET OF 18

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 8/14/12  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE

*[Signature]* 8/27/12  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE

*[Signature]* 8/27/12  
DIRECTOR  
DATE

BY THE DEVELOPER:

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

*[Signature]* 8/2/12  
SIGNATURE OF DEVELOPER  
DATE

BY THE ENGINEER:

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

*[Signature]* 8/2/12  
SIGNATURE OF ENGINEER  
DATE

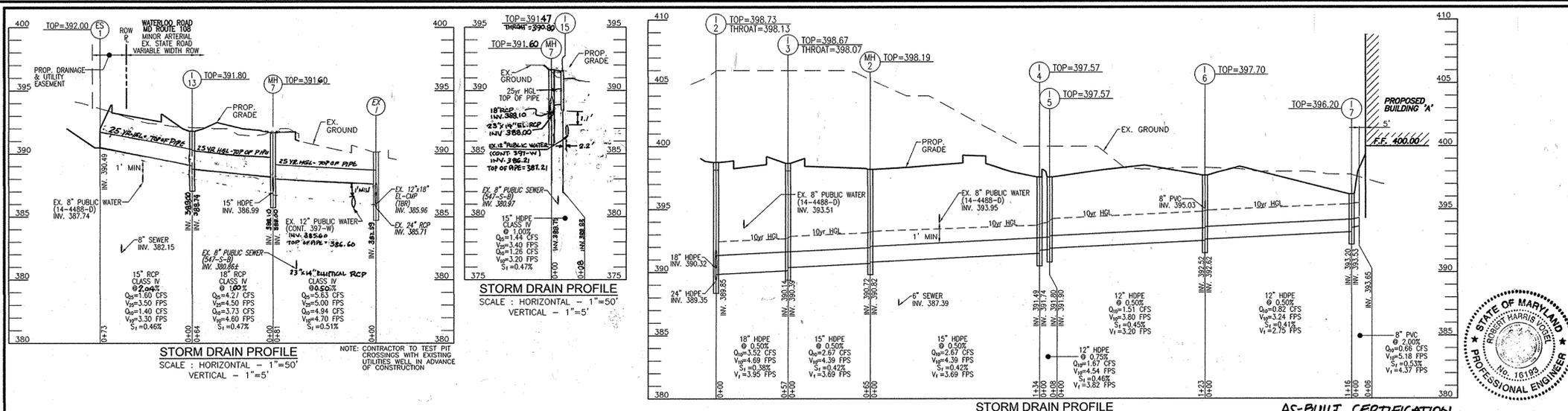
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

*[Signature]* 8/2/12  
HOWARD S.C.D.  
DATE

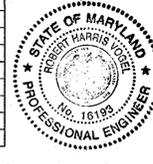
SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP
BsB2	BELTSVILLE SILT LOAM, 1 TO 5 PERCENT SLOPES, MODERATELY ERODED	C
luB2	IUKA LOAM, LOCAL ALLUVIUM, 1 TO 5 PERCENT SLOPES	C
KeB2	KELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	D
KeC2	KELLY SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED	D

NOTE: BASED ON HOWARD SOIL SURVEY  
NO AS-BUILT INFORMATION THIS SHEET

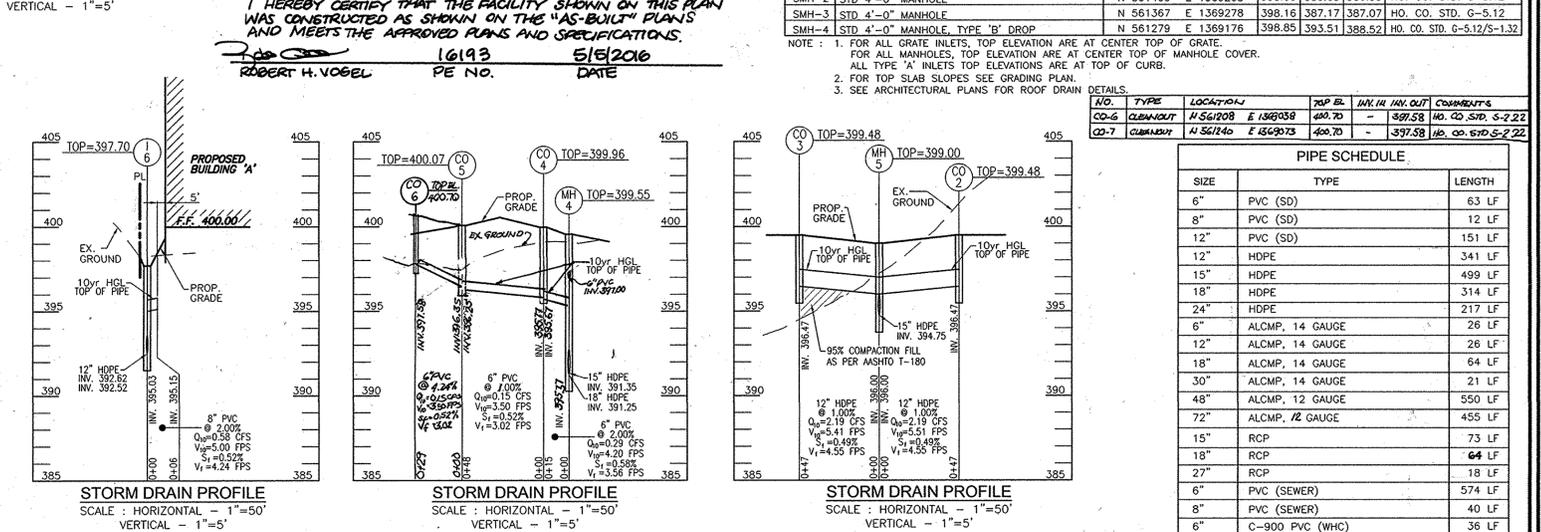
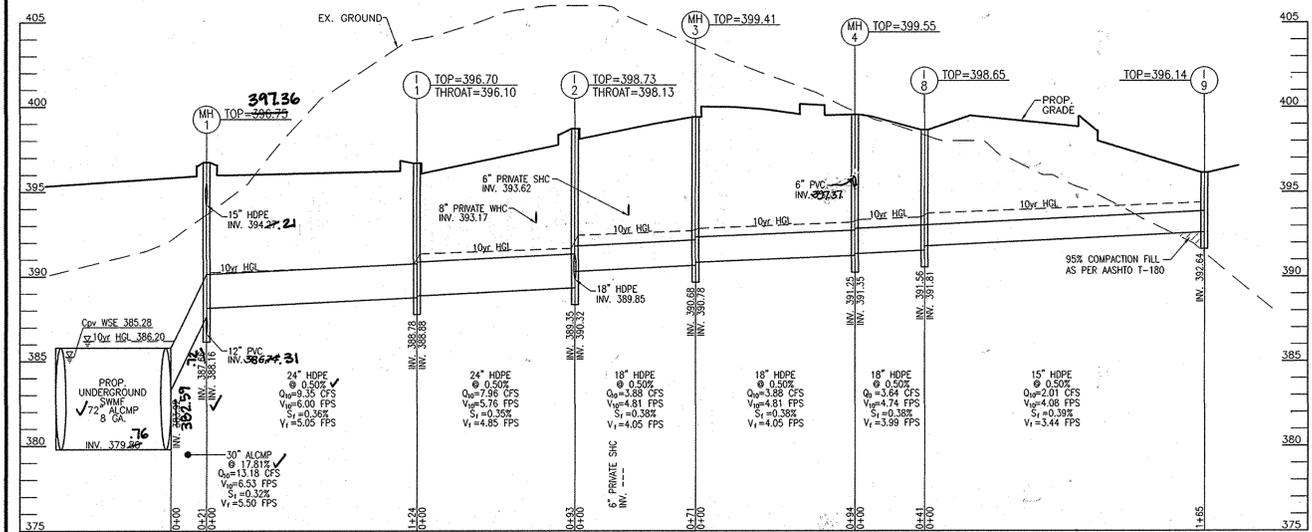


STRUCTURE SCHEDULE						
NO.	TYPE	LOCATION	TOP ELEV.	INV. IN	INV. OUT	COMMENTS
I-1	TYPE 'A-10' INLET	N 561185 E 1369257	396.70	388.88	388.78	HO. CO. STD. SD-4.03
I-2	TYPE 'A-5' INLET	N 561252 E 1369193	398.73	389.32	389.35	HO. CO. STD. SD-4.01
I-3	TYPE 'A-5' INLET	N 561289 E 1369236	398.67	390.39	390.14	HO. CO. STD. SD-4.01
I-4	DOUBLE WR INLET	N 561467 E 1369235	398.06	391.74	391.49	HO. CO. STD. SD-4.35
I-5	YARD INLET	N 561473 E 1369231	397.57	391.90	391.80	HO. CO. STD. SD-4.14
I-6	YARD INLET	N 561549 E 1369327	397.70	392.53	392.52	HO. CO. STD. SD-4.14
I-7	YARD INLET	N 561621 E 1369418	396.20	393.53	393.20	HO. CO. STD. SD-4.14
I-8	DOUBLE WR INLET	N 561301 E 1369024	398.65	391.81	391.56	HO. CO. STD. SD-4.35
I-9	DOUBLE WR INLET	N 561199 E 1368895	396.14	392.64	392.64	HO. CO. STD. SD-4.35
I-10	TYPE 'D' INLET	N 561008 E 1369165	392.91	383.58	383.58	HO. CO. STD. SD-4.10
I-11	DOUBLE WR INLET	N 560991 E 1369030	394.36	390.84	390.59	HO. CO. STD. SD-4.35
I-12	DOUBLE 'S' INLET	N 561069 E 1368964	395.51	392.84	392.84	HO. CO. STD. SD-4.23
I-13	SHA TYPE 'K' INLET (DOUBLE OPENING)	N 561562 E 1369612	391.80	389.00	388.74	MD 378.03
I-14	PRECAST COG OPENING (10' TROUGH LENGTH X 6' WIDE)	N 561643 E 1369561	393.20	-	-	MD 374.66
I-15	SHALLOW COG INLET (10' OPENING) (PRECAST)	N 561523 E 1369566	391.47	-	-	MD 374.66
MH-1	STD 5'-0" MANHOLE	N 561099 E 1369161	396.75	388.78	388.78	HO. CO. STD. G-5.13
MH-2	STD 4'-0" MANHOLE	N 561339 E 1369277	398.19	390.82	390.72	HO. CO. STD. G-5.12
MH-3	STD 4'-0" MANHOLE	N 561305 E 1369147	399.41	390.78	390.68	HO. CO. STD. G-5.12
MH-4	STD 4'-0" MANHOLE	N 561278 E 1369057	399.55	391.25	391.25	HO. CO. STD. G-5.12
MH-5	STD 4'-0" MANHOLE	N 561117 E 1369146	399.00	394.75	394.75	HO. CO. STD. G-5.12
MH-6	STD 4'-0" MANHOLE	N 561011 E 1369077	394.89	390.33	390.33	HO. CO. STD. G-5.12
MH-7	STD 4'-0" MANHOLE	N 561513 E 1369653	391.63	388.00	388.00	MD 384.03
ES-1	CONCRETE END SECTION	N 561617 E 1369564	391.82	390.49	-	MD 368.01
HW-1	TYPE 'A' HEADWALL (27")	N 560946 E 1369072	383.00	379.25	-	HO. CO. STD. D-5.11
BF-1	EXHAUSTER MANHOLE (EXHAUSTER TECHNOLOGIES)	N 561064 E 1369187	394.85	383.41	380.36	SEE DETAIL SHEET 10
BF-2	EXHAUSTER MANHOLE (EXHAUSTER TECHNOLOGIES)	N 560969 E 1369053	394.79	385.20	382.90	SEE DETAIL SHEET 10
CS-1	96" DIAM PRECAST MANHOLE	N 560967 E 1369064	394.85	383.41	380.36	MD 384.09 (DETAIL SHEET 9)
CO-2	CLEANOUT	N 561149 E 1369181	399.48	-	396.47	HO. CO. STD. S-2.22
CO-3	CLEANOUT	N 561087 E 1369109	399.48	-	396.47	HO. CO. STD. S-2.22
CO-4	CLEANOUT	N 561261 E 1369054	399.96	-	396.47	HO. CO. STD. S-2.22
CO-5	CLEANOUT	N 561229 E 1369018	400.07	-	396.47	HO. CO. STD. S-2.22
SMH-1	STD 4'-0" MANHOLE	N 561800 E 1369544	395.25	383.16	383.16	HO. CO. STD. G-5.12
SMH-2	STD 4'-0" MANHOLE	N 561409 E 1369265	398.60	386.63	386.53	HO. CO. STD. G-5.12
SMH-3	STD 4'-0" MANHOLE	N 561367 E 1369278	398.16	387.17	387.07	HO. CO. STD. G-5.12
SMH-4	STD 4'-0" MANHOLE	N 561279 E 1369176	398.85	393.51	388.52	HO. CO. STD. G-5.12/S-1.32



I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

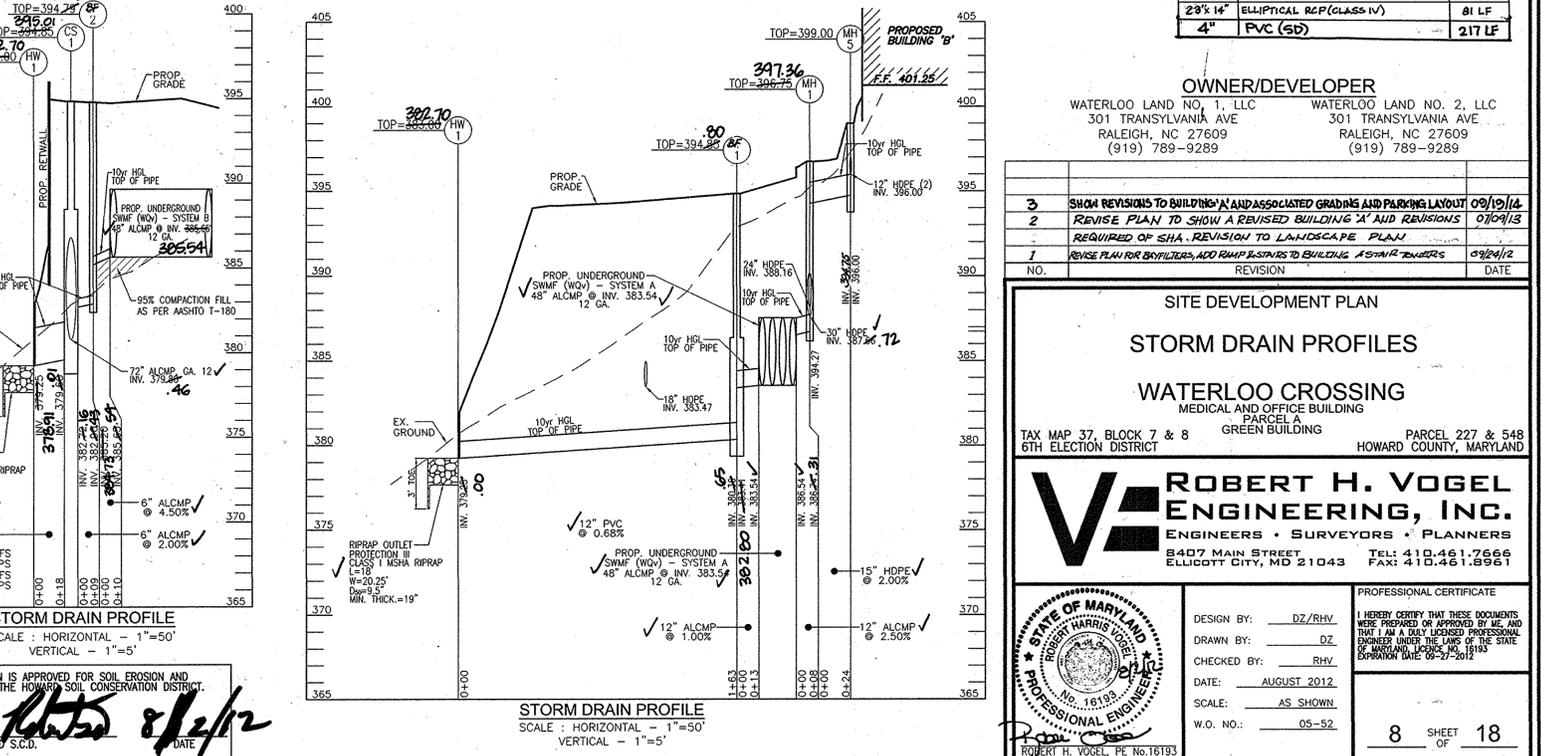
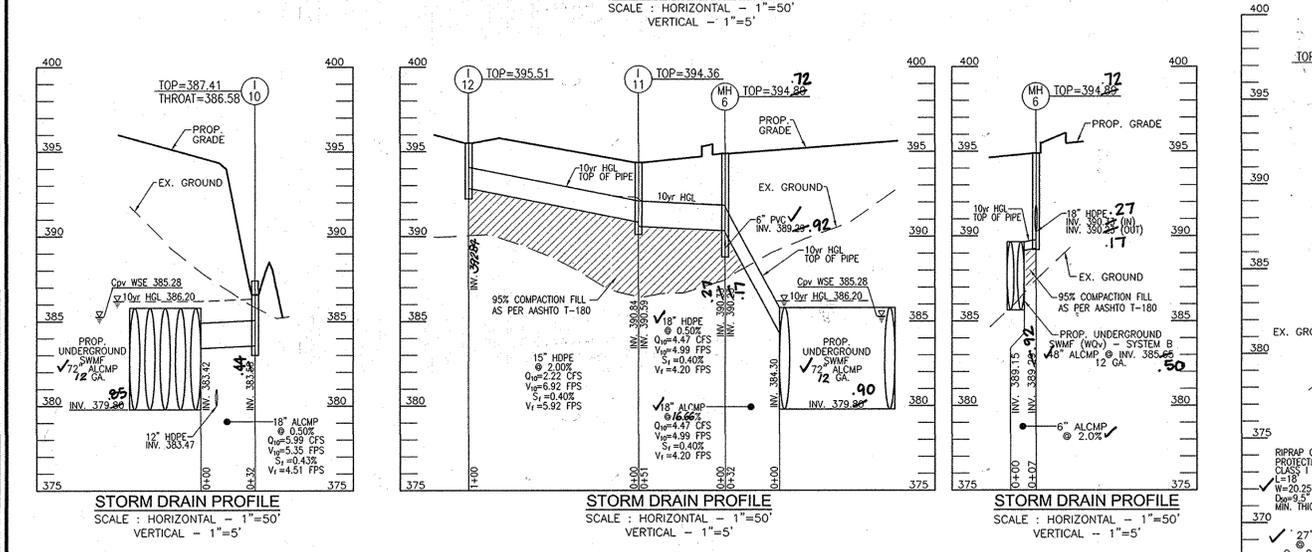
ROBERT H. VOGEL PE NO. 16193 DATE 5/15/2016



NO.	TYPE	LOCATION	TOP ELEV.	INV. IN	INV. OUT	COMMENTS
CO-2	CLEANOUT	N 561209 E 1369039	400.70	-	397.58	HO. CO. STD. S-2.22
CO-7	CLEANOUT	N 561240 E 1369073	400.70	-	397.58	HO. CO. STD. S-2.22

PIPE SCHEDULE		
SIZE	PIPE TYPE	LENGTH
6"	PVC (SD)	63 LF
8"	PVC (SD)	12 LF
12"	PVC (SD)	151 LF
12"	HDPE	341 LF
15"	HDPE	499 LF
18"	HDPE	314 LF
24"	HDPE	217 LF
6"	ALCMP, 14 GAUGE	26 LF
12"	ALCMP, 14 GAUGE	26 LF
18"	ALCMP, 14 GAUGE	64 LF
30"	ALCMP, 14 GAUGE	21 LF
48"	ALCMP, 12 GAUGE	550 LF
72"	ALCMP, 12 GAUGE	455 LF
15"	RCP	73 LF
18"	RCP	64 LF
27"	RCP	18 LF
6"	PVC (SEWER)	574 LF
8"	PVC (SEWER)	40 LF
6"	C-900 PVC (WHC)	36 LF
8"	C-900 PVC (WHC)	37 LF
28" x 14"	ELLIPTICAL RCP (CLASS IV)	81 LF
4"	PVC (SD)	217 LF



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION

DATE: 5/12/12

BY THE DEVELOPER:

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

DATE: 5-2-12

BY THE ENGINEER:

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

DATE: 5/12/12

**OWNER/DEVELOPER**

WATERLOO LAND NO. 1, LLC  
301 PENNSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

WATERLOO LAND NO. 2, LLC  
301 PENNSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

**REVISIONS**

NO.	REVISION	DATE
3	SHA REVISIONS TO BUILDING AND ASSOCIATED GRADING AND PARKING LAYOUT	09/19/14
2	REVISE PLAN TO SHOW A REVISED BUILDING 'A' AND REVISIONS	01/09/13
1	REQUIRED OF SHA, REVISION TO LANDSCAPE PLAN	
1	REVISE PLAN FOR BUILDINGS, ADD RAMP REVISIONS TO BUILDING 'A' STAIR TOWER	08/24/12

**SITE DEVELOPMENT PLAN**

**STORM DRAIN PROFILES**

**WATERLOO CROSSING**  
MEDICAL AND OFFICE BUILDING

TAX MAP 37, BLOCK 7 & 8  
6TH ELECTION DISTRICT

PARCEL A  
GREEN BUILDING

PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET  
ELLIOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.9961

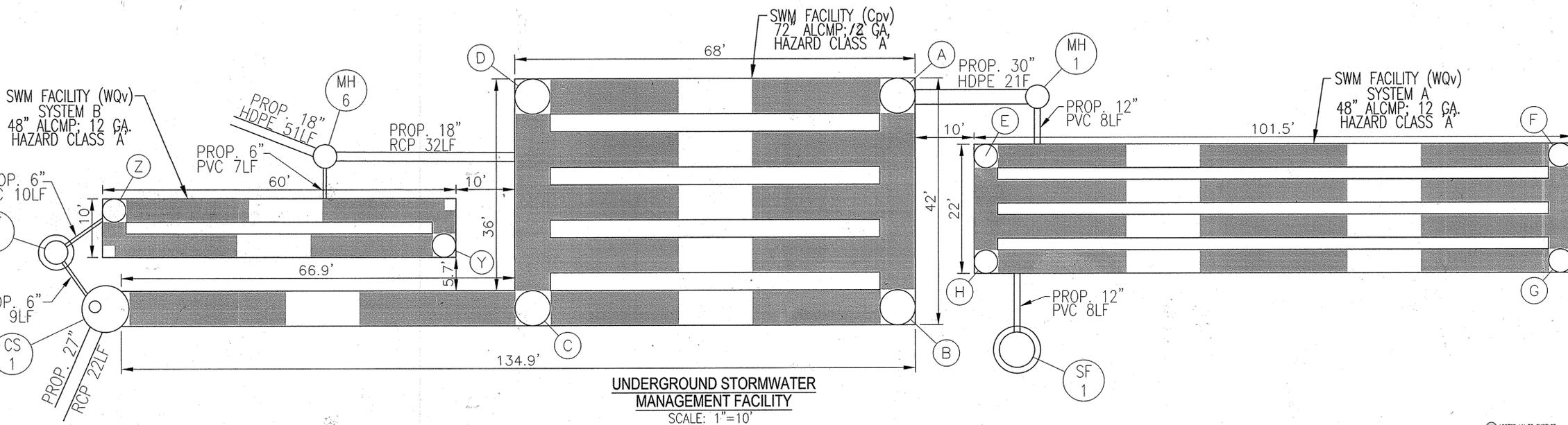
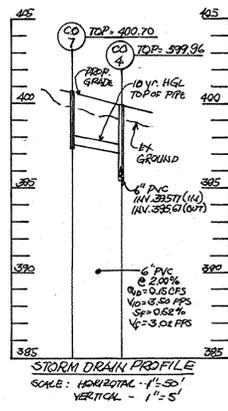
DESIGN BY: DZ/RHV  
DRAWN BY: DZ  
CHECKED BY: RHV  
DATE: AUGUST 2012  
SCALE: AS SHOWN  
W.D. NO.: 05-52

PROFESSIONAL CERTIFICATE

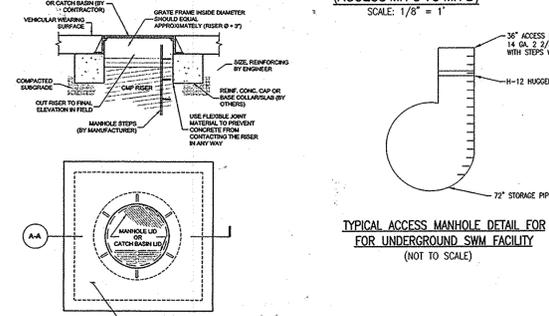
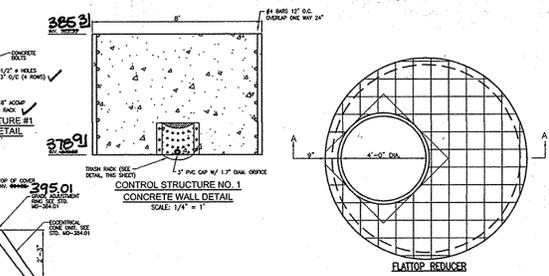
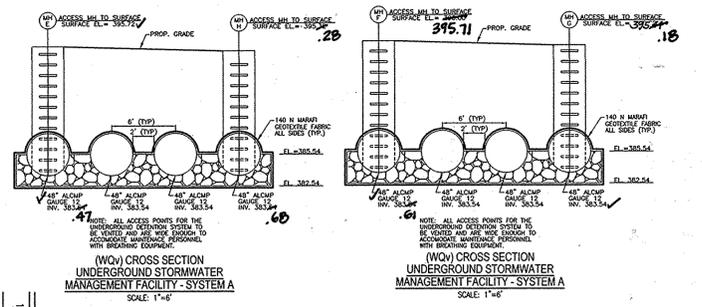
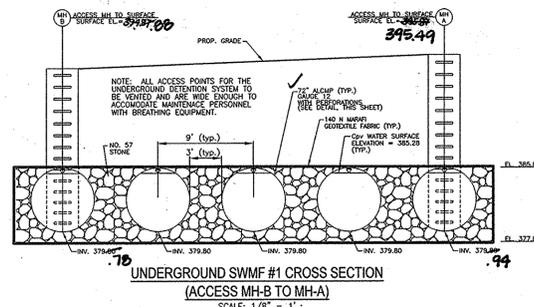
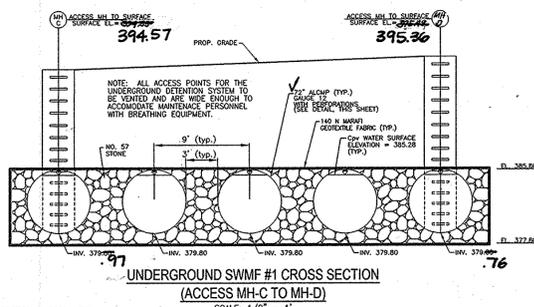
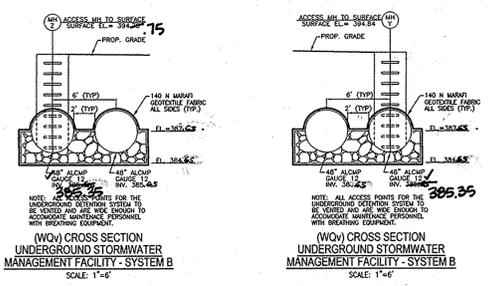
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

EXPIRATION DATE: 09-27-2012

8 SHEET OF 18



UNDERGROUND STORMWATER MANAGEMENT FACILITY  
SCALE: 1"=10'



**AS-BUILT CERTIFICATION**  
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLAN AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.  
16/93 5/5/2016  
ROBERT H. VOGEL PE NO DATE

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED UNDERGROUND FACILITIES**

- THE UNDERGROUND STORMWATER MANAGEMENT FACILITY IS PRIVATELY OWNED AND IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO PERIODICALLY INSPECT AND CLEAN THE FACILITY TO MAINTAIN ITS OPERATION AND FUNCTION.
- THE UNDERGROUND STORMWATER MANAGEMENT FACILITY SHALL BE INSPECTED YEARLY AT A MINIMUM AND AFTER ESPECIALLY SEVERE STORM EVENTS.
- WHEN SEDIMENT ACCUMULATION OF MORE THAN 2" IS OBSERVED OR ANY DEBRIS THAT MIGHT OBSTRUCT THE OUTFALL IS OBSERVED, THE FACILITY SHALL BE CLEANED.
- THE FACILITY SHALL BE CLEANED IMMEDIATELY AFTER PETROLEUM SPILLS. THE OWNER SHALL CONTACT THE APPROPRIATE REGULATORY AGENCIES NOTIFYING THEM OF THE SPILL AND CLEANUP OPERATION.
- THE SEDIMENT AND DEBRIS SHALL BE REMOVED FROM THE UNDERGROUND STORMWATER MANAGEMENT FACILITY BY VACUUM TRUCK OR OTHER MANUAL MEANS. THE OWNER SHALL FOLLOW PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIAL AND LIQUID.
- THE INLET AND OUTLET PIPES SHALL BE CHECKED FOR ANY OBSTRUCTIONS AT LEAST ONCE EVERY SIX (6) MONTHS. IF OBSTRUCTIONS ARE FOUND, THE OWNER SHALL HAVE THEM REMOVED AND PROPERLY DISPOSED OF.

**SUMMARY TABLE AREA (DA1)**

AREA A	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WQV	1239 CF	1239 CF	0	GRASS CHANNEL CREDIT FOR ALL IMPERVIOUS AREA
2	RECHARGE VOLUME REV	161 CF OR 1911 SF	1911 SF	0	GRASS CHANNEL CREDIT FOR ALL IMPERVIOUS AREA
3	CHANNEL PROTECTION VOLUME CPV	N/A	N/A	N/A	Q1=1.45 CFS CPV NOT REQUIRED
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	
5	EXTREME FLOOD VOLUME, Q100P	N/A	N/A	N/A	

**SUMMARY TABLE AREA (DA2)**

AREA A	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WQV	13,012 CF	2225 CF	10,787 CF	GRASS CHANNEL CREDIT AND PROVIDE STORMFILTERS
2	RECHARGE VOLUME REV	1,362 CF OR 16,876 SF	16,876 SF	0	GRASS CHANNEL CREDIT FOR 29,621 SF PAVING
3	CHANNEL PROTECTION VOLUME CPV	14,262 CF	N/A	14,262 CF	PIPE STORAGE
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	
5	EXTREME FLOOD VOLUME, Q100P	N/A	N/A	N/A	

**OWNER/DEVELOPER**  
WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

NO.	REVISION	DATE
1	BASE PLAN FOR EXISTENCES, ADD DUMP & STAR TO BUILDING A STAIR TOWERS	08/04/12

**SITE DEVELOPMENT PLAN**  
**STORMWATER MANAGEMENT DETAILS, AND STORM DRAIN PROFILES**  
**WATERLOO CROSSING**  
MEDICAL AND OFFICE BUILDING  
PARCEL A  
GREEN BUILDING  
PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

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

**PROFESSIONAL CERTIFICATE**  
DESIGN BY: DZ/RHV  
DRAWN BY: DZ  
CHECKED BY: RHV  
DATE: AUGUST 2012  
SCALE: AS SHOWN  
W.O. NO.: 05-52

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: 08-27-2012

9 SHEET OF 18

NOTE: DEBRIS IS TO BE KEPT OUT OF STORMWATER MANAGEMENT FACILITIES DURING AND AFTER CONSTRUCTION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 8/14/12

APPROVED: *Robert H. Vogel*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 8/27/12

APPROVED: *Robert H. Vogel*  
DIRECTOR  
DATE: 8-27-12

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

BY THE ENGINEER:  
I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

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

APPROVED: *John L. Roberts*  
DATE: 8/2/12  
HOWARD S.C.D.

**BAYFILTER™ SPECIFICATIONS**

**PART 1.00 GENERAL**

**1.1 DESCRIPTION**

A. The BayFilter™ system's internal components manufacturer selected by the Contractor and approved by the Engineer, shall furnish all labor, materials, equipment and incidentals required to manufacture the BayFilter system component(s) specified herein in accordance with the attached drawing(s) and these specifications.

B. Concrete structures and any appurtenances that form an integral part of the BayFilter™ system shall be described in Part 2.00 of these specifications.

**1.2 QUALITY CONTROL INSPECTION**

A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the worksite after delivery, or at both places, and shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements. If a BayFilter system component(s) is rejected after delivery to the site, it shall be marked for identification and removed from the site. Any BayFilter system component(s) which have been damaged beyond repair during delivery will be rejected.

**1.3 SUBMITTALS**

A. Plan, elevation, and profile dimensional drawings shall be submitted to the Engineer for review and approval. The Contractor shall be provided with the approved plan, elevation, and profile dimensional drawings.

**PART 2.00 PRODUCTS**

**2.1 INTERNAL COMPONENTS**

All components including concrete structure(s), PVC manifold piping and filter cartridges, shall be provided by BaySaver Technologies Inc., 1030 Deer Hollow Drive, Mount Airy, MD (800.229.7283).

A. PVC Manifold Piping: All internal PVC pipe and fittings shall meet ASTM D1785. Manifold piping shall be provided to the contractor partially pre-cut and pre-assembled.

B. Filter Cartridges: External shell of the filter cartridges shall be substantially constructed of polyethylene or equivalent material acceptable to the manufacturer. Filtration media shall be arranged in a layered fashion to maximize available filtration area. An orifice plate shall be supplied with each cartridge to restrict flow rate to a maximum of 30 gpm.

C. Filter Media: Filter media shall be by BaySaver Technologies Inc. or approved alternate. Filter media shall consist of the following mix. Sand media shall have an effective particle size of not more than 0.49mm, it shall have an angular grain shape, a hardness of 7, be 99% silica, and not leach nutrients. The media shall also include a blend of Perlite and Activated Alumina.

**2.2 PERFORMANCE**

- A. The stormwater filter system shall be capable of treating 100% of the required treatment flow at full sediment load conditions.
- B. The stormwater filter system's cartridges shall have no moving parts.
- C. The stormwater treatment unit shall be designed to remove at least 80% of the suspended solids load. Said removal shall be based on full-scale testing using SIL-CO-SIL 106 media gradation with a  $d_{50}$  of 23 microns (manufactured by US Silica) or equivalent. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater filtration system.
- D. The stormwater filtration system shall reduce incoming turbidity (measured as NTUs) by 50% or more and shall not have any components that leach nitrates or phosphates.
- E. The stormwater filtration cartridge shall be equipped with a hydrodynamic backwash mechanism to extend the filter's life and optimize its performance. Inlet flow shall be upflow.
- F. The stormwater filtration system shall be designed to remove a minimum of 50% of the incoming Total Phosphorus (TP) load.
- G. The stormwater filtration system's cartridges shall have the following minimum flow and sediment load capacities:

Design Flow per BFC (gpm) Nominal	Treated Sediment Load (lbs)
30	150
23	200
20	250
15	300

**2.3 PRECAST CONCRETE VAULT COMPONENTS**

- A. Concrete structures shall be designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- B. The minimum compressive strength of the concrete shall be 4000 psi.
- C. Cement shall conform to the requirements for Portland cement of Specification C150.
- D. Aggregates shall conform to Specification C33, except that the requirement for gradation shall not apply.
- E. Reinforcement shall consist of wire conforming to Specification A82 or Specification A496, of wire fabric conforming to Specification A185 or Specification A497, or of bars of Grade 40 steel conforming to Specification A615/A615M.
- F. The access cover shall be designed for HS20-44 traffic loading and shall provide a minimum 30 inch clear opening.
- G. All joints shall be waterproof with wrapped gaskets or sealed with a mastic treatment.
- H. Any grout used within the system shall meet the ASTM C 1107 "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)" Grades A, B and C at a pourable and plastic consistency at 70°F. CRD C 621 "Corps of Engineers Specification For Non-Shrink Grout."

**2.4 CONTRACTOR PROVIDED COMPONENTS**

Specifications for all contractor-provided components are minimum requirements. If a higher standard is shown on the plans or described in another section of the technical specifications, then the higher standard shall govern.

- A. Sub-Base: Sub-base shall be six-inch minimum of ¾-inch minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of maximum density at ±2% of optimum moisture content. Unsuitable material below sub-grade shall be replaced to engineer's approval.
- B. The minimum compressive strength of the concrete for cast in place structures shall be 4000 psi.
- C. Silicone Sealant: Shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.
- D. Grout: Shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C888. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 6,200 psi. Grout shall not exhibit visible bleeding.
- E. Backfill: Backfill shall be ¾-inch minus rock at 95% compaction.

**PART 3.00 EXECUTION**

**3.1 PRECAST CONCRETE VAULT**

- A. Vault top finish grade shall be even with surrounding finish grade surface unless otherwise noted on plans.
- B. Contractor shall grout all inlet and outlet pipes flush with vault interior wall.
- C. Sanded PVC fittings shall be used on all PVC inlet and outlet pipes.

**3.2 ANTI-FLOTATION BALLAST (Where Required)**

- A. Ballast shall be to the dimensions specified by the engineer and noted on the data block. Ballast shall run the entire length of the long side of the vault on both sides. Ballast shall not encase the inlet and/or outlet piping. Provide 12" clearance from outside diameter of pipe.

**3.3 CLEAN UP**

- A. Remove all excess materials, rocks, roots, or foreign debris, leaving the site in a clean, complete condition approved by the engineer. All filter components shall be free of any foreign materials including concrete.

**3.4 FILTER CARTRIDGES**

- A. Filter cartridges shall not be installed until the project site is clean and stabilized or if the inlet and outlet pipes are temporarily blocked off. The project site includes any surface that contributes stormwater runoff to the BayFilter system. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

**3.5 INSTALLATION NOTES**

- A. Contractor to strictly follow the approved design and construction specifications. Any substitutions are to be pre-approved by the inspector and design engineer in writing prior to placement of materials.
- B. The stormwater filtration system(s) may not be activated until all contributing drainage areas to each facility are stabilized. Construction of the facility shall not proceed without prior authorization of the inspector.
- C. No "rock dust" can be used for sand.
- D. Contact "Miss Utility" at 1-800-257-7777 at least 48 hours prior to the start of construction.

**PART 4.00 EXECUTION**

**4.1 INSTALLATION**

- A. Installation of the BayFilter System(s) shall be performed per manufacturer's Installation Instructions. Such instructions can be obtained by calling BaySaver Technologies, Inc. at 1.800.229.7283 or by login to [www.BaySaver.com](http://www.BaySaver.com)

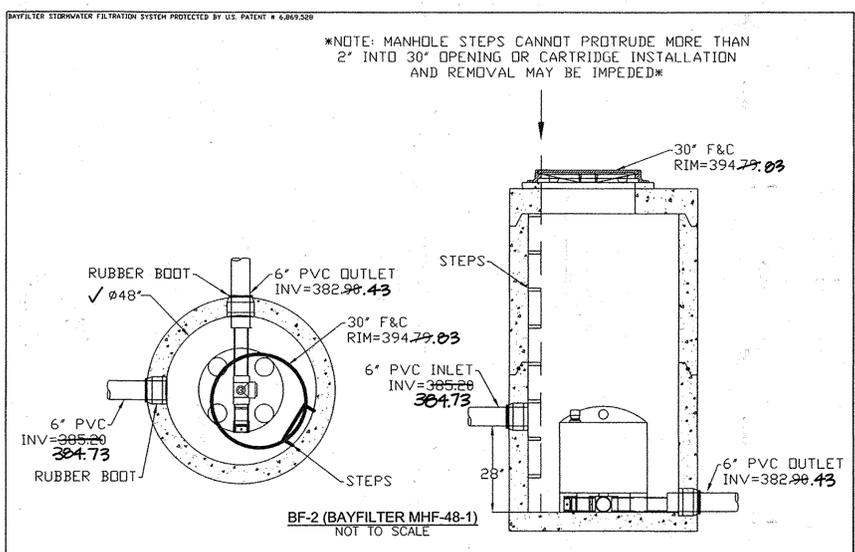
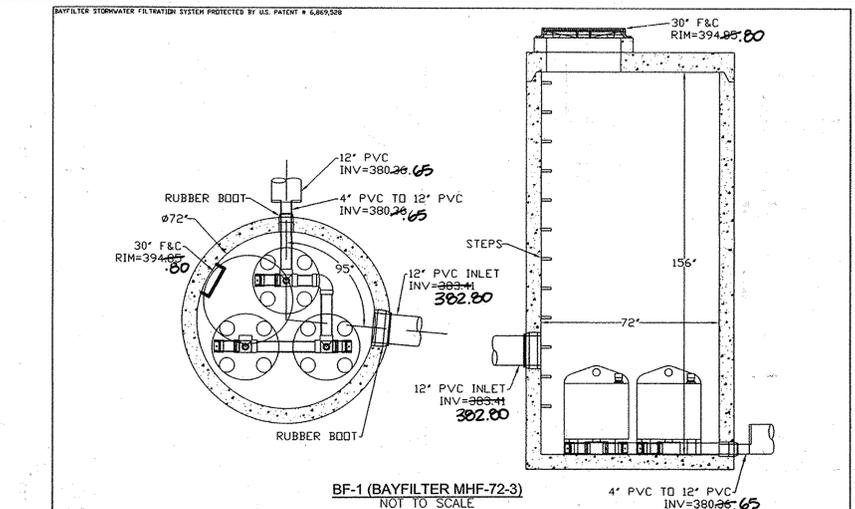
**BayFilter Installation Instructions**

**Installation of a BayFilter™ System**

1. Contact utility locator to mark any nearby underground utilities and make sure it is safe to excavate.
2. Reference the site plan and stake out the location of the BayFilter™ manhole/vault.
3. Excavate the hole, providing any shoring and shoring necessary to comply with all federal, state and local safety regulations.
4. Level the subgrade to the proper elevation. Verify the elevation against the manhole/vault dimensions, the invert elevations, and the site plans. Adjust the base aggregate, if necessary.
5. Have the soil bearing capacity verified by a licensed engineer for the required load bearing capacity. On solid subgrade, set the first section of the BayFilter™ manhole/vault.
6. Check the level and elevation of the first section to ensure it is correct before adding any riser sections.
7. If additional section(s) are required, add a watertight seal to the first section of the BayFilter™ manhole/vault. Set additional section(s) of the manhole/vault, adding a watertight seal to each joint.
8. Install the trolley system (if applicable). See separate instruction sheet.
9. Install the PVC outlet manifold. Glue all PVC joints with the exception of the BayFilter cartridge coupling. See separate instruction sheet.
10. Install the PVC outlet pipe in BayFilter™ manhole/vault.
11. Install the inlet pipe to the BayFilter™ manhole/vault.
12. After the site has stabilized, remove any accumulated sediment or debris from the vault and install the BayFilter Drain Down Modules (DDM) with red mark aligned to the top of the manifold system.
13. Install the flow disks and the BayFilter™ cartridges.

**TOOL LIST:**

- PVC GLUE AND PRIMER
- CRANE / LIFTING MECHANISM TO LOWER THE CARTRIDGES IN THE VAULT (EACH CARTRIDGE WEIGHS 350 LB)
- SCREWDRIVER OR NUT DRIVER FOR FERRO COUPLERS
- SOFT BLOW HAMMER
- SAW (IN CASE PVC SCH 40 PIPING LENGTH NEEDS TO BE ADJUSTED).



\*NOTE: MANHOLE STEPS CANNOT PROTRUDE MORE THAN 2" INTO 30" OPENING OR CARTRIDGE INSTALLATION AND REMOVAL MAY BE IMPEDED\*

APPENDIX B.3.C SPECIFICATIONS FOR OPEN CHANNELS AND FILTER STRIPS

1. MATERIAL SPECIFICATIONS  
THE RECOMMENDED CONSTRUCTION MATERIALS FOR OPEN CHANNELS AND FILTER STRIPS ARE DETAILED IN TABLE B.3.3.

2. DRY SWALES  
PERMEABLE SOIL MIXTURE (20" TO 30" DEEP) SHOULD MEET THE BIORETENTION "PLANTING" SOIL SPECIFICATIONS. CHECK DIMS. IF REQUIRED SHALL BE PLACED AS SPECIFIED.  
SYSTEM TO HAVE 3" OF FREEBOARD, MINIMUM ABOVE 21R WATER SURFACE ELEVATION. SIDE SLOPES TO BE 2:1 MINIMUM. (4:1 OR FLATTER IS PREFERRED).  
NO GRAVEL OR PERFORATED PIPE OS TO BE PLACED UNDER DRENCHERS.  
BOTTOM OF FACILITY TO BE ABOVE THE SEASONABLE HIGH WATER TABLE PER TABLE 2 OF APPENDIX D.1.  
SEED WITH FLOOD/DROUGHT RESISTANT GRASSES; SEE APPENDIX A, SECTION 2.4.  
LONGITUDINAL SLOPE TO BE 4% MAXIMUM.  
BOTTOM WIDTH TO BE 6" MAXIMUM TO AVOID BRIDGING; LARGER WIDTHS MAY BE USED IF PROPER BERMING IS SUPPLIED. WIDTH TO BE 2' MINIMUM.

3. WET SWALES  
FOLLOW ABOVE INFORMATION FOR DRY SWALES, WITH THE FOLLOWING EXCEPTIONS: THE SEASONALLY HIGH WATER TABLE MAY INFLUENCE THE SWALE, BUT NOT ABOVE THE DESIGN BOTTOM OF THE CHANNEL (NOTE: IF THE WATER TABLE IS SHALE WITHIN THE CHANNEL, THE SWALE MAY STAY AT THIS POINT - SEE FIGURE 3.1.9)  
EXCAVATE INTO UNDISTURBED SOILS; DO NOT USE AN UNDERDRAIN SYSTEM.

APPENDIX B.3.C CONSTRUCTION SPECIFICATIONS FOR SAND FILTERS, BIORETENTION AND OPEN CHANNELS.

4. FILTER STRIPS  
CONSTRUCT PER GRAVEL DIAPHRAGMS 12" WIDE, MAXIMUM, AND 24" DEEP MINIMUM.  
PERVIOUS BERM TO BE A SAND/GRAVEL MIX. SEE BIORETENTION PLANTING MEDIA SPECIFICATIONS; ADD 20% GRAVEL; REDUCE CLAY COMPONENT ACCORDING; BERMS TO HAVE OVERFLOW WEIRS WITH 6" MINIMUM HEAD.  
SLOPE RANGE TO BE 2% MINIMUM TO 6% MAXIMUM.

5. PLANT SELECTION  
RECOMMENDED GRASS SPECIES FOR USE IN ESTABLISHING PERMANENT GROUND COVER ARE PROVIDED IN SECTION 2.4 OF APPENDIX A.

MATERIAL	SPECIFICATION	SIZE	NOTES
DRY SWALE SOIL	USCS: ML, SM, SC	N/A	SOILS WITH A HIGHER PERCENT ORGANIC CONTENT IS PREFERRED
DRY SWALE SAND	ASTM C-33 FINE AGGREGATE CONCRETE SAND	0.02" TO 0.04"	
CHECK DAM (PRESSURE TREATED)	AWPA STANDARD C6	6" BY 6" OR 8" BY 8"	DO NOT COAT WITH CROCOSETE; EMBED AT LEAST 3" INTO SIDE SLOPES
CHECK DAM (NATURAL WOOD)	BLACK LOCUST, RED MULBERRY, CEDARS, CATALPA, WHITE OAK, CHESTNUT OAK, BLACK WALNUT	6" TO 12" DIAMETER; NOTCH AS NECESSARY	DO NOT USE THE FOLLOWING, AS THESE SPECIES HAVE A REDISPOSITION TOWARDS ROT: ASH, BEECH, BIRCH, ELM, HACKBERRY, HEMLOCK, HICKORIES, MAPLES, RED AND BLACK OAK, PINE, POPLAR, SPRUCE, SWEETGUM, YEW
FILTER STRIP SAND/GRAVEL PERVIOUS BERM	SAND: PER DRY SWALE SAND; ASHTO M-43	SAND: 0.02" TO 0.04" GRAVEL: 1/2" TO 1"	MIX WITH APPROXIMATE 25% LOAN SOIL TO SUPPORT GRASS COVER ORP. SEE BIORETENTION PLANTING SOIL NOTES FOR MORE DETAIL.
PEA GRAVEL DIAPHRAGM AND CURTAIN DRAIN	ASTM D 448	VARIABLE (NO. 6) OR (1/8" TO 3/8")	USE CLEAN BANK-RUN GRAVEL
UNDERDRAIN GRAVEL	ASHTO M-43	0.25" TO 0.75"	
UNDERDRAIN	F 758, TYPE PS 28 OOR ASHTO M-278	4" TO 6" RIGID SCHEDULE 40 PVC OR SDR35	3/8" PERF. @ 6" O.C., 4 HOLES PER ROW; MIN. OF 3" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES
GEOTEXTILE	CLASS "C" - APPARENT OPENING SIZE (ASTM-D-4751), GRAV TENSILE STRENGTH (ASTM-D-4832), PUNCTURE RESISTANCE (ASTM-D-4833)	N/A	
RIP RAP	PER COUNTY CRITERIA; IF NONE GIVEN, USE MSHA STANDARDS AND SPECS SECTION 905	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DBASE AND GRANSTONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR DOLICITE SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND

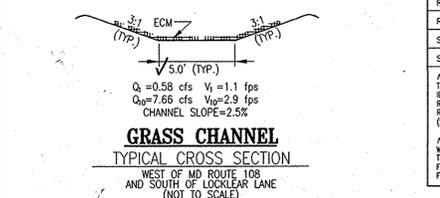
COMMON NAME	SCIENTIFIC NAME	NOTES
BIG BLUESTEM	ANDROPOGON GERARDII	WARM, NOT FOR WET SWALE
CREEPING BENTGRASS	AGROSTIS PALUSTRIS	COOL.
RED FESCUE	FESTUCA RUBRA	COOL, NOT FOR WET SWALE
REED CANARY GRASS	PHALARIS ARUNDINACEA	COOL, WET SWALE
REDTOP	AGROSTIS ALBA	COOL.
SMOOTH BROME	BROMUS INERMIS	COOL, NOT FOR WET SWALE
SWITCH GRASS	PANICUM VIRGATUM	WARM

NOTE 1: THESE GRASSES ARE SOIL-FORMING AND CAN WITHSTAND FREQUENT INUNDATION AND ARE THE IDEAL FOR THE SWALE OR GRASS CHANNEL ENVIRONMENT. MOST ARE SALT-TOLERANT, AS WELL COOL REFER TO COOL SEASON GRASSES THAT DO WELL IN THE WESTERN PART OF THE STATE. WARM REFER TO WARM SEASON GRASSES THAT WORK WELL IN THE EASTERN PART OF THE STATE (SEE TABLE A.8).

NOTE 2: WHERE POSSIBLE, ONE OR MORE OF THESE GRASSES SHOULD BE IN THE SEED MIXES FOR A MORE THROUGH LISTING OF SEED MIXES, CONSULT THE 1994 MARYLAND STANDARD AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL (MDE, 1994) OR THE MD NRCS CODE 391 RIPARIAN FOREST BUFFER STANDARD, TABLE 2 (ZONE 3).

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED OPEN CHANNEL SYSTEMS (O-1 AND O-2)**

1. THE OPEN CHANNEL SYSTEM SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
2. THE OPEN CHANNEL SHALL BE MOVED A MINIMUM OF AS NEEDED DURING THE GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 6 INCHES.
3. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE OPEN CHANNEL SYSTEM SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
5. REMOVE SILT IN THE OPEN CHANNEL SYSTEM WHEN IT EXCEEDS 25% OF THE ORIGINAL WOV.



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION: *[Signature]* DATE: 1/14/13

CHIEF, DIVISION OF LAND DEVELOPMENT: *[Signature]* DATE: 1/10/13

DIRECTOR: *[Signature]* DATE: 1/14/13

BY THE DEVELOPER:

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

*[Signature]* DATE: 12/5/12

BY THE ENGINEER:

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

*[Signature]* DATE: 12/7/12

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

*[Signature]* DATE: 12/7/12

**BAYSAVER TECHNOLOGIES, INC.**  
Engineering Stormwater Solutions

Waterloo Crossing  
Columbia, MD  
April 21, 2010

BayFilter

	DA1	DA2
Treatment Volume (cf)	5,348	1,561
Treatment Capacity Per Cartridge (cf)	2,500	2,500
Number of Cartridges Required	3	1
Number of Drain Down Modules Required	3	1
Treatment Capacity Provided (cf)	7,500	2,500
Vault Required (see below)	MH-72	MH-48

**Maintenance of the BayFilter System**

The BayFilter™ system requires periodic maintenance to continue operating at the design efficiency. The maintenance process comprises the removal and replacement of each BayFilter™ cartridge and drain down module and the cleaning of the vault or manhole with a vacuum truck. BayFilter™ maintenance should be performed by a BaySaver Technologies, Inc. certified maintenance contractor.

The maintenance cycle of the BayFilter™ system will be driven mostly by the actual solids load on the filter. The system should be periodically monitored to be certain it is operating correctly. Since stormwater solids loads can be variable, it is possible that the maintenance cycle could be more or less than the projected duration.

The BayFilter systems in New Development applications are designed to treat the WQv in 24 hours initially. Later in the cycle these cartridges will flow at a slower rate, and when the WQv does not drain down within +/- 40 hours after the storm event, the system must be maintained.

When a BayFilter™ system is first installed, it is recommended that it be inspected every six (6) months. When the filter system exhibits flows below design levels the system should be maintained. Filter cartridge replacement should also be considered when sediment levels are at or above the level of the 4 inch manifold system. Please contact the BaySaver Technologies Inc. Engineering Department for maintenance cycle estimations or assistance at 1.800.229.7283.

**Maintenance Procedures**

1. Remove the manhole covers and open all access hatches.
2. Before entering the system make sure the air is safe per OSHA Standards or use a breathing apparatus. Use low O<sub>2</sub>, high CO<sub>2</sub>, or other applicable warning devices per regulatory requirements.
3. Using a vacuum truck remove any liquid and sediments that can be removed prior to entry.
4. Using a small lift or the boom of the vacuum truck, remove the used cartridges by lifting them out.
5. Any cartridges that cannot be readily lifted directly out of the vault should be removed from their location and carried to the lifting point using the Trolley system installed in the Vault (if applicable).
6. When all cartridges and drain down modules are removed, remove the balance of the solids and water, then loosen the stainless clamps on the Fernco couplings in the pipe manifold; remove the drain pipes as well. Carefully cap the manifold and the Fernco's and raise the floor removing the balance of the collected solids.
7. Clean the manifold pipes, inspect, and reinstall.
8. Install the exchange cartridges and close all covers.
9. The used cartridges must be sent back to BaySaver Technologies, Inc. for exchange/recycling and credit on undamaged units (1030 Deer Hollow Drive, Mt. Airy, MD 21771. Phone: 800.229.7283).

**OWNER/DEVELOPER**

WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

WATERLOO LAND NO. 2, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

NO.	REVISION	DATE
1	REVISE PLAN TO CHANGE THE STORMFILTERS TO BAYFILTERS AND CHANGE THE 72" UNDERGROUND FACILITY FROM 8 GAUGE TO 12 GAUGE	09-24-12

**SITE DEVELOPMENT PLAN**  
**STORMWATER MANAGEMENT**  
**DETAILS, AND STORM DRAIN PROFILES**  
**WATERLOO CROSSING**  
MEDICAL AND OFFICE BUILDING  
PARCEL A  
GREEN BUILDING

TAX MAP 37, BLOCK 7 & 8  
6TH ELECTION DISTRICT

PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

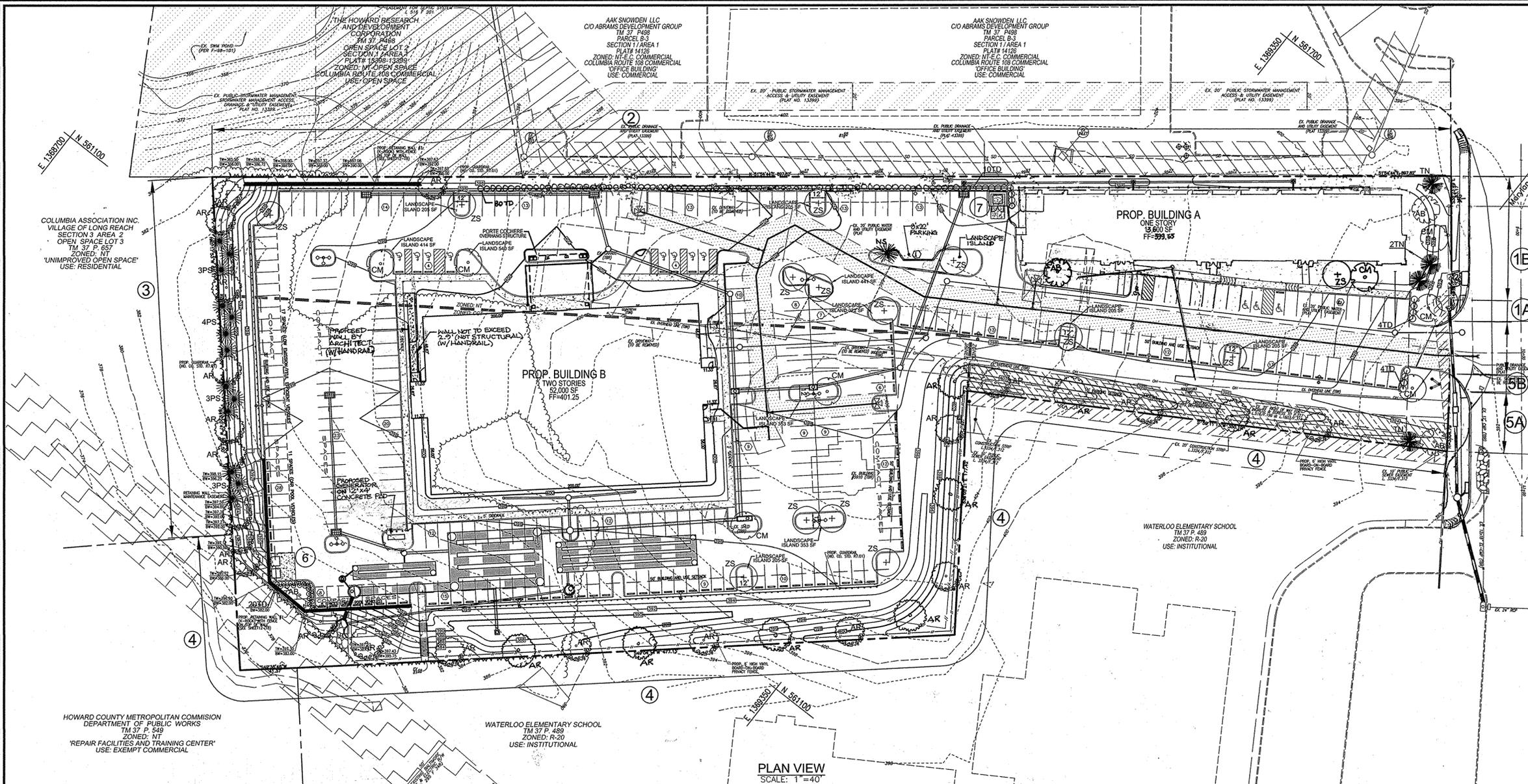
**ROBERT H. VOGEL, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET  
ELLCOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.8961

DESIGN BY: *[Signature]* /RHY  
DRAWN BY: *[Signature]* /RHY  
CHECKED BY: *[Signature]* /RHY  
DATE: OCTOBER 2012  
SCALE: AS SHOWN  
W.O. NO.: 05-52

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULL LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. EXPIRATION DATE: 09-27-2014

10 SHEET OF 18

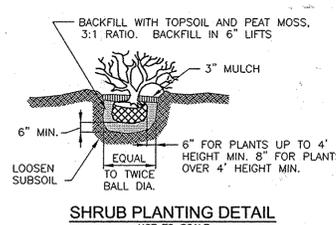
NOTE: DEBRIS IS TO BE KEPT OUT OF STORMWATER MANAGEMENT FACILITIES DURING AND AFTER CONSTRUCTION.



### LEGEND:

	EXISTING CONTOUR
	PROPOSED CONTOUR
	EXISTING SPOT ELEVATION
	PROPOSED SPOT ELEVATION
	EXISTING CURB AND GUTTER
	PROPOSED 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 TREES (FIELD LOCATED)
	EXISTING TREELINE (FIELD LOCATED)
	PROP. TREELINE
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	MIB2
	MIDS
	PROPOSED STORM DRAIN
	PROPOSED STORM DRAIN INLET
	PROPOSED SIDEWALK
	PROPOSED LIGHT POLE
	PROPOSED SHADE TREE
	EXISTING EVERGREEN TREE
	PROPOSED EVERGREEN TREE
	PROPOSED SHRUBS
	LANDSCAPE PERIMETER
	ZONING LINE

WATERLOO ROAD  
 MD ROUTE 108  
 VARIABLE WIDTH ROW  
 (STATE ROAD)



OWNER/DEVELOPER  
 WATERLOO LAND NO. 1, LLC  
 301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609  
 (919) 789-9289

### SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO PERIMETER AND ROADWAYS				ADJACENT TO DUMPSTER				
	1A	1B	2	3	4	5A	5B	6	7
PERIMETER/FRONTAGE DESIGNATION	E	B	A	C	A	B	E	C	C
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	16	90	898	260	1145	44	16	33	33
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO	NO	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	YES, 528'	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED	1:40	1:50	1:60	1:15	1:40	1:50	1:40	1:40	1
SHADE TREES	1:4	1:4	1:4	1:3	1:4	1:4	1:4	1:2	2
EVERGREEN TREES	1:4	1:4	1:4	1:3	1:4	1:4	1:4	1:2	2
SHRUBS	1:4	1:4	1:4	1:3	1:4	1:4	1:4	1:2	2
NUMBER OF PLANTS PROVIDED	1	2	1**	7	21**	1	1	1	36
SHADE TREES	1	2	1**	7	21**	1	1	1	36
EVERGREEN TREES	1	2	1**	7	21**	1	1	1	36
OTHER TREES (2:1 SUBSTITUTION)	1	2	1**	7	21**	1	1	1	36
SHRUBS (1:1 SUBSTITUTION)	1	2	1**	7	21**	1	1	1	36
DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED									

### LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	CAT.
AR	29	ACER RUBRUM	2 1/2"-3" CAL.	B & B
ZS	14	ZELCOVA SERRATA VILLAGE GREEN	2 1/2"-3" CAL.	B & B
AB	4	ACER PALMATUM BLOODGOOD	3"-6" HT.	B & B
CM	9	CHAMAECARYS M. JAPANESE RED MAPLE	(MAX. HEIGHT=25')	B & B
PS	13	PRINUS STRIBIS	4"-8" HT.	B & B
TN	5	TRILIAX OCCIDENTALIS 'NIGRA'	6"-8" HT.	B & B
TD	38	TAXUS MEDIA 'DENSIFORMIS'	2 1/2"-3" HT.	B & B
MS	1	MILVUS STRIBIS	2"-4" HT.	B & B

### SCHEDULE B PARKING LOT INTERNAL LANDSCAPING

NUMBER OF PARKING SPACES	328
NUMBER OF ISLANDS AND TREES REQUIRED	16
NUMBER OF ISLANDS AND TREES PROVIDED	20
ISLANDS AND SHADE TREES	20
OTHER TREES (2:1 SUBSTITUTION)	-

### BGE NOTES:

1. THE PROPOSED LANDSCAPING ON WIREZONE (40' FROM BGE POLES) IS IN ACCORDANCE WITH BGE LIST OF TREES AND PLANTS, AS SHOWN ON THIS PLAN.
2. BGE RESERVES THE RIGHT TO TRIM, TOP OR CUT DOWN ANY TREE IN PROXIMITY TO THE LINE THAT IN THE OPINION OF BGE SHALL BE DEEMED A HAZARD TO THE SAFE AND RELIABLE DELIVERY OF ELECTRICITY.
3. THE CONTRACTOR IS TO CALL "MISS UTILITY" PRIOR TO THE INSTALLATION OF ANY LANDSCAPING TO LOCATE ANY UNDERGROUND GAS LINES THAT MAY BE LOCATED IN OR NEAR THE PROPERTY. LANDSCAPING MAY NOT BE INSTALLED ANY CLOSER THAN 10' FROM THE GAS LINE IN EITHER DIRECTION.

### LANDSCAPE SCHEDULE NOTE:

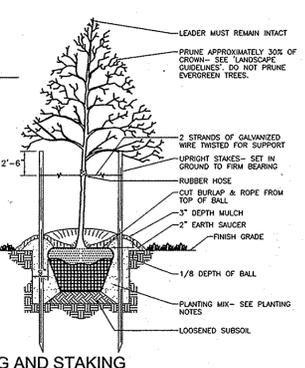
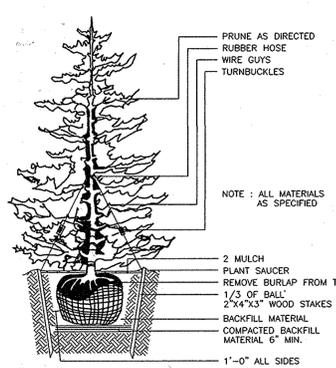
1. ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AAS SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HRD PLANTING SPECIFICATIONS.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
3. FINAL LOCATION OF PLANT 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.

### GENERAL NOTES:

1. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. THE REQUIRED PARKING AND PERIMETER LANDSCAPING WILL BE BONDED PER THIS SUBMISSION.
2. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$18,090.00 FOR THE REQUIRED 49 SHADE TREES, 21 EVERGREEN TREES AND 8 SHRUBS.

### FOREST CONSERVATION WORKSHEET

A. TOTAL TRACT AREA	5.69 AC
B. DEDUCTIONS - PARCEL 548 ZONED NT	2.69 AC
C. NET TRACT AREA	3.00 AC
LAND USE CATEGORY (FROM TABLE 3.2.1, PAGE 40, MANUAL)	
INPUT THE NUMBER "1" UNDER THE APPROPRIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY.	
ARA	0
M	0
IDA	0
HDR	0
MPD	0
CIA	1
D. AFFOREST THRESHOLD	15% X D = 0.45 AC
E. CONSERVATION THRESHOLD	15% X D = 0.45 AC
EXISTING FOREST COVER:	
F. EXISTING FOREST COVER (EXCLUDING FLOODPLAIN) =	0.00 AC
G. AREA OF FOREST ABOVE AFFORESTATION THRESHOLD =	0.00 AC
H. AREA OF FOREST ABOVE CONSERVATION THRESHOLD =	0.00 AC
BREAK EVEN POINT: (1:43)	
I. FOREST RETENTION WITH NO MITIGATION REQUIRED =	0.00 AC
J. CLEARING PERMITTED WITHOUT MITIGATION =	0.00 AC
PROPOSED FOREST CLEARING:	
K. TOTAL AREA OF FOREST TO BE CLEARED =	0.00 AC
L. TOTAL AREA OF FOREST TO BE RETAINED =	0.00 AC
PLANTING REQUIREMENTS:	
M. REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD =	0.00 AC
N. REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD =	0.00 AC
P. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD =	0.00 AC
Q. TOTAL REFORESTATION REQUIRED =	0.00 AC
R. TOTAL AFFORESTATION REQUIRED =	0.45 AC
S. TOTAL REFORESTATION AND AFFORESTATION REQUIRED =	0.45 AC
THE FOREST CONSERVATION AFFORESTATION OBLIGATION OF 0.45 ACRES OF AFFORESTATION FOR THIS PLAN HAS BEEN FULLY MET THROUGH A FEE-IN-LIEU PAYMENT OF \$14,701.50 (19,602 SF x 0.75) TO THE HOWARD COUNTY FOREST CONSERVATION FUND.	



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 8/14/12

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 OF DEVELOPER: [Signature]  
 DATE: 8/21/12

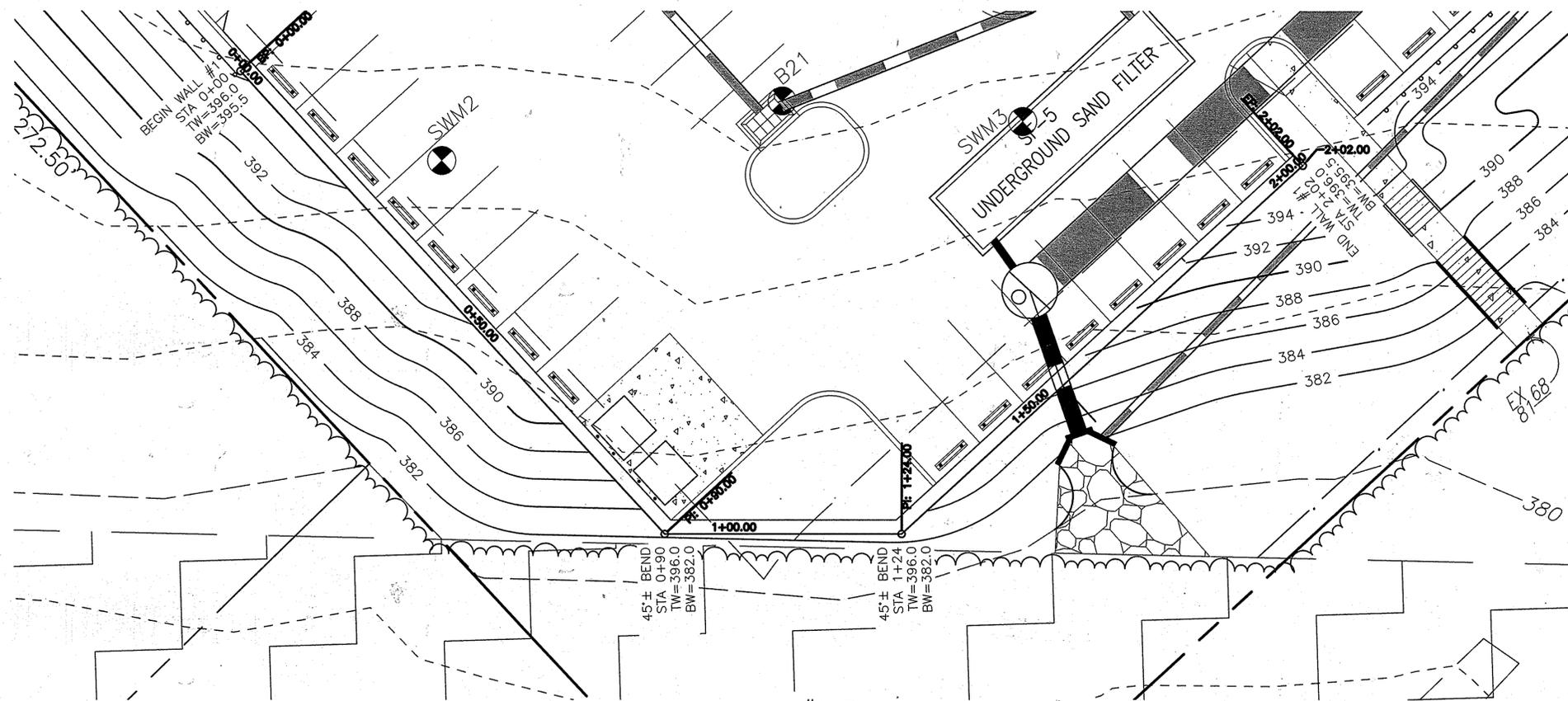
JOHN COOLES  
 DNR QUALIFIED PROFESSIONAL

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER  
 ROBERT H. VOGEL, PE No. 16193

DESIGN BY: DZ/RHV  
 DRAWN BY: DZ  
 CHECKED BY: RHV  
 DATE: AUGUST 2012  
 SCALE: AS SHOWN  
 W.D. NO.: 05-52

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. 16193, EXPIRATION DATE: 08-31-2015

11 SHEET OF 18



WALL #1 PLAN  
SCALE 1"=10 FT

THE PURPOSE OF THIS DRAWING IS TO PRESENT THE PLAN AND ELEVATION OF THE K-ROCK SEGMENTAL CONCRETE RETAINING WALL (MECHANICALLY STABILIZED EMBANKMENT). THIS PLAN SHOWS THE SAME INFORMATION AS THE SITE DEVELOPMENT PLANS, ONLY AT AN ENLARGED SCALE. DETAILS OF THE SITE DEVELOPMENT HAVE BEEN OMITTED FROM THIS PLAN FOR CLARITY.

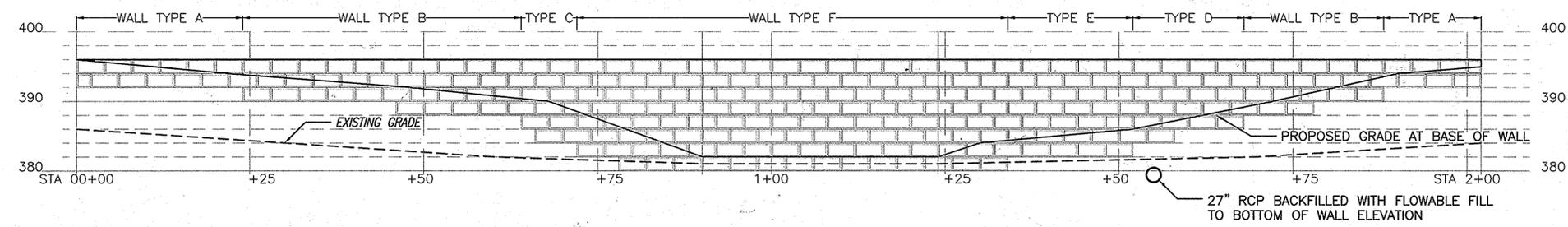
● BORINGS BY HILLIS CARNES.

BEGIN WALL #1  
STA 0+00  
TW=396.0  
BW=395.5

45± BEND  
STA 0+90  
TW=396.0  
BW=382.0

45± BEND  
STA 1+24  
TW=396.0  
BW=382.0

END WALL #1  
STA 2+02  
TW=396.0  
BW=395.5



WALL #1 ELEVATION  
SCALE 1"=10 FT

SEGMENT RETAINING WALL (SRW) / MECHANICALLY STABILIZED EMBANKMENT (MSE) WILL BE CONSTRUCTED IN NEW CONTROLLED COMPACTED FILL. RECOMMENDATIONS IN THE HILLIS CARNES REPORT FOR COMPACTION AND ALLOWING FILL TO CONSOLIDATE MUST BE FOLLOWED. LIMITS OF CONTROLLED COMPACTED FILL SHOULD BE 5 FEET OUTSIDE THE LIMITS OF WALL AT THE BOTTOM OF FOOTING ELEVATION, AND EXTEND OUTWARD 1:1 WITH THE DEPTH OF FILL. FILL MATERIALS NEED TO BE CONSISTENT WITH SUPPORTING A SRW/MSE WALL WITH MINIMAL SETTLEMENT

**OWNER/DEVELOPER**  
 WATERLOO LAND NO. 1, LLC      WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE      301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609      RALEIGH, NC 27609  
 (919) 789-9289      (919) 789-9289

NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
**K-ROCK RETAINING WALL**  
**WALL #1 PLAN & ELEVATION**  
**WATERLOO CROSSING**  
 MEDICAL AND OFFICE BUILDING  
 PARCEL A

TAX MAP 37, BLOCK 7 & 8      PARCEL 227 & 548  
 6TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

**STEGMAN ENGINEERING, pc**  
 35 East Avenue, Red Lion, PA 17356  
**TOLL FREE 888.333.1566      FAX 717.244-3070**  
 www.StegmanEngineering.com  
 © 2011 Stegman Engineering. All Rights Reserved



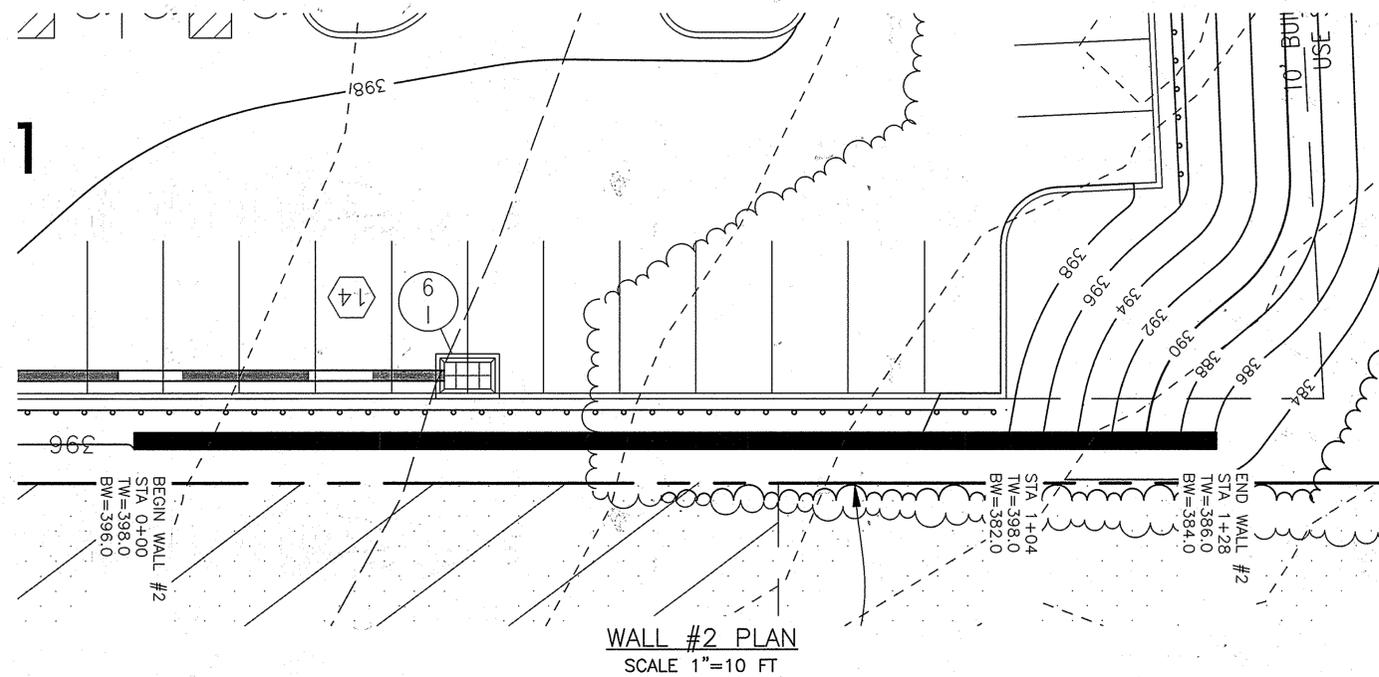
DESIGN BY: MN/BGS  
 DRAWN BY: MN/BGS  
 CHECKED BY: BGS  
 DATE: JULY 2012  
 SCALE: AS SHOWN  
 24x36 ARE FULL SIZE  
 12x18 ARE HALF SIZE  
 11x17 ARE NO SCALE  
 W.O. NO.: 05-52

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.  
 13981, EXPIRATION DATE: JULY  
 2014.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 8/14/12  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 8/27/12  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 8-27-12  
 DIRECTOR

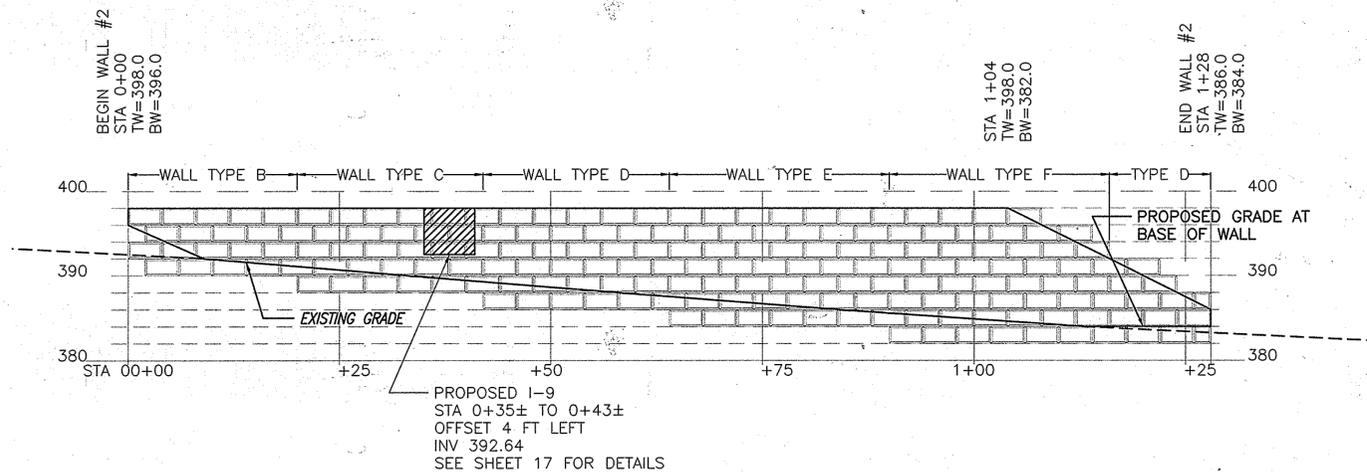
NO AS-BUILT INFORMATION THIS SHEET

AS-BUILT 5/5/2016



WALL #2 PLAN  
SCALE 1"=10 FT

THE PURPOSE OF THIS DRAWING IS TO PRESENT THE PLAN AND ELEVATION OF THE K-ROCK SEGMENTAL CONCRETE RETAINING WALL (MECHANICALLY STABILIZED EMBANKMENT). THIS PLAN SHOWS THE SAME INFORMATION AS THE SITE DEVELOPMENT PLANS, ONLY AT AN ENLARGED SCALE. DETAILS OF THE SITE DEVELOPMENT HAVE BEEN OMITTED FROM THIS PLAN FOR CLARITY.



WALL #2 ELEVATION  
SCALE 1"=10 FT

**OWNER/DEVELOPER**  
 WATERLOO LAND NO. 1, LLC      WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE      301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609      RALEIGH, NC 27609  
 (919) 789-9289      (919) 789-9289

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**  
**K-ROCK RETAINING WALL**  
**WALL #2 PLAN & ELEVATION**  
**WATERLOO CROSSING**  
 MEDICAL AND OFFICE BUILDING  
 PARCEL A  
 TAX MAP 37, BLOCK 7 & 8      PARCEL 227 & 548  
 6TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

**STEGMAN ENGINEERING, pc**  
 35 East Avenue, Red Lion, PA 17356  
 TOLL FREE 888.333.1566      FAX 717.244-3070  
 www.StegmanEngineering.com  
 © 2011 Stegman Engineering, All Rights Reserved

	DESIGN BY: MN/BGS DRAWN BY: MN/BGS CHECKED BY: BGS DATE: JULY 2012	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. 13981, EXPIRATION DATE: JULY 2014.
	SCALE: AS SHOWN 22x18 ARE FULL SIZE 11x17 ARE NO SCALE W.O. NO.: 05-52	13 SHEET OF 18

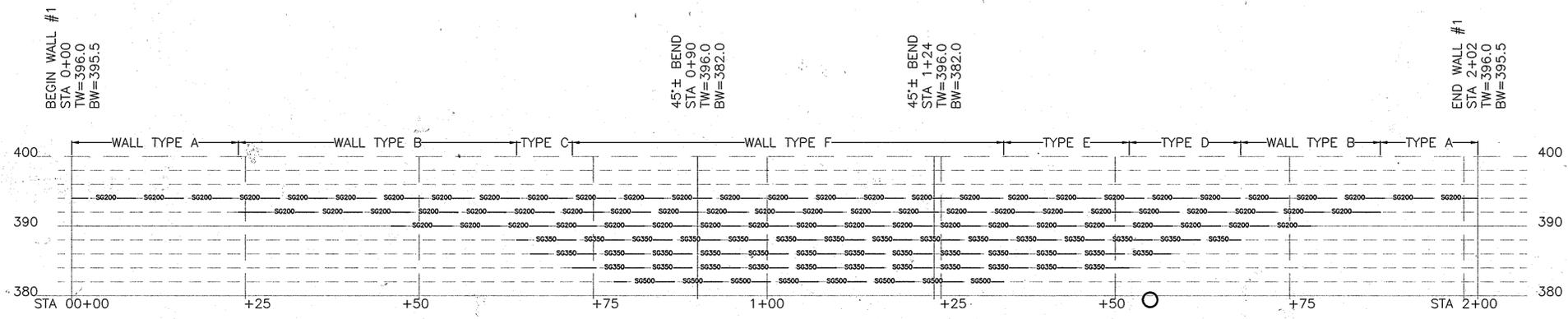
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 8/14/12  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 8/27/12  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 8-27-12  
 DIRECTOR

SEGMENT RETAINING WALL (SRW) / MECHANICALLY STABILIZED EMBANKMENT (MSE) WILL BE CONSTRUCTED IN NEW CONTROLLED COMPACTED FILL. RECOMMENDATIONS IN THE HILLIS CARNES REPORT FOR COMPACTION AND ALLOWING FILL TO CONSOLIDATE MUST BE FOLLOWED. LIMITS OF CONTROLLED COMPACTED FILL SHOULD BE 5 FEET OUTSIDE THE LIMITS OF WALL AT THE BOTTOM OF FOOTING ELEVATION, AND EXTEND OUTWARD 1:1 WITH THE DEPTH OF FILL. FILL MATERIALS NEED TO BE CONSISTENT WITH SUPPORTING A SRW/MSE WALL WITH MINIMAL SETTLEMENT

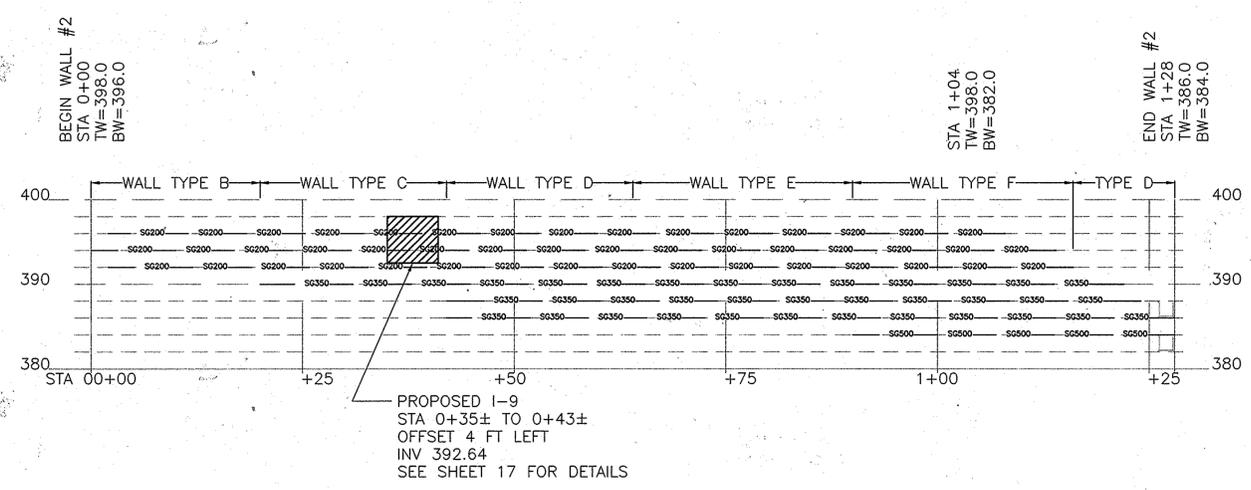
NO AS-BUILT INFORMATION THIS SHEET

AS-BUILT 5/5/2016

GRID LEGEND  
 STRATAGRID 200 — S0200  
 STRATAGRID 350 — S0350  
 STRATAGRID 500 — S0500



WALL #1 GRID ELEVATION  
 SCALE 1"=10 FT



WALL #2 GRID ELEVATION  
 SCALE 1"=10 FT

OWNER/DEVELOPER  
 WATERLOO LAND NO. 1, LLC 301 TRANSYLVANIA AVE RALEIGH, NC 27609 (919) 789-9289  
 WATERLOO LAND NO. 2, LLC 301 TRANSYLVANIA AVE RALEIGH, NC 27609 (919) 789-9289

NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
 K-ROCK RETAINING WALL  
 WALL #1 & #2 GRID ELEVATIONS  
 WATERLOO CROSSING  
 MEDICAL AND OFFICE BUILDING  
 PARCEL A  
 TAX MAP 37, BLOCK 7 & 8 6TH ELECTION DISTRICT  
 PARCEL 227 & 548 HOWARD COUNTY, MARYLAND

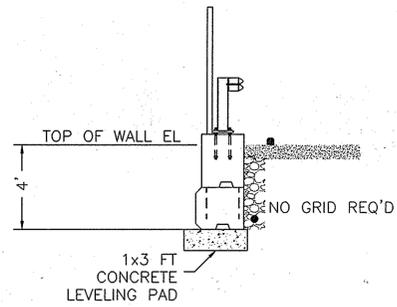
STEGMAN ENGINEERING, pc  
 35 East Avenue, Red Lion, PA 17356  
 TOLL FREE 888.333.1566 FAX 717.244-3070  
 www.StegmanEngineering.com  
 © 2011 Stegman Engineering, All Rights Reserved

	DESIGN BY: MN/BGS DRAWN BY: MN/BGS CHECKED BY: BGS DATE: JULY 2012	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. 13981, EXPIRATION DATE: JULY 2014.
	SCALE: AS SHOWN 24x36 ARE FULL SIZE 12x18 ARE HALF SIZE 11x17 ARE NO SCALE W.O. NO.: 05-52	

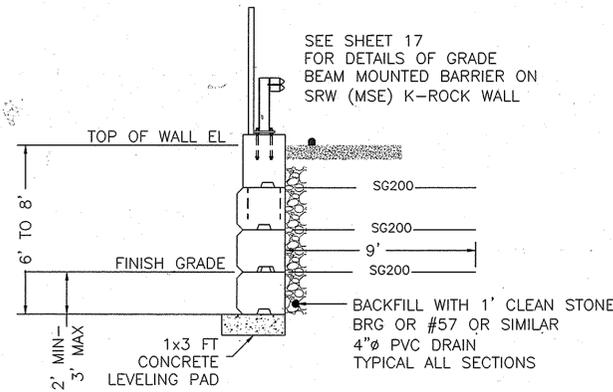
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 5/12/12  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 5/20/12  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 5-27-12  
 DIRECTOR

NO AS-BUILT INFORMATION THIS SHEET

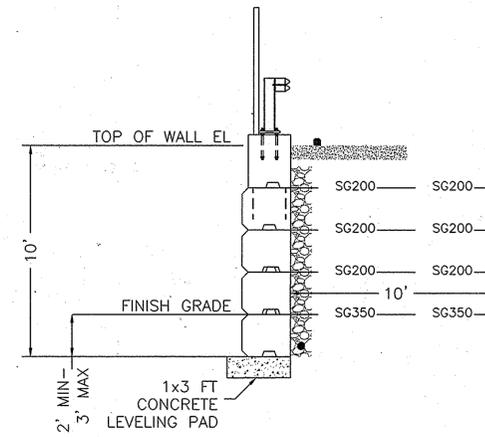
AS-BUILT 5/5/2016



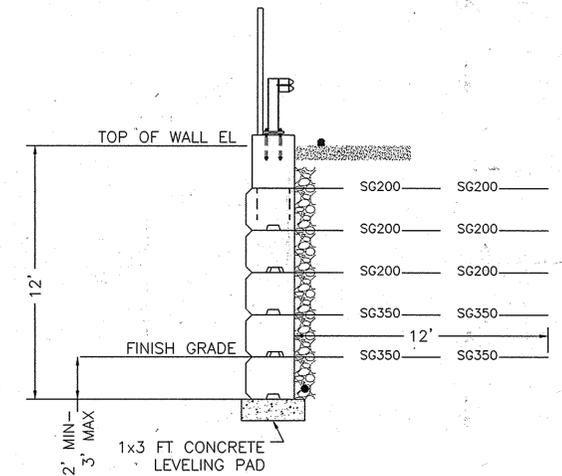
SECTION A 4 OR LESS WALL HEIGHT  
SCALE 1/4"=1'-0"



SECTION B 4 TO 6 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

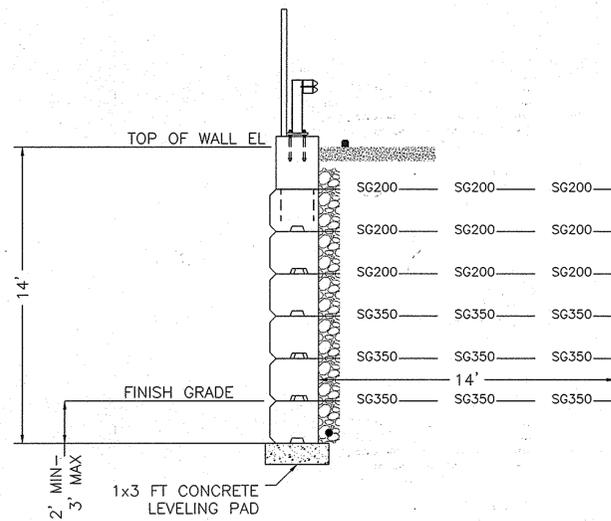


SECTION C 7 TO 8-FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

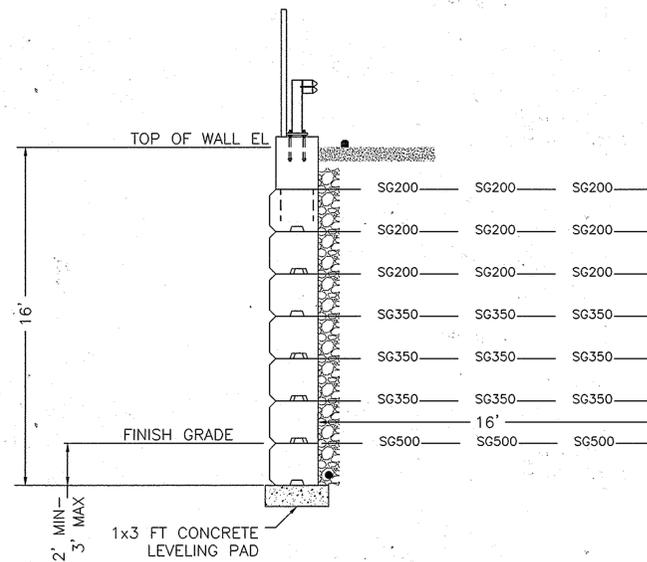


SECTION D 9 TO 10 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

K-ROCK WALL SECTIONS  
SCALE 1/4"= 1'-0"



SECTION E 11 TO 12 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"



SECTION F 13 TO 14 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

K-ROCK WALL SECTIONS  
SCALE 1/4"= 1'-0"

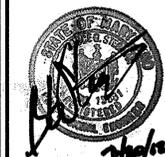
**OWNER/DEVELOPER**  
 WATERLOO LAND NO. 1, LLC      WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE      301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609      RALEIGH, NC 27609  
 (919) 789-9289      (919) 789-9289

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**  
**K-ROCK RETAINING WALL**  
**WALL #1 SECTIONS (NO BATTER)**  
**WATERLOO CROSSING**  
 MEDICAL AND OFFICE BUILDING  
 PARCEL A

TAX MAP 37, BLOCK 7 & 8      PARCEL 227 & 548  
 6TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

**STEGMAN ENGINEERING, pc**  
 35 East Avenue, Red Lion, PA 17356  
 TOLL FREE 888.333.1566      FAX 717.244-3070  
 www.StegmanEngineering.com  
 © 2011 Stegman Engineering, All Rights Reserved



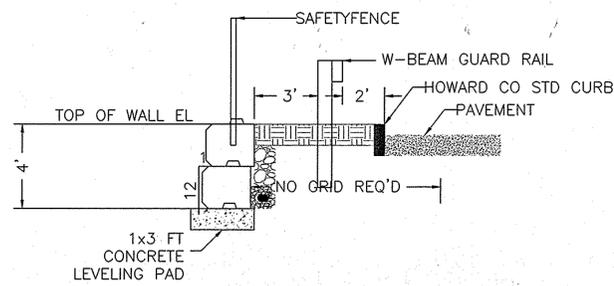
DESIGN BY: MN/BGS  
 DRAWN BY: MN/BGS  
 CHECKED BY: BGS  
 DATE: JULY 2012  
 SCALE: AS SHOWN  
 24x36 ARE FULL SIZE  
 12x18 ARE HALF SIZE  
 11x17 ARE NO SCALE  
 W.O. NO.: 05-52  
 PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE  
 DOCUMENTS WERE PREPARED OR  
 APPROVED BY ME, AND THAT I AM  
 A DULY LICENSED PROFESSIONAL  
 ENGINEER UNDER THE LAWS OF THE  
 STATE OF MARYLAND, LICENSE NO.  
 13981, EXPIRATION DATE: JULY  
 2014.  
 15 SHEET OF 18

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 8/14/12  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 8/22/12  
 DEPT. DIVISION OF LAND DEVELOPMENT  
 [Signature] 8-22-12  
 DIRECTOR

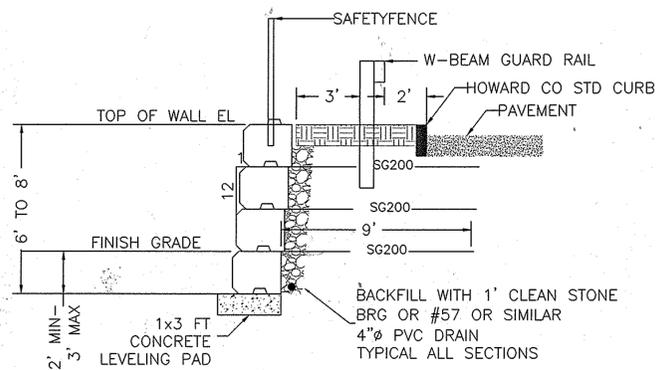
SEGMENT RETAINING WALL (SRW) / MECHANICALLY STABILIZED EMBANKMENT (MSE) WILL BE CONSTRUCTED IN NEW CONTROLLED COMPACTED FILL. RECOMMENDATIONS IN THE HILLIS CARNES REPORT FOR COMPACTION AND ALLOWING FILL TO CONSOLIDATE MUST BE FOLLOWED. LIMITS OF CONTROLLED COMPACTED FILL SHOULD BE 5 FEET OUTSIDE THE LIMITS OF WALL AT THE BOTTOM OF FOOTING ELEVATION, AND EXTEND OUTWARD 1:1 WITH THE DEPTH OF FILL. FILL MATERIALS NEED TO BE CONSISTENT WITH SUPPORTING A SRW/MSE WALL WITH MINIMAL SETTLEMENT

NO AS-BUILT INFORMATION THIS SHEET

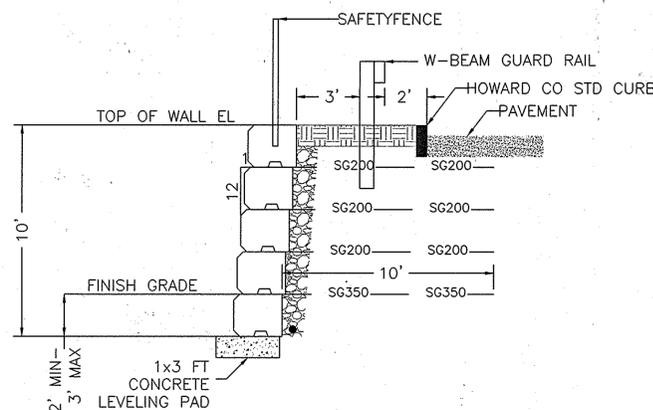
AS-BUILT 5/5/2016



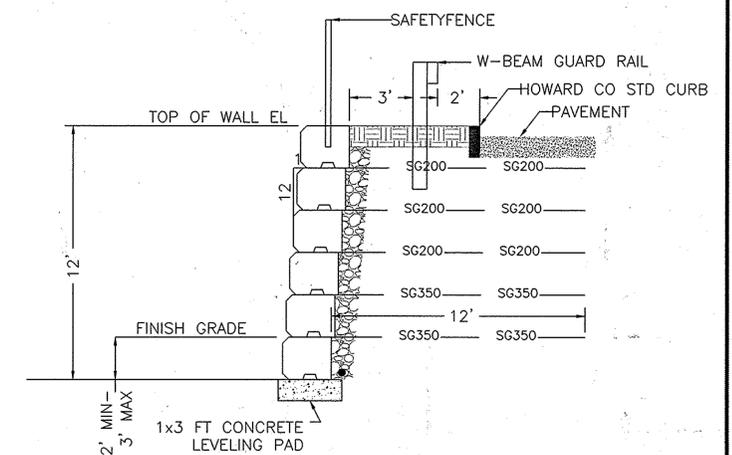
SECTION A 4 FT WALL HEIGHT  
SCALE 1/4"=1'-0"



SECTION B 4 TO 6 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

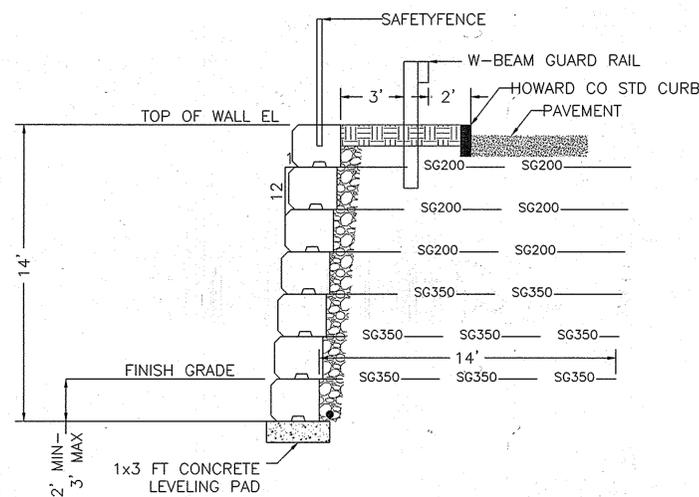


SECTION C 7 TO 8-FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

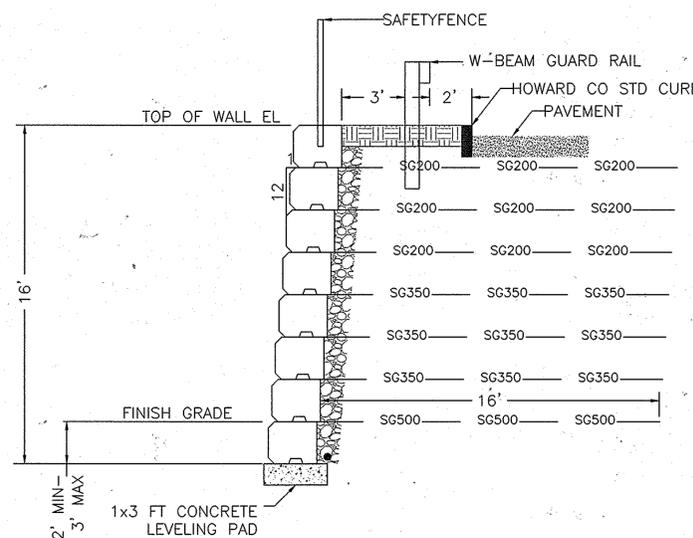


SECTION D 9 TO 10 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

K-ROCK WALL SECTIONS  
SCALE 1/4"= 1'-0"



SECTION E 11 TO 12 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"



SECTION F 13 TO 14 FT EXPOSED WALL HEIGHT  
SCALE 1/4"=1'-0"

K-ROCK WALL SECTIONS  
SCALE 1/4"= 1'-0"

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 8/14/12  
  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 8/27/12  
  
 DIRECTOR  
 DATE: 8/27-12

SEGMENT RETAINING WALL (SRW) / MECHANICALLY STABILIZED EMBANKMENT (MSE) WILL BE CONSTRUCTED IN NEW CONTROLLED COMPACTED FILL. RECOMMENDATIONS IN THE HILLIS CARNES REPORT FOR COMPACTION AND ALLOWING FILL TO CONSOLIDATE MUST BE FOLLOWED. LIMITS OF CONTROLLED COMPACTED FILL SHOULD BE 5 FEET OUTSIDE THE LIMITS OF WALL AT THE BOTTOM OF FOOTING ELEVATION, AND EXTEND OUTWARD 1:1 WITH THE DEPTH OF FILL. FILL MATERIALS NEED TO BE CONSISTENT WITH SUPPORTING A SRW/MSE WALL WITH MINIMAL SETTLEMENT

NO AS-BUILT INFORMATION THIS SHEET

OWNER/DEVELOPER  
 WATERLOO LAND NO. 1, LLC      WATERLOO LAND NO. 2, LLC  
 301 TRANSYLVANIA AVE      301 TRANSYLVANIA AVE  
 RALEIGH, NC 27609      RALEIGH, NC 27609  
 (919) 789-9289      (919) 789-9289

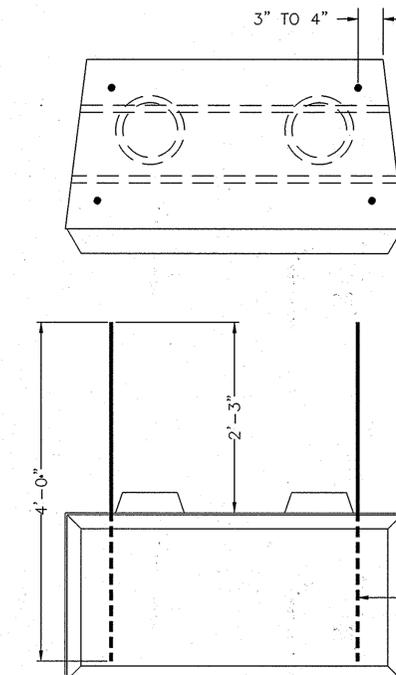
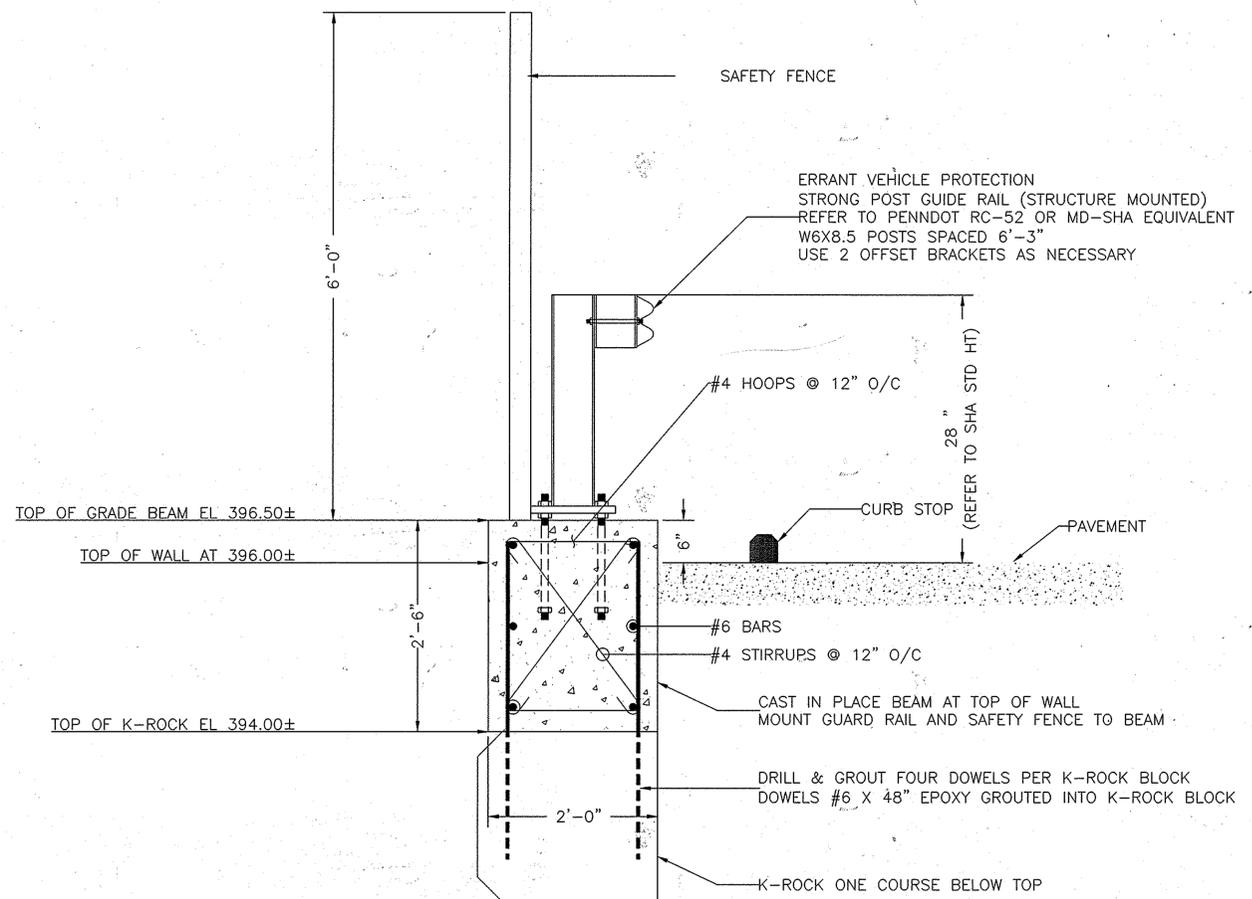
NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
 K-ROCK RETAINING WALL  
 WALL #2 SECTIONS  
 WATERLOO CROSSING  
 MEDICAL AND OFFICE BUILDING  
 PARCELA

TAX MAP 37, BLOCK 7 & 8      PARCEL 227 & 548  
 6TH ELECTION DISTRICT      HOWARD COUNTY, MARYLAND

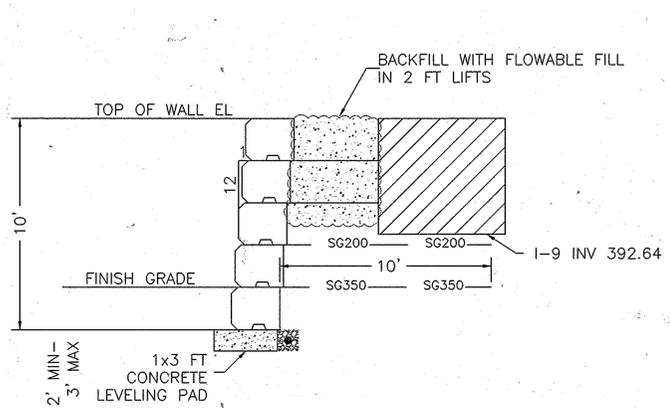
STEGMAN ENGINEERING, pc  
 35 East Avenue, Red Lion, PA 17356  
 TOLL FREE 888.333.1566      FAX 717.244-3070  
 www.StegmanEngineering.com  
 © 2011 Stegman Engineering. All Rights Reserved

 DESIGN BY: MN/BGS DRAWN BY: MN/BGS CHECKED BY: BGS DATE: JULY 2012 SCALE: AS SHOWN 24x36 ARE FULL SIZE 12x18 ARE HALF SIZE 11x17 ARE NO SCALE W.O. NO.: 05-52	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. 13981, EXPIRATION DATE JULY 2014.
	16 SHEET OF 18 AS-BUILT 5/5/2016

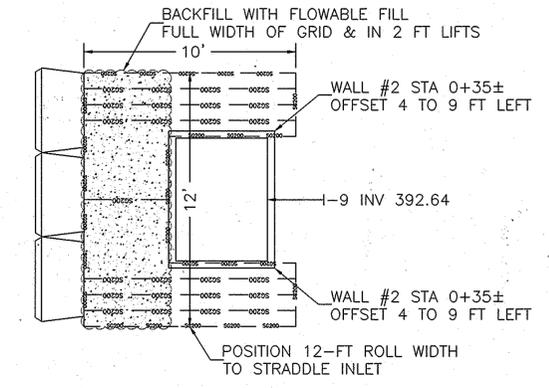


DRILL & GROUT FOUR DOWELS PER K-ROCK BLOCK  
IN BLOCK ONE COURSE BELOW GRADE BEAM  
DOWELS #6 X 48" EPOXY GROUTED INTO K-ROCK BLOCK

W-BEAM BARRIER (GUARD RAIL) ON K-ROCK WALL  
SCALE 1" = 1'-0"



SECTION & PLAN AT CONFLICT WITH I-9  
SCALE 1/4" = 1'-0"



K-ROCK WALL AT INLET I-9  
SCALE 1/4" = 1'-0"

OWNER/DEVELOPER

WATERLOO LAND NO. 1, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

WATERLOO LAND NO. 2, LLC  
301 TRANSYLVANIA AVE  
RALEIGH, NC 27609  
(919) 789-9289

NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
K-ROCK RETAINING WALL  
TRAFFIC BARRIER ON WALL  
WATERLOO CROSSING  
MEDICAL AND OFFICE BUILDING  
PARCEL A

TAX MAP 37, BLOCK 7 & 8  
6TH ELECTION DISTRICT

PARCEL 227 & 548  
HOWARD COUNTY, MARYLAND

**STEGMAN ENGINEERING, pc**  
35 East Avenue, Red Lion, PA 17356  
TOLL FREE 888.333.1566 FAX 717.244-3070  
www.StegmanEngineering.com  
© 2011 Stegman Engineering. All Rights Reserved



DESIGN BY: MN/BGS  
DRAWN BY: MN/BGS  
CHECKED BY: BGS  
DATE: JULY 2012  
SCALE: AS SHOWN  
24x36 ARE FULL SIZE  
12x18 ARE HALF SCALE  
11x17 ARE NO SCALE  
W.O. NO.: 05-52

PROFESSIONAL CERTIFICATE  
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.  
13981, EXPIRATION DATE: JULY  
2014.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 8/14/12  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 8/21/12  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*[Signature]* 8-27-12  
INSPECTOR DATE

NO AS-BUILT INFORMATION THIS SHEET

AS-BUILT 5/5/2016

PART 1 - GENERAL

PART 1 REFERENCES

1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
2. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)

PART 2 - GENERAL REQUIREMENTS

1. DESIGN INCLUDES A LIVE LOAD SURCHARGE OF 250 PSF.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUCH COVERING, SHIELDING, AND BARRICADES AS REQUIRED TO PROTECT BYSTANDERS AND PASSERSBY, EQUIPMENT, SUPPLIES, FROM DUST, DEBRIS, AND OTHER CAUSES OF DAMAGE RESULTING FROM CONSTRUCTION, ANY DAMAGE SHALL BE RESTORED TO THE OWNERS SATISFACTION.
3. ALL REFERENCES TO THE OWNER HEREIN SHALL BE CONSTRUED TO MEAN WATERLOO LAND NO 1 & NO 2, OR THEIR DESIGNATED REPRESENTATIVE. ALL REFERENCES TO THE ENGINEER SHALL MEAN STEGMAN ENGINEERING.
4. ALL WORK PRESENTED ON THESE DRAWINGS IS TO BE COMPLETED BY THE CONTRACTOR (KINSLEY CONSTRUCTION) UNLESS OTHERWISE NOTED AND/OR AGREED TO WITH THE OWNER. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT THEY HAVE SUFFICIENT EXPERIENCE AND ABILITY, AND KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT THEY ARE PROPERLY LICENSED, REGISTERED, AND/OR INSURED TO PERFORM THIS WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR DISSEMINATION OF CONTRACT INFORMATION TO ANY SUBCONTRACTORS, INCLUDING REVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH OTHER TRADES, CONTRACTORS, AND MANUFACTURERS.
6. WORK SHALL BE SUPERVISED BY PERSONNEL KNOWLEDGEABLE AND EXPERIENCED WITH THE PROPOSED WORK TYPE. CONSTRUCTION SHALL BE IN ACCORDANCE WITH HOWARD COUNTY STANDARDS, GENERALLY ACCEPTED INSTALLATION PRACTICES AND IN A GOOD WORKMANLIKE MANNER.
7. CONTRACTOR IS REQUIRED TO HAVE ALL NECESSARY INSPECTIONS PERFORMED BY HOWARD COUNTY BUILDING CODE OFFICIAL OR AN APPROVED AGENCY.
8. DESIGN ASSUMES FIELD INSPECTIONS WILL BE PERFORMED TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON CONDITIONS EXISTING AT THE SITE.
9. CONTRACTOR IS SOLELY RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION, INCLUDING, BUT NOT LIMITED TO: LAYOUT, INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING EXCAVATION SUPPORT SYSTEMS. CONTRACTOR IS SOLELY RESPONSIBLE FOR INSURING THE WORK COMPLIES WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS. CONTRACTOR IS REQUIRED TO MAINTAIN A NEAR AND ORDERLY SITE, REMOVE AND DISPOSE OFF SITE ALL RUBBISH, WASTE MATERIALS, LITTER, AND FOREIGN SUBSTANCES DAILY.
10. ALL MATERIALS FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THESE DRAWINGS. ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED BY THE ENGINEER PRIOR TO ORDERING AND/OR INSTALLATION.
11. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL FOR ANY MATERIAL TO BE REMOVED, OR SIMILAR EXCESS MATERIAL.
12. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY ONE-CALL TO MARK UNDERGROUND UTILITIES

PART 3 - PRODUCTS & MATERIALS

1. GEOGRID REINFORCEMENT:

(a) STRATAGRID SG150, SG200, SG350, SG500 & SG700; OR, EQUIVALENT TEN CATE / MIRAGRID

2. LEVELING PAD BASE (WALL HEIGHT 6 FEET OR LESS)

- 2.1. AGGREGATE BASE: CRUSHED STONE OR GRANULAR FILL, SUCH AS MD-SHA CR-6 2A OR EQUIVALENT.
- 2.2. BASE THICKNESS: 12 INCHES (MINIMUM COMPACTED THICKNESS).
- 2.3. BASE WIDTH: 36 INCHES MINIMUM

3. LEVELING PAD (FOOTING) BASE (WALL HEIGHT 8 FEET OR MORE)

- 3.1. LEAN CONCRETE OR FLOWABLE FILL (f<sub>c</sub>=2,000 PSI).
- 3.2. BASE THICKNESS: 12 INCHES (MINIMUM COMPACTED THICKNESS).
- 3.3. BASE WIDTH: 36 INCHES MINIMUM

4. DRAINAGE AGGREGATE: CLEAN CRUSHED STONE OR GRANULAR FILL, SUCH AS AASHTO #57 OR EQUIVALENT.

5. COMMON WALL BACKFILL - ANGLE OF INTERNAL FRICTION 30 DEGREES OR GREATER, AASHTO A-2-4 (SILTY SAND). CH-MH MATERIALS ARE UNACCEPTABLE. IMPERVIOUS MATERIAL: CLAYEY SOIL OR OTHER SIMILAR MATERIAL WHICH WILL PREVENT PERCOLATION INTO THE DRAINAGE ZONE SHALL NOT BE USED

5.1. FILL BELOW WALL -ONSITE SOILS OR IMPORTED FILL CONSISTING OF GRANULAR MATERIAL AND MEETING THE FOLLOWING GRADUATION AS DETERMINED IN ACCORDANCE WITH ASTM D448:

SIEVE SIZE	PERCENT PASSING
4 INCH	100 TO 85
NO. 4	100 TO 20
NO. 40	0 TO 60
NO. 200	0 TO 35

LIQUID LIMIT LESS THAN 40%, PLASTICITY INDEX LESS THAN 10%

6. BACKFILL: IMPORTED FILL CONSISTING OF GRANULAR MATERIAL AND MEETING THE REQUIREMENTS OF AASHTO #57 STONE

7. DRAINAGE PIPE: 4" CORRUGATED HDPE. THE PIPE MAY BE COVERED WITH A GEOTEXTILE FILTER FABRIC TO FUNCTION AS A FILTER.

PART 4 - EXECUTION

1. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH THE RETAINING WALL SYSTEM IS TO BE ERECTED, AND NOTIFY THE ENGINEER IN WRITING OF CONDITIONS DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
2. THE PLAN VIEW OF THE PROPOSED SEGMENTAL RETAINING WALLS SHOWN ON THIS DRAWING MAY NEED TO BE ADJUSTED BY KINSLEY IN THE FIELD. THESE DESIGN DRAWINGS REPRESENT THE STRUCTURAL ELEMENTS AND INTEGRAL COMPONENTS OF THE WALL SYSTEM. THE PLAN VIEW OF THE WALLS ARE PRESENTED FOR CONVENIENCE ONLY AND SHOULD NOT BE RELIED UPON FOR STAKEOUT OF THE WALLS OR GRADING OF THE SITE.
3. ALL PLAN VIEWS INDICATE THE FACE OF WALL LOCATIONS, AT THE BOTTOM OF THE WALL. THE ENGINEER HAS TAKEN REASONABLE MEASURES TO SHOW THE CONSTRUCTION ELEMENTS PERTINENT TO THE WALL DESIGN, HOWEVER, THE FINAL LOCATION OF ALL EXISTING AND PROPOSED UTILITY LINES MUST BE TAKEN FROM THE SITE GRADING AND UTILITY PLAN(S).
4. CONSTRUCTION INSPECTION OF THESE WALLS IS REQUIRED BY PERSONNEL QUALIFIED IN SEGMENTAL RETAINING WALL CONSTRUCTION AND SHALL INCLUDE MAINTAINING DETAILED RECORDS OF SUBGRADE AND BACKFILL SOIL APPROVAL, AND DENSITY TESTING. A STATEMENT THAT THE WALL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS SHALL BE SUBMITTED TO THE ENGINEER, UPON COMPLETION OF THE WALLS BY THE PROFESSIONAL ENGINEER OVERSEEING THE INSPECTION.
5. ENSURE SURROUNDING STRUCTURES ARE PROTECTED FROM THE EFFECTS OF WALL EXCAVATION.
6. EXCAVATION SUPPORT, IF REQUIRED, IS THE RESPONSIBILITY OF THE CONTRACTOR, INCLUDING THE STABILITY OF THE EXCAVATION AND ITS INFLUENCE ON ADJACENT PROPERTIES AND STRUCTURES.
7. EXCAVATE FOUNDATION SOIL AS REQUIRED FOR FOOTING OR BASE DIMENSION SHOWN ON THE DRAWINGS.
8. HOWARD COUNTY, OR AN APPROVED INSPECTION AGENCY WILL EXAMINE FOUNDATION SOIL TO ENSURE THAT THE FOUNDATION SUBGRADE IS FIRM AND STABLE AND MEETS OR EXCEEDS THE ALLOWABLE BEARING CAPACITY OF 3,000 PSF. REMOVE ANY SOIL WHICH IS WEAK AND YIELDING AND BACKFILL WITH SUITABLE COMPACTED BACKFILL SOILS.
9. HOWARD COUNTY AND/OR THE INSPECTION AGENCY WILL DETERMINE IF THE FOUNDATION SOILS WILL REQUIRE SPECIAL TREATMENT OR CORRECTION TO CONTROL TOTAL AND DIFFERENTIAL SETTLEMENT.
10. FILL OVER-EXCAVATED AREAS WITH SUITABLE COMPACTED BACKFILL, AS RECOMMENDED BY THE INSPECTION AGENCY
11. PLACE BASE MATERIALS TO THE DEPTHS AND WIDTHS SHOWN ON THE DRAWINGS, UPON UNDISTURBED SOILS, OR FOUNDATION SOILS PREPARED ABOVE.
12. EXTEND THE LEVELING PAD LATERALLY AT LEAST 6 INCHES IN FRONT AND BEHIND THE LOWERMOST CONCRETE RETAINING WALL UNIT.

13. PROVIDE AGGREGATE BASE COMPACTED TO 12 INCH THICK (MINIMUM).
14. COMPACT AGGREGATE BASE MATERIAL TO PROVIDE A LEVEL, HARD SURFACE ON WHICH TO PLACE THE CONCRETE FOOTING.
15. PLACE THE CONCRETE FOOTING ON THE PREPARED BASE MATERIAL OR FOOTING.
16. PLACE UNIT ON FOOTING, CHECK UNITS FOR LEVEL AND ALIGNMENT. MAINTAIN THE SAME ELEVATION AT THE TOP OF EACH UNIT WITHIN EACH SECTION OF THE BASE COURSE.
17. PLACE CONCRETE WALL UNITS SIDE-BY-SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE DONE BY USING A STRING LINE MEASURED FROM THE BACK OF THE BLOCK. GAPS ARE NOT ALLOWED BETWEEN THE FOUNDATION CONCRETE WALL UNITS.
18. REMOVE EXCESS FILL FROM TOP OF UNITS AND INSTALL NEXT COURSE. ENSURE BACKFILL IS COMPACTED BEFORE INSTALLATION OF NEXT COURSE.
19. CHECK EACH COURSE FOR LEVEL AND ALIGNMENT. ADJUST UNITS AS NECESSARY TO MAINTAIN LEVEL AND ALIGNMENT PRIOR TO PROCEEDING WITH EACH ADDITIONAL COURSE.
20. INSTALL EACH SUCCEEDING COURSE. BACKFILL AS EACH COURSE IS COMPLETED. PULL THE UNITS FORWARD UNTIL THE LOCATING SURFACE OF THE UNIT CONTACTS THE LOCATING SURFACE OF THE UNITS IN THE PRECEDING COURSE. INTERLOCK WALL SEGMENTS THAT MEET AT CORNERS BY OVERLAPPING SUCCESSIVE COURSES.
21. DO NOT OPERATE TRACKED CONSTRUCTION EQUIPMENT DIRECTLY NEXT TO WALL.
22. FINAL GRADING AT TOP OF WALL SHOULD ALLOW FOR POSITIVE DRAINAGE SURFACE WATER AWAY FROM THE WALL.
23. PLACE FIRST COURSE OF CONCRETE WALL UNITS ON THE PREPARED BASE MATERIAL. CHECK UNITS FOR LEVEL AND ALIGNMENT. MAINTAIN THE SAME ELEVATION AT THE TOP OF EACH UNIT WITHIN EACH SECTION OF THE BASE COURSE.
24. ENSURE THAT FOUNDATION UNITS ARE IN FULL CONTACT WITH NATURAL OR COMPACTED SOIL BASE.
25. PLACE CONCRETE WALL UNITS SIDE-BY-SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE DONE BY USING A STRING LINE MEASURED FROM THE BACK OF THE BLOCK. GAPS ARE NOT ALLOWED BETWEEN THE FOUNDATION CONCRETE WALL UNITS.
26. PLACE 12 INCHES (MINIMUM) OF DRAINAGE AGGREGATE BETWEEN, AND DIRECTLY BEHIND THE CONCRETE WALL UNITS. FILL VOIDS IN RETAINING WALL UNITS WITH DRAINAGE AGGREGATE.
27. REMOVE EXCESS FILL FROM TOP OF UNITS AND INSTALL NEXT COURSE. ENSURE DRAINAGE AGGREGATE AND BACKFILL ARE COMPACTED BEFORE INSTALLATION OF NEXT COURSE.
28. CHECK EACH COURSE FOR LEVEL AND ALIGNMENT. ADJUST UNITS AS NECESSARY TO MAINTAIN LEVEL AND ALIGNMENT PRIOR TO PROCEEDING WITH EACH ADDITIONAL COURSE.
29. INSTALL EACH SUCCEEDING COURSE. BACKFILL AS EACH COURSE IS COMPLETED. PULL THE UNITS FORWARD UNTIL THE LOCATING SURFACE OF THE UNIT CONTACTS THE LOCATING SURFACE OF THE UNITS IN THE PRECEDING COURSE. INTERLOCK WALL SEGMENTS THAT MEET AT CORNERS BY OVERLAPPING SUCCESSIVE COURSES.
30. INSTALL GEOGRID REINFORCEMENT IN ACCORDANCE WITH GEOGRID MANUFACTURER'S RECOMMENDATIONS.
  - 30.1. PLACE THE BACKFILL AND COMPACT TO THE ELEVATION OF THE TOP OF THE WALL UNITS AT THE ELEVATION OF THE GEOGRID REINFORCEMENT.
  - 30.2. ORIENT GEOGRID REINFORCEMENT WITH THE HIGHEST STRENGTH AXIS PERPENDICULAR TO THE WALL FACE.
  - 30.3. PLACE GEOGRID REINFORCEMENT AT THE ELEVATIONS AND TO THE LENGTHS SHOWN ON THE DRAWINGS.
  - 30.4. LAY GEOGRID REINFORCEMENT HORIZONTALLY ON TOP OF THE CONCRETE RETAINING WALL UNITS AND THE COMPACTED BACKFILL SOILS. PLACE THE GEOGRID REINFORCEMENT WITHIN ONE INCH OF THE FACE OF THE CONCRETE RETAINING WALL UNITS. LAP THE GEOGRID AROUND THE FIBERGLAS ROD AS SHOWN ON THE CONNECTION DETAIL, LEAVE A MINIMUM ONE FOOT "TAIL".
  - 30.5. PLACE THE NEXT COURSE OF CONCRETE RETAINING WALL UNITS ON TOP OF THE GEOGRID REINFORCEMENT.
  - 30.6. THE GEOGRID REINFORCEMENT SHALL BE IN TENSION AND FREE FROM WRINKLES PRIOR TO PLACEMENT OF THE BACKFILL SOILS. PULL GEOGRID REINFORCEMENT HAND-TAUT AND SECURE IN PLACE WITH STAPLES, STAKES, OR BY HAND-TENSIONING UNTIL THE GEOGRID REINFORCEMENT IS COVERED BY 6 INCHES OF LOOSE FILL.
  - 30.7. THE GEOGRID REINFORCEMENTS SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTHS. SPLICES IN THE GEOGRID REINFORCEMENT STRENGTH DIRECTION ARE NOT ALLOWED.
31. DO NOT OPERATE TRACKED CONSTRUCTION EQUIPMENT DIRECTLY ON THE GEOGRID REINFORCEMENT.
  - 31.1. AT LEAST 6 INCHES OF COMPACTED BACKFILL SOIL IS REQUIRED PRIOR TO OPERATION OF TRACKED VEHICLES OVER THE GEOGRID REINFORCEMENT. KEEP TURNING OF TRACKED CONSTRUCTION EQUIPMENT TO A MINIMUM.
  - 31.2. RUBBER-TIRED EQUIPMENT MAY PASS OVER THE GEOGRID REINFORCEMENT AT SPEEDS OF LESS THAN 5 MILES PER HOUR. TURNING OF RUBBER-TIRED EQUIPMENT IS NOT ALLOWED ON THE GEOGRID REINFORCEMENT.
32. INSTALL IMPERVIOUS CAP. FINAL GRADING AT TOP OF WALL SHOULD ALLOW FOR POSITIVE DRAINAGE SURFACE WATER AWAY FROM THE WALL. FINAL GRADING MAY INCLUDE EITHER A SWALE OR ALLOW FOR SHEET FLOW OVER THE TOP OF THE WALL.

BACKFILL PLACEMENT

1. PLACE FILL WITHIN THE REINFORCEMENT ZONE AND COMPACT IN LIFTS NOT EXCEEDING 6 TO 8 INCHES (LOOSE THICKNESS) WHERE HAND-OPERATED COMPACTION EQUIPMENT IS USED, AND NOT EXCEEDING 12 INCHES (LOOSE THICKNESS) WHERE HEAVY, SELF-PROPELLED COMPACTION EQUIPMENT IS USED.
2. ONLY LIGHTWEIGHT HAND-OPERATED COMPACTION EQUIPMENT IS ALLOWED WITHIN 4 FEET OF THE BACK OF THE RETAINING WALL UNITS. IF THE SPECIFIED COMPACTION CANNOT BE ACHIEVED WITHIN 4 FEET OF THE BACK OF THE RETAINING WALL UNITS, REPLACE THE REINFORCED SOIL IN THIS ZONE WITH DRAINAGE AGGREGATE MATERIALS.
3. MINIMUM COMPACTION REQUIREMENTS FOR FILL PLACED IN THE REINFORCED ZONE
  - 3.1. COMPACT TO 95 PERCENT OF THE SOIL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D698).
  - 3.2. MOISTURE CONTENT: WITHIN 2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT FOR ALL WALL HEIGHTS
  - 3.3. AT THE END OF EACH DAY'S OPERATION, SLOPE THE LAST LEVEL OF COMPACTED BACKFILL AWAY FROM THE INTERIOR (CONCEALED) FACE OF THE WALL TO DIRECT SURFACE WATER RUNOFF AWAY FROM THE WALL FACE.
4. WATER MANAGEMENT - SHOULD GROUNDWATER SEEPS BE ENCOUNTERED WITHIN THE EXCAVATION, THE WALL SHALL BE CONSTRUCTED WITH AN ADDITIONAL DRAIN AT THE BACK BOTTOM OF THE REINFORCED SOIL MASS. THIS DRAIN IS REFERRED TO AS A HEEL DRAIN. THE HEEL DRAIN SHOULD CONSIST OF A PREFORMED DRAINAGE MATERIAL SUCH AS AFTIX-TEXEL WITH 4 (20MM) PIPES PER METER.

AS-BUILT CONSTRUCTION TOLERANCE

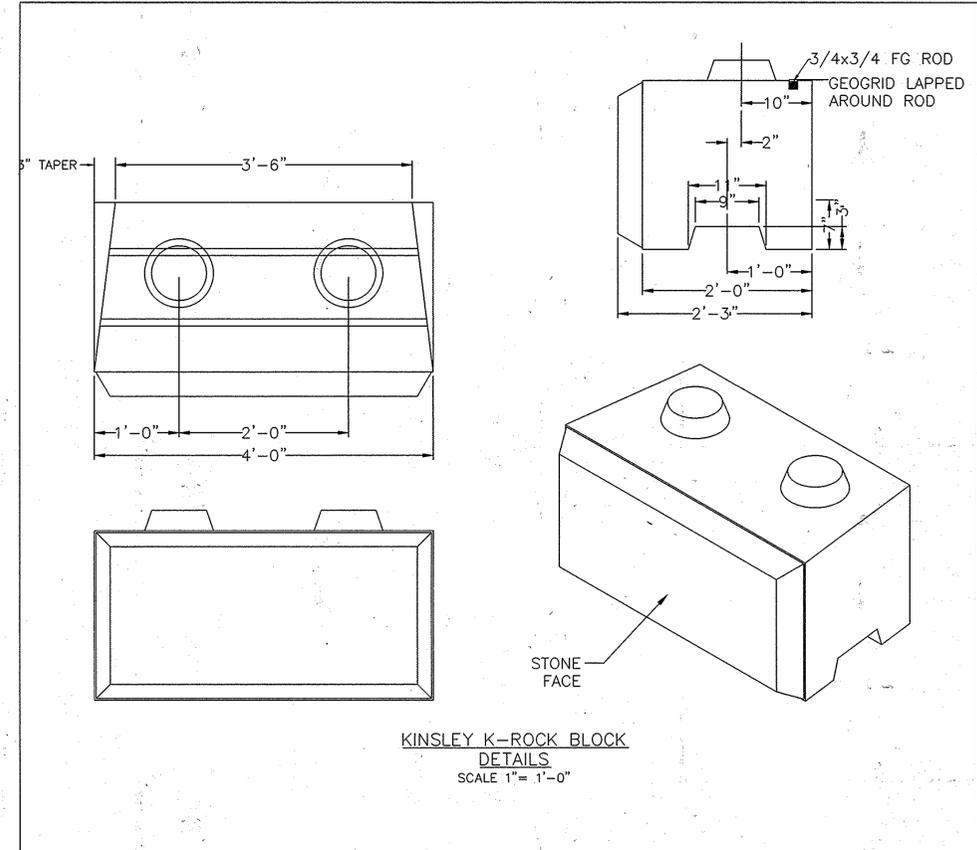
1. VERTICAL ALIGNMENT: + 1.5" OVER ANY 10.0' DISTANCE, MAXIMUM 3.0" OVER THE ENTIRE LENGTH OF THE WALL.
2. WALL BATTER: WITHIN 2 DEGREES OF DESIGN BATTER.
3. HORIZONTAL ALIGNMENT: + 1.5" OVER AND 10.0' DISTANCE. CORNERS, BENDS AND CURVES: + 1.0 FOOT TO THEORETICAL LOCATION.
4. BULGING: + 1.25" OVER ANY 10.0' DISTANCE

CONCRETE

1. WORK SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF ACI 318, BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2. PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR RESISTANCE TO LOCAL ANTICIPATED AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENTS OF ACI 318 CHAPTER 4 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE. AS A MINIMUM, CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI IN 28 DAYS. CONCRETE MATERIALS SHALL ALSO CONFORM TO THE APPROPRIATE STATE REQUIREMENTS FOR EXPOSED STRUCTURAL CONCRETE.
3. MAXIMUM SIZE OF AGGREGATE SHALL NOT EXCEED SIZE SUITABLE FOR INSTALLATION METHOD UTILIZED OR 1/3 CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING. MAXIMUM SIZE MAY BE INCREASED TO 2/3 CLEAR DISTANCE PROVIDED WORKABILITY AND METHODS OF CONSOLIDATION SUCH AS VIBRATING WILL PREVENT HONEYCOMBS OR VOIDS.
4. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" X 3/4" MINIMUM.
5. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL AND OTHER OCCURRENCES THAT MAY DECREASE THE STRENGTH OR DURABILITY.
6. FOUNDATION DESIGN ASSUMES NO OTHER CONSTRUCTION JOINTS THAN THOSE SHOWN.
7. REINFORCEMENT SHALL BE DEFORMED AND CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60 UNLESS OTHERWISE NOTED. SPLICES IN REINFORCEMENT SHALL NOT BE ALLOWED UNLESS OTHERWISE INDICATED.
8. REINFORCING SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE.
9. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
10. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3 INCHES UNLESS OTHERWISE NOTED. APPROVED SPACERS SHALL BE USED TO INSURE A 3-INCH MINIMUM COVER ON REINFORCEMENT.
11. CONCRETE COVER FROM TOP OF FOUNDATION TO ENDS OF VERTICAL REINFORCEMENT SHALL NOT EXCEED 3 INCHES NOR BE LESS THAN 2 INCHES.

SITE CONDITIONS:

1. REFER TO THE GEOTECHNICAL REPORT BY HILLIS CARNES ENGINEERING ASSOCIATES, HCEA JOB 06716A, REPORT "WATERLOO CROSSING EXECUTIVE PARK", DATED 03-16-2007.



KINSLEY K-ROCK BLOCK  
DETAILS  
SCALE 1"= 1'-0"

OWNER/DEVELOPER

WATERLOO LAND NO. 1, LLC WATERLOO LAND NO. 2, LLC  
301 TRANSYLVANIA AVE 301 TRANSYLVANIA AVE  
RALEIGH, NC 27609 RALEIGH, NC 27609  
(919) 789-9289 (919) 789-9289

NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
K-ROCK RETAINING WALL  
NOTES AND DETAILS  
WATERLOO CROSSING  
MEDICAL AND OFFICE BUILDING  
PARCEL A

TAX MAP 37, BLOCK 7 & 8 PARCEL 227 & 548  
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

STEGMAN ENGINEERING, pc

35 East Avenue, Red Lion, PA 17356  
TOLL FREE 888.333.1566 FAX 717.244-3070

www.StegmanEngineering.com  
© 2011 Stegman Engineering. All Rights Reserved

DESIGN BY: MN/BGS  
DRAWN BY: MN/BGS  
CHECKED BY: BGS  
DATE: JULY 2012

SCALE: AS SHOWN  
24x36 ARE FULL SIZE  
12x18 ARE HALF SIZE  
11x17 ARE NO SCALE  
W.O. NO.: 05-52

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.  
13981, EXPIRATION DATE: JULY  
2014.



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division  
Chief, Division of Land Development  
Director

NO AS-BUILT INFORMATION THIS SHEET

AS-BUILT 5/5/2016

18 SHEET OF 18