

**GENERAL NOTES**

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
- THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE DAYS BEFORE STARTING WORK ON THESE DRAWINGS:  
 MISS UTILITY: 1-800-257-7777  
 VERIZON TELEPHONE COMPANY: 1-410-954-6281  
 HOWARD COUNTY BUREAU OF UTILITIES: 313-2366  
 AT&T CABLE LOCATION DIVISION: 383-3553  
 B.G.&E. CO. CONTRACTOR SERVICES: 850-4620  
 B.G.&E. CO. UNDERGROUND CONTROL: 787-4620  
 STATE HIGHWAY ADMINISTRATION: 531-5533
- SITE ANALYSIS**  
 AREA OF PARCEL E-2: 7.08 AC.  
 PRESENT ZONING: M-1  
 USE OF STRUCTURE:  
 BUILDING A: TWO STORY WAREHOUSE AND OFFICE BUILDING  
 BUILDING B: COVERAGE: 9028 SF (0.21 AC. OR 1.0% OF GROSS AREA)  
 BUILDING C: COVERAGE: 9028 SF (0.21 AC. OR 1.0% OF GROSS AREA)  
 TOTAL BUILDING COVERAGE: 18056 SF (0.42 AC. OR 5.9% OF GROSS AREA)  
 PAVED PARKING LOT/AREA ON SITE: 2.83 AC. OR 40% OF GROSS AREA  
 AREA OF LANDSCAPE ISLAND: 0.01 AC. OR 0.11% OF GROSS AREA  
 LIMIT OF DISTURBED AREAS: 5.42 AC.  
 AREA OF STEEP SLOPES: 2.18 AC.  
 AREA OF MODERATE SLOPES: 5.427 AC.  
 CUT: 18609 CF

- PROJECT BACKGROUND:**  
 LOCATION: ELKBRIDGE, MD.; TAX MAP 38, BLOCK 14, PARCEL 890  
 ZONING: M-1  
 SUBDIVISION: HARWOOD INDUSTRIAL CENTER  
 SECTION/AREA: 1/A  
 SITE AREA: 7.091 AC.  
 REFERENCE: L 639/F 450; BA-80-15, VP-81-31, AA-05-038, WP-08-018, AA-08-003, F-07-170 (PART No. 2000A-2000B)
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 311-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO START OF WORK.
- ANY DAMAGE TO PUBLIC RIGHT-OF-WAYS, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
- EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, FIELD SURVEYS, PUBLIC WATER AND AND SEWER EXTENSION PLANS AND AVAILABLE RECORD DRAWINGS APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTOR'S INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- ALL REINFORCED CONCRETE FOR STORM DRAIN STRUCTURES SHALL HAVE A MINIMUM OF 28 DAYS STRENGTH OF 3,500 P.S.I.
- TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.
- ESTIMATES OF EARTHWORK QUANTITIES ARE PROVIDED SOLELY FOR THE PURPOSE OF CALCULATING FEES.
- SOIL COMPACTION SPECIFICATIONS, REQUIREMENTS, METHODS AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE PROJECT GEOTECHNICAL ENGINEER TO CONFIRM ACCEPTABILITY OF PROPOSED PAVING SECTION, BASED ON SOIL TEST PRIOR TO CONSTRUCTION.
- THE EXISTING TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD TOPOGRAPHICAL SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED MAY 2005.
- THE PROPERTY LINES SHOWN HEREON IS BASED ON A BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED MAY 2005.
- A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
- ALL PAVING TO BE MINIMUM HOWARD COUNTY STANDARD DETAIL P-3 UNLESS OTHERWISE NOTED. GEOTECHNICAL ENGINEERING TO CONFIRM PAVING SECTION PRIOR TO CONSTRUCTION.
- ALL CURB AND GUTTER TO BE HOWARD COUNTY STANDARD DETAIL 3.01 UNLESS OTHERWISE NOTED. (SEE DETAIL SHEET 2)
- CONTRACTOR RESPONSIBLE TO CONSTRUCT ALL HANDICAP RAMPS AND HANDICAP ACCESS IN ACCORDANCE WITH CURRENT ADA REQUIREMENTS.
- WHERE DRAINAGE FLOWS AWAY FROM CURB, CONTRACTOR TO REVERSE THE GUTTER PAN.
- ALL ELEVATIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
- PUBLIC WATER AVAILABLE THROUGH CONTRACT 554-D-W&S.
- PUBLIC SEWER AVAILABLE THROUGH CONTRACT 554-D-W&S.
- STORMWATER MANAGEMENT QUANTITY IS PROVIDED BY THE PROPOSED STORMWATER MANAGEMENT UNDERGROUND PIPING SYSTEM, WHICH PROVIDES FOR THE PROPOSED STORMWATER MANAGEMENT AND WATER QUALITY SYSTEM ARE TO BE PRIVATELY OWNED AND MAINTAINED. THE PROPOSED STORMWATER MANAGEMENT SYSTEM AND WATER QUALITY SYSTEM ARE TO BE PRIVATELY OWNED AND MAINTAINED.
- ALL EXTERIOR LIGHTING TO CONFORM TO SECTION 134 OF THE HOWARD COUNTY ZONING REGULATIONS. (DETAIL ON SHEET 6)
- GEOTECHNICAL REPORT PREPARED BY HERSTY ASSOCIATES, DATED JULY 12, 2006.
- ANY EXISTING STREET TREES DAMAGED OR DESTROYED DURING CONSTRUCTION WILL BE REPLACED BY THE CONTRACTOR.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$8,400.00 FOR THE REQUIRED 18 SHADE TREES, 20 EVERGREEN TREES AND 0 SHRUBS.
- TRAFFIC STUDY PREPARED BY THE TRAFFIC GROUP DATED APRIL 13, 2006.
- ALL STORMDRAIN PIPE BEDDING IS TO BE CLASS "C".
- BUILDING TO HAVE INSIDE WATER METER SETTING.
- THIS PLAN IS SUBJECT TO THE LATEST EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.
- NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS AND FOREST CONSERVATION EASEMENT AREAS.
- THE SUBJECT PROPERTY IS ZONED M-1 PER THE 02/02/2004 COMPREHENSIVE ZONING PLAN.
- THE TOTAL FOREST CONSERVATION EASEMENT OBLIGATION MET ON THIS SITE IS 1.42 AC., WITH A TOTAL FOREST CONSERVATION SURETY AMOUNT OF \$1589.50 POSTED AS PART OF THE DEVELOPER'S AGREEMENT.
- (RETENTION OF 1.15AC/50,094 SF @ \$0.20/SF = \$10,018.80; REFORESTATION OF 0.27AC/11,761 SF X \$0.50 = \$5,880.50)
- THIS PLAN IS SUBJECT TO AA-05-38, AN ADMINISTRATIVE ADJUSTMENT, APPROVED DECEMBER 5, 2005 TO REDUCE 100 FEET SETBACK FROM A RESIDENTIAL DISTRICT TO 80 FEET FOR OUTDOOR STORAGE AREAS AND OTHER USES. APPROVAL SUBJECT TO THE FOLLOWING CONDITIONS:

1. THE PETITIONER SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND COUNTY LAWS AND REGULATIONS.
  2. THE GRANTED ADMINISTRATIVE ADJUSTMENT SHALL APPLY SOLELY TO THE PROPOSED DEVELOPMENT AS DEPICTED ON THE ADMINISTRATIVE ADJUSTMENT PLAN SUBMITTED BY THE PETITIONER AND NOT TO ANY OTHER STRUCTURE, ADDITION, BUILDING, OR USE.
  3. A BUILDING PERMIT FOR THE OFFICE/WAREHOUSE DEVELOPMENT SHALL BE OBTAINED WITHIN TWO YEARS FROM THE DATE OF THIS ORDER AND SUBSTANTIAL CONSTRUCTION SHALL BE COMPLETED WITHIN THREE YEARS. THE PETITIONER SHALL SUBMIT A COPY OF THIS DECISION AND ORDER WITH THE BUILDING PERMIT APPLICATION.
  4. THIS DECISION AND ORDER SHALL BE MAINTAINED IN THE OWNER'S PROPERTY RECORDS AND SHALL BE TRANSFERRED TO ANY SUCCEEDING OWNER OF THE PROPERTY.
39. THERE IS NO FLOODPLAIN ON THIS PARCEL.
  - NO WETLAND ARE PRESENT ON THIS SITE.
  - ALL ROOF LEADERS TO DRAIN OVERLAND.
  - LANDSCAPING NOT PERMITTED WITHIN 7'1/2" OF EACH SIDE OF THE FIRE DEPARTMENT CONNECTION. PROVIDE A CLEAR UNRESTRICTED ACCESS PATH TO THE FIRE DEPARTMENT CONNECTION. NFPA-1 13.14.
  - A KNOX BOX (FIRE DEPARTMENT ACCESS BOX) IS REQUIRED TO BE PLACED ON THE FRONT OF THE BUILDING. IT SHALL BE PLACED TO THE RIGHT OF THE MAIN ENTRANCE AT A RANGE OF 405" IN HEIGHT AND NO MORE THAN 6' LATERALLY FROM THE DOOR. THE BOX SHALL BE ELECTRONICALLY SUPERVISED TO NOTIFY THE OWNER THAT IT IS BEING ACCESSED (INTEGRATED WITH THE FIRE ALARM SYSTEM). NFPA-1 10.12.1.
  - SIGNAGE SHALL BE PROVIDED ON THE BUILDING IDENTIFYING THE BUILDING ADDRESS, AND EACH SUITE SEPARATED BY LETTER.
  - STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURE AND POLE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III (1993) AND AS MODIFIED BY "GUIDELINES FOR STREET LIGHTS IN RESIDENTIAL DEVELOPMENTS (JUNE 1993)". A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
  - ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTRY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL PERFORATED SQUARE TUBE POST (1 1/2" GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL PERFORATED SQUARE TUBE SLEEVE (1 1/2" GAUGE) - 3' LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.
  - THIS PLAN IS SUBJECT TO WP-08-118; APPROVED OCTOBER 30, 2007 TO WAIVE SUBDIVISION SECTION 16.116(b)(1) TO BE PERMITTED TO CLEAR GRADE, REMOVE VEGETATIVE COVER AND DEVELOP/IMPROVE ON 25,700 SF OF AN ONSITE FORESTED 61,408 SF STEEP SLOPE AREA AS SHOWN ON THE WP EXHIBIT. APPROVAL OF THIS WAIVER PETITION IS SUBJECT TO FOLLOWING CONDITION:  
 THE APPLICANT, PROJECT ENGINEER AND STRUCTURAL ENGINEER FOR THE RETAINING WALL SHALL RESEARCH/ANALYSIS OF THE USE OF A HIGHER RETAINING WALL AND/OR A DIFFERENT RETAINING WALL DESIGN IN ORDER TO REDUCE THE AREA OF STEEP SLOPE REQUIRED TO BE GRADED OUT AND USE A HIGHER RETAINING WALL AND/OR DIFFERENT RETAINING WALL DESIGN IF IT RESULTS IN A REDUCTION OF THE AREA OF STEEP SLOPE REQUIRED TO BE GRADED OUT.
  - THE PLANNING DIRECTOR APPROVED YOUR REQUEST TO WAIVE SUBDIVISION SECTION 16.116(b)(1) TO BE PERMITTED TO CLEAR GRADE, REMOVE VEGETATIVE COVER AND DEVELOP/IMPROVE ON 25,700 SF OF AN ONSITE FORESTED 61,408 SF STEEP SLOPE AREA AS SHOWN ON THE WP EXHIBIT (PLAN).  
 APPROVAL OF THIS WAIVER PETITION IS SUBJECT TO THE FOLLOWING CONDITION:  
 1. THE APPLICANT, PROJECT ENGINEER AND STRUCTURE ENGINEER FOR THE RETAINING WALL SHALL RESEARCH/ANALYSIS OF THE USE OF A HIGHER RETAINING WALL AND/OR A DIFFERENT RETAINING WALL DESIGN IN ORDER TO REDUCE THE AREA OF STEEP SLOPE REQUIRED TO BE GRADED OUT AND USE A HIGHER RETAINING WALL AND/OR DIFFERENT RETAINING WALL DESIGN IF IT RESULTS IN A REDUCTION OF THE AREA OF STEEP SLOPE REQUIRED TO BE GRADED OUT.
  - THIS PLAN IS SUBJECT TO AA-08-003, AN ADMINISTRATIVE ADJUSTMENT TO SECTION 122.D.2.c.; APPROVED MARCH 19, 2008; TO REDUCE THE 100 FOOT SETBACK FROM A RESIDENTIAL DISTRICT TO 80 FEET FOR CONTRACTOR OUTDOOR STORAGE AREAS, OTHER USES, AND RETAINING WALL SUBJECT TO THE FOLLOWING CONDITIONS:  
 1. THE PETITIONER SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND COUNTY LAWS AND REGULATIONS.  
 2. THE GRANTED ADMINISTRATIVE ADJUSTMENT SHALL APPLY SOLELY TO THE PROPOSED DEVELOPMENT AS DEPICTED ON THE ADMINISTRATIVE ADJUSTMENT PLAN SUBMITTED BY THE PETITIONER AND NOT TO ANY OTHER STRUCTURE, ADDITION, BUILDING OR USE.  
 3. A BUILDING PERMIT FOR THE OFFICE/WAREHOUSE DEVELOPMENT SHALL BE OBTAINED WITHIN TWO YEARS FROM THE DATE OF THIS ORDER AND SUBSTANTIAL CONSTRUCTION SHALL BE COMPLETED WITHIN THREE YEARS. THE PETITIONER SHALL SUBMIT A COPY OF THIS DECISION AND ORDER WITH THE BUILDING PERMIT APPLICATION.  
 4. THIS DECISION AND ORDER SHALL BE MAINTAINED IN THE OWNER'S PROPERTY RECORDS AND SHALL BE TRANSFERRED TO ANY SUCCEEDING OWNER OF THE PROPERTY.

50. TRASH REMOVAL TO BE PRIVATE.

- PARKING TABULATION**
- | REQUIRED  | PROVIDED  |
|---|-----------|
| BUILDING B: 12,200 SF                                   | 5 SPACES  |
| WAREHOUSE: 9028 SF @ 0.5 SPACE/1000 SF                  | 11 SPACES |
| OFFICE: 3,172 SF @ 3.3 SPACE/1000 SF                    | 11 SPACES |
| BUILDING A: 12,200 SF                                   | 5 SPACES  |
| WAREHOUSE: 9028 SF @ 0.5 SPACE/1000 SF                  | 11 SPACES |
| OFFICE: 3,172 SF @ 3.3 SPACE/1000 SF                    | 11 SPACES |
| TOTAL SPACES REQUIRED: 32 SPACES                        |           |
| TOTAL SPACES PROVIDED: 35 SPACES (INCLUDING 2 HANDICAP) |           |

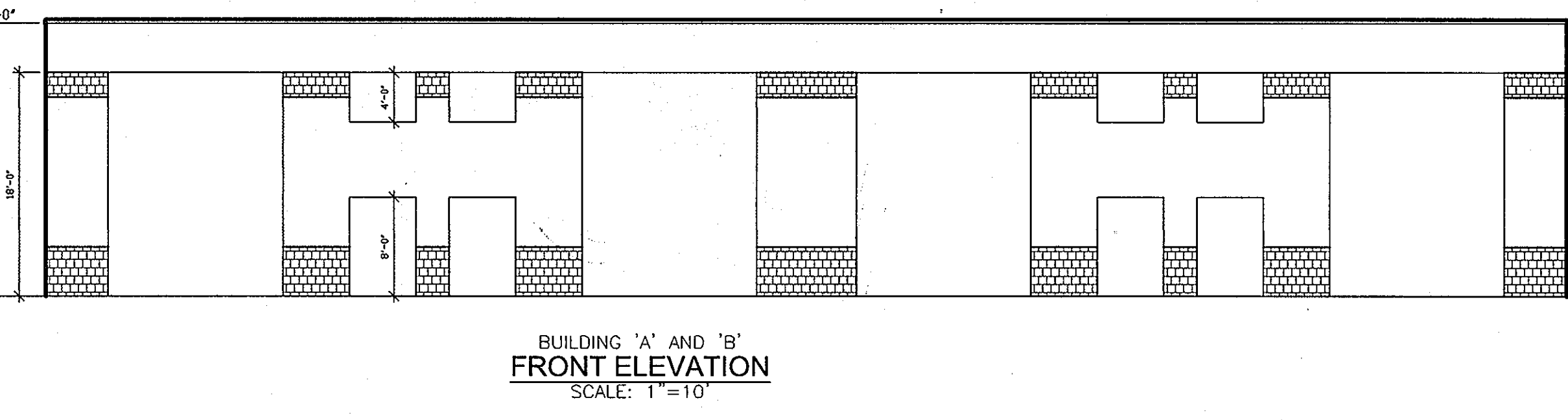
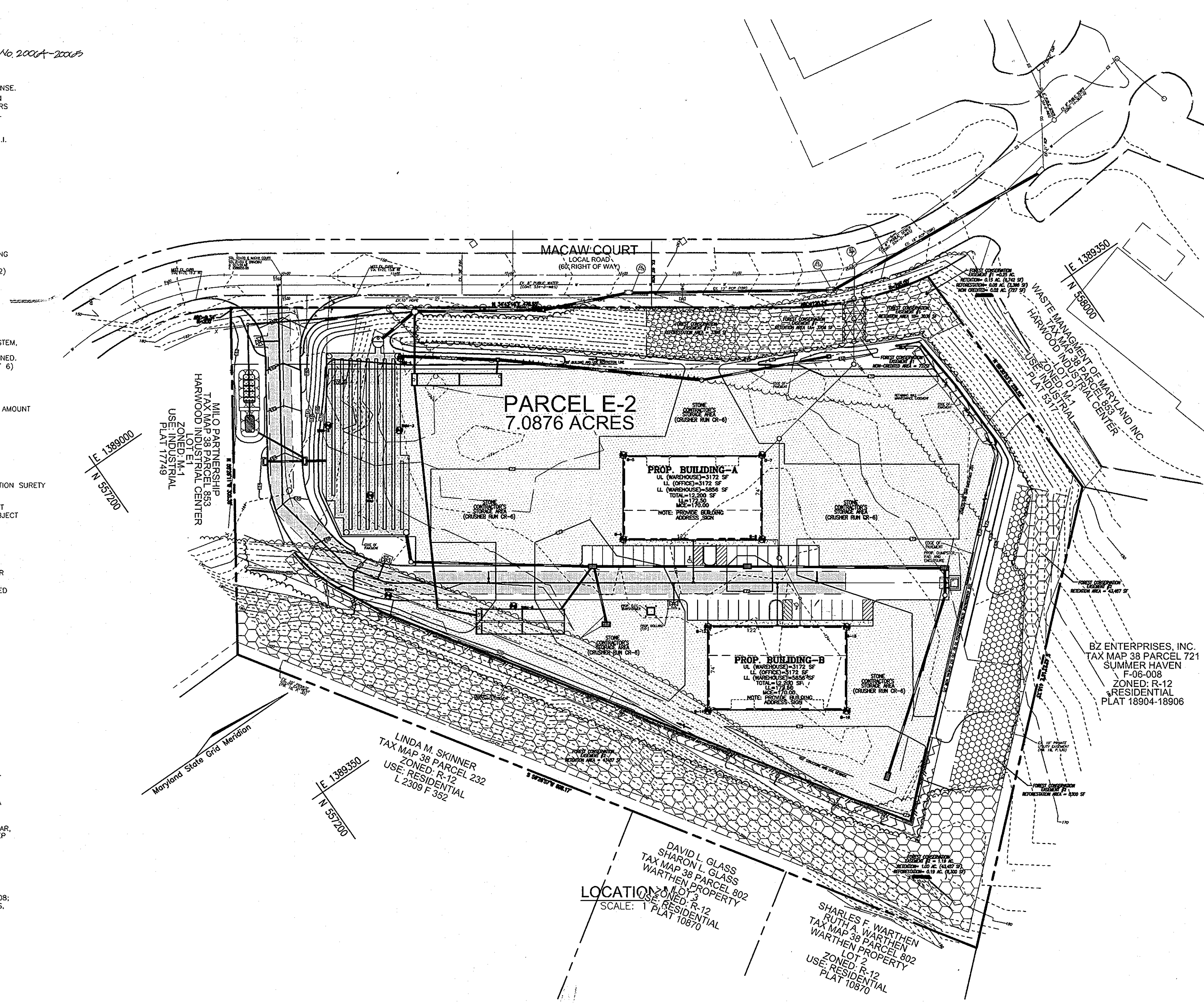
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

7/30/08  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE

8/6/08  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE

8/18/08  
 DIRECTOR  
 DATE

# HARWOOD INDUSTRIAL CENTER PARCEL E-2 SITE DEVELOPMENT PLAN



**LEGEND**

- Existing Contour: ---
- Proposed Contour: - - -
- Existing Spot Elevation: 382.56
- Proposed Spot Elevation: +82.53
- Direction of Flow: →
- Existing Trees to Remain: [Tree Symbol]
- Light Poles: [Pole Symbol]
- Soil Type: M182 M183
- Concrete: [Concrete Pattern]

**BENCHMARKS**

- HOWARD COUNTY BENCHMARK 3805 (CONCRETE MONUMENT)  
 N 558378.575 E 1386524.158 ELEV. 183.726
- HOWARD COUNTY BENCHMARK 3806 (CONCRETE MONUMENT)  
 N 557155.459 E 1384992.262 ELEV. 175.228



DESCRIPTION	SHEET INDEX	SHEET NO.
COVER SHEET		1 OF 12
SITE LAYOUT PLAN AND SITE DETAILS		2 OF 12
SITE GRADING, PHASE II SEDIMENT AND EROSION CONTROL PLAN		3 OF 12
SEDIMENT AND EROSION CONTROL NOTES AND DETAILS		4 OF 12
STORM DRAIN DRAINAGE AREA MAP, WATER AND SEWER PROFILES		5 OF 12
STORMWATER MANAGEMENT NOTES AND DETAILS		6 OF 12
STORMWATER MANAGEMENT NOTES AND DETAILS		7 OF 12
STORMWATER MANAGEMENT NOTES AND DETAILS; PHASE I SEDIMENT AND EROSION CONTROL PLAN		8 OF 12
SITE LANDSCAPE		9 OF 12
FOREST CONSERVATION PLAN		10 OF 12
FOREST CONSERVATION DETAIL		11 OF 12
RETAINING WALL PLANS AND DETAILS		12 OF 16
RETAINING WALL PLANS AND DETAILS		13 OF 16
RETAINING WALL PLANS AND DETAILS		14 OF 16
RETAINING WALL PLANS AND DETAILS		15 OF 16
AASCO/MAA NOTES AND DETAILS; MACAW COURT STORM DRAIN CONSTRUCTION		12 OF 12

NO.	REVISION	DATE
1	REVISE PARKING LAYOUT AND ADD SMALL WALL AT SAND FILTER, REVISE TO SHOW AS BUILT CONDITIONS, REMOVE RETAINING WALL	5/20/10

**SITE DEVELOPMENT PLAN  
 COVER SHEET**

**HARWOOD INDUSTRIAL CENTER  
 PARCEL E-2**

TAX MAP 38 BLOCK 14  
 1ST ELECTION DISTRICT

PARCEL E-2  
 HOWARD COUNTY, MARYLAND

**OWNER/PETITIONER**  
 MIDDLE PATUXENT PROPERTIES, L.L.C.  
 12421 HOOPER COURT  
 FULTON, MARYLAND 20759-9645  
 240-372-9038

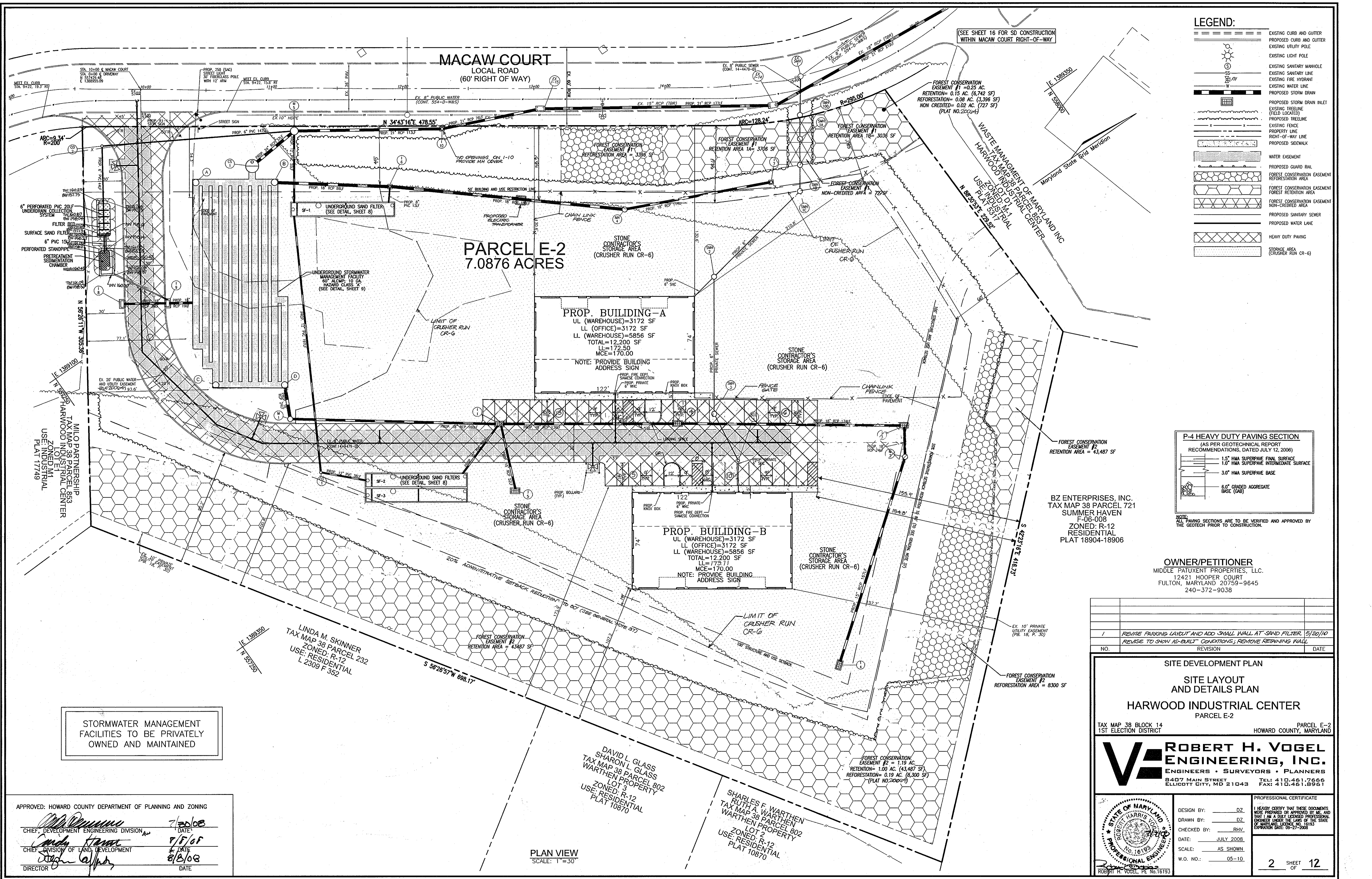
**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS

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

PROFESSIONAL CERTIFICATE

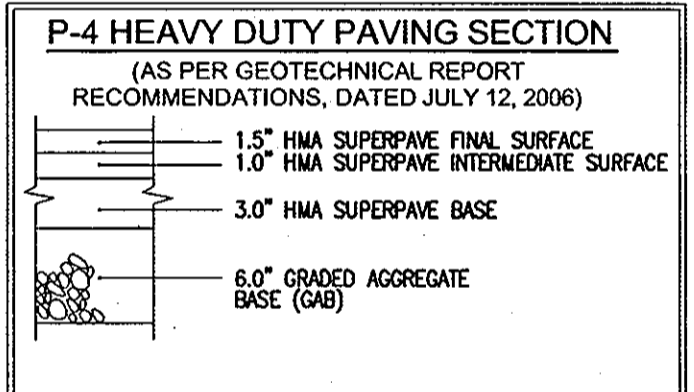
DESIGN BY: [Signature] DZ  
 DRAWN BY: [Signature] DZ  
 CHECKED BY: [Signature] RHV  
 DATE: JULY 2008  
 SCALE: AS SHOWN  
 W.O. NO.: 05-10

1 SHEET OF 12



**LEGEND:**

[Symbol]	EXISTING CURB AND GUTTER
[Symbol]	PROPOSED CURB AND GUTTER
[Symbol]	EXISTING UTILITY POLE
[Symbol]	EXISTING LIGHT POLE
[Symbol]	EXISTING SANITARY MANHOLE
[Symbol]	EXISTING SANITARY LINE
[Symbol]	EXISTING FIRE HYDRANT
[Symbol]	EXISTING WATER LINE
[Symbol]	PROPOSED STORM DRAIN
[Symbol]	PROPOSED STORM DRAIN INLET
[Symbol]	EXISTING TREETRUNK
[Symbol]	PROPOSED TREETRUNK
[Symbol]	EXISTING FENCE
[Symbol]	PROPERTY LINE
[Symbol]	RIGHT-OF-WAY LINE
[Symbol]	PROPOSED SIDEWALK
[Symbol]	WATER EASEMENT
[Symbol]	PROPOSED GUARD RAIL
[Symbol]	FOREST CONSERVATION EASEMENT #1 REFORESTATION AREA
[Symbol]	FOREST CONSERVATION EASEMENT #2 REFORESTATION AREA
[Symbol]	PROPOSED SANITARY SEWER
[Symbol]	PROPOSED WATER LAINE
[Symbol]	HEAVY DUTY PAVING
[Symbol]	STORAGE AREA (CRUSHER RUN CR-6)



NOTE: ALL PAVING SECTIONS ARE TO BE VERIFIED AND APPROVED BY THE GEOTECH PRIOR TO CONSTRUCTION.

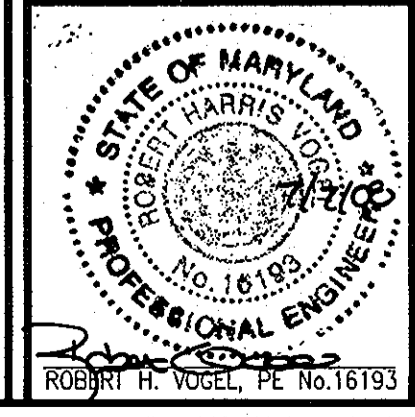
BZ ENTERPRISES, INC.  
TAX MAP 38 PARCEL 721  
SUMMER HAVEN  
F-06-008  
ZONED: R-12  
RESIDENTIAL  
PLAT 18904-18906

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE
1	REVISE PARKING LAYOUT AND ADD SMALL WALL AT SAND FILTER	5/20/10
	REVISE TO SHOW AS-BUILT CONDITIONS; REMOVE RETAINING WALL	

**SITE DEVELOPMENT PLAN**  
**SITE LAYOUT AND DETAILS PLAN**  
**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2  
TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT  
PARCEL E-2  
HOWARD COUNTY, MARYLAND

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



PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2008

DESIGN BY: \_\_\_\_\_ DZ  
DRAWN BY: \_\_\_\_\_ DZ  
CHECKED BY: \_\_\_\_\_ RHV  
DATE: \_\_\_\_\_ JULY 2008  
SCALE: \_\_\_\_\_ AS SHOWN  
W.O. NO.: \_\_\_\_\_ 05-10

2 SHEET OF 12

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

\_\_\_\_\_  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 7/20/08

\_\_\_\_\_  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 8/5/08

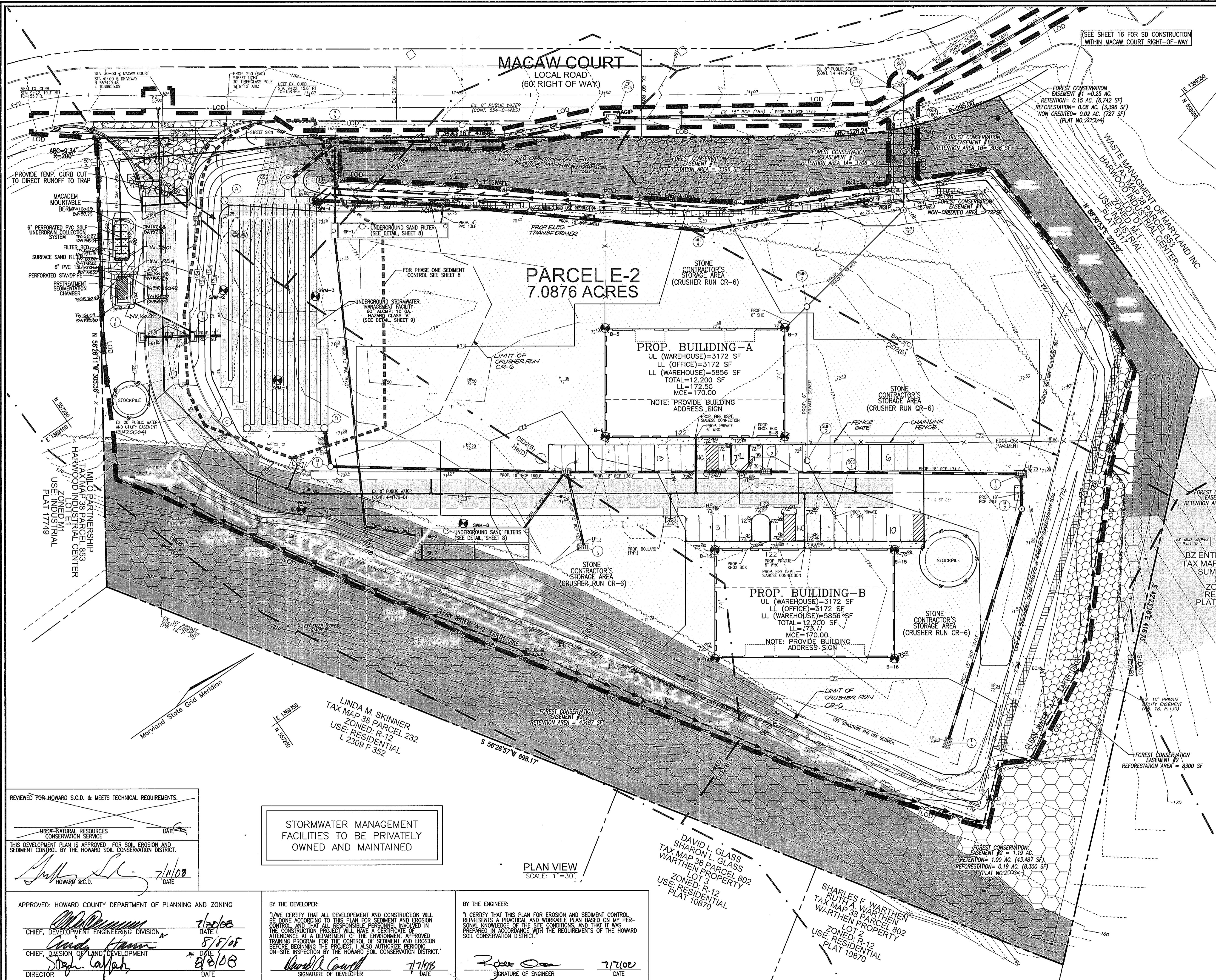
\_\_\_\_\_  
DIRECTOR  
DATE: 8/8/08

PLAN VIEW  
SCALE: 1"=30'

DAVID L. GLASS  
SHARON L. GLASS  
TAX MAP 38 PARCEL 802  
WARTHEN PROPERTY  
LOT 3  
ZONED: R-12  
USE: RESIDENTIAL  
PLAT 10670

CHARLES F. WARTHEN  
RUTH A. WARTHEN  
TAX MAP 38 PARCEL 802  
WARTHEN PROPERTY  
LOT 2  
ZONED: R-12  
USE: RESIDENTIAL  
PLAT 10670

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED



- LEGEND:**
- EXISTING CONTOUR
  - PROPOSED CONTOUR
  - + 0288 PROPOSED SPOT ELEVATION
  - + 0288 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 CLEAVOUT
  - EXISTING FIRE HYDRANT
  - EXISTING WATER LINE
  - PROPOSED STORM DRAIN
  - PROPOSED STORM DRAIN INLET
  - EXISTING TREE LINE (FIELD LOCATED)
  - SWALE
  - EARTH DIKE
  - EXISTING FENCE
  - PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - SOILS BOUNDARY
  - PROPOSED SIDEWALK
  - WATER EASEMENT
  - MODERATE SLOPES (15% - 24.99%)
  - STEEP SLOPE (>25%)
  - SF SF SF SILT FENCE
  - SSF SSF SUPER SILT FENCE
  - LOD LOD LIMIT OF DISTURBANCE
  - CIP CURB INLET PROTECTION
  - AGIP AT GRADE INLET PROTECTION
  - STABILIZED CONSTRUCTION ENTRANCE
  - HEAVY DUTY PAVING
  - STORAGE AREA (CRUSHER RUN CR-6)
  - FOREST CONSERVATION EASEMENT REFORESTATION AREA
  - FOREST CONSERVATION EASEMENT FOREST RETENTION AREA
  - FOREST CONSERVATION EASEMENT NON-CREDITED AREA

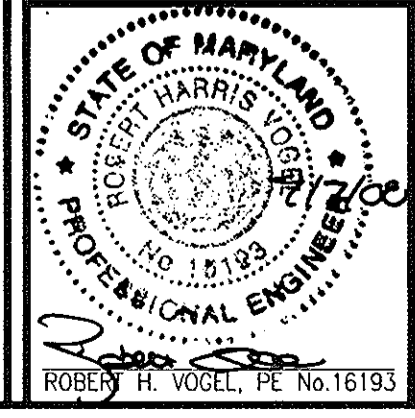
NOTE:  
ALL SWALES BEHIND RETAINING WALLS ARE TO BE SOD.

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, L.L.C.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE
1	REVISE PARKING LAYOUT AND ADD SMALL WALL AT SAND FILTER, REVISE TO SHOW AS-BUILT CONDITIONS, REMOVE	5/20/10

**SITE DEVELOPMENT PLAN**  
**SITE GRADING, PHASE II SEDIMENT AND EROSION CONTROL PLAN**  
**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2  
TAX MAP 38 BLOCK 14 1ST ELECTION DISTRICT  
PARCEL E-2 HOWARD COUNTY, MARYLAND

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DESIGN BY: \_\_\_\_\_ DZ.  
DRAWN BY: \_\_\_\_\_ DZ.  
CHECKED BY: \_\_\_\_\_ RHV.  
DATE: \_\_\_\_\_ JULY 2008.  
SCALE: \_\_\_\_\_ AS SHOWN.  
W.O. NO.: \_\_\_\_\_ 05-10.

3 SHEET OF 12

REVIEWED FOR HOWARD S.C.D. & MEETS TECHNICAL REQUIREMENTS.  
USDA-NATURAL RESOURCES CONSERVATION SERVICE  
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
DATE: 7/10/08  
HOWARD S.C.D.

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED

PLAN VIEW  
SCALE: 1" = 30'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DIRECTOR

DATE: 7/10/08  
DATE: 8/5/08  
DATE: 8/2/08

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.

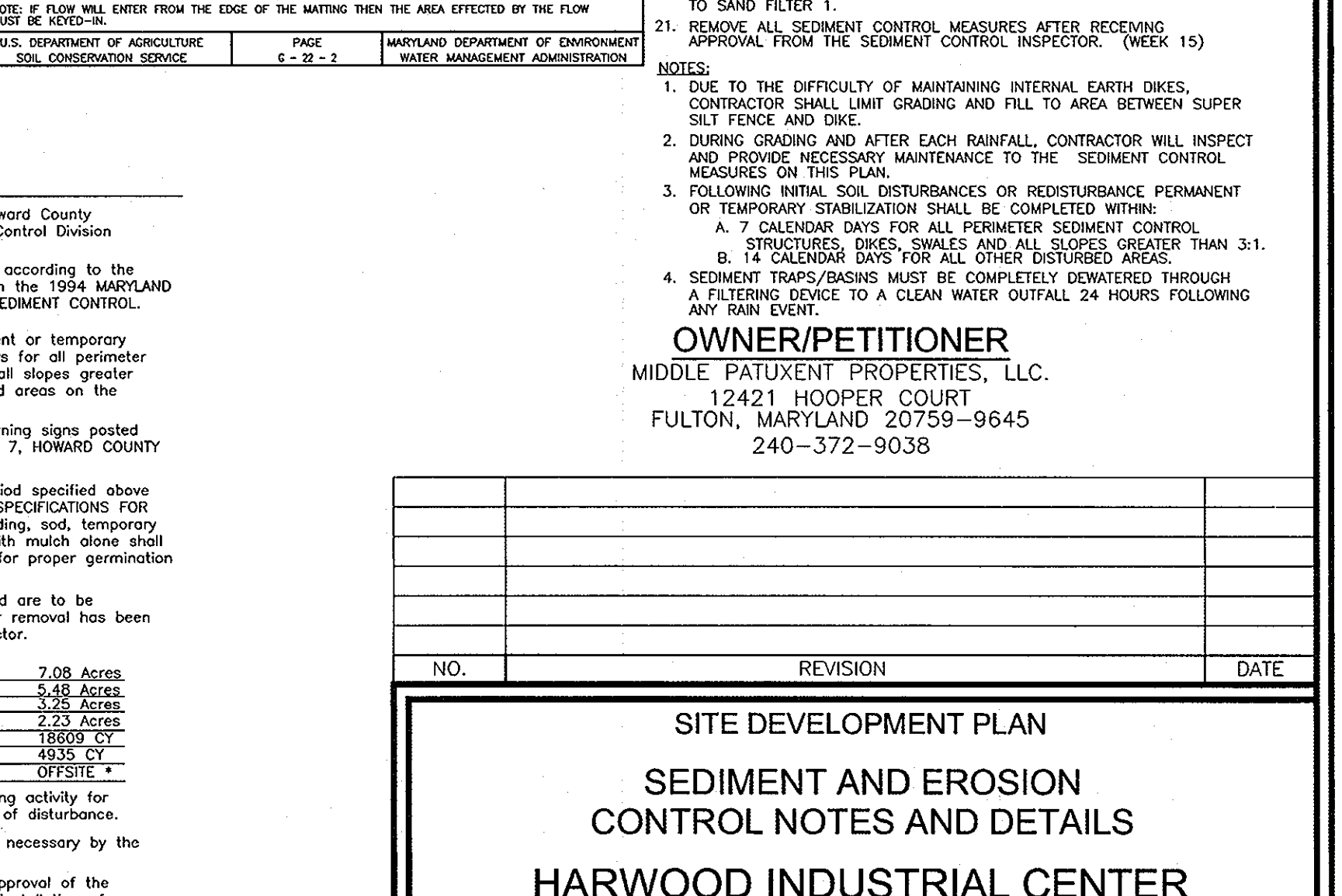
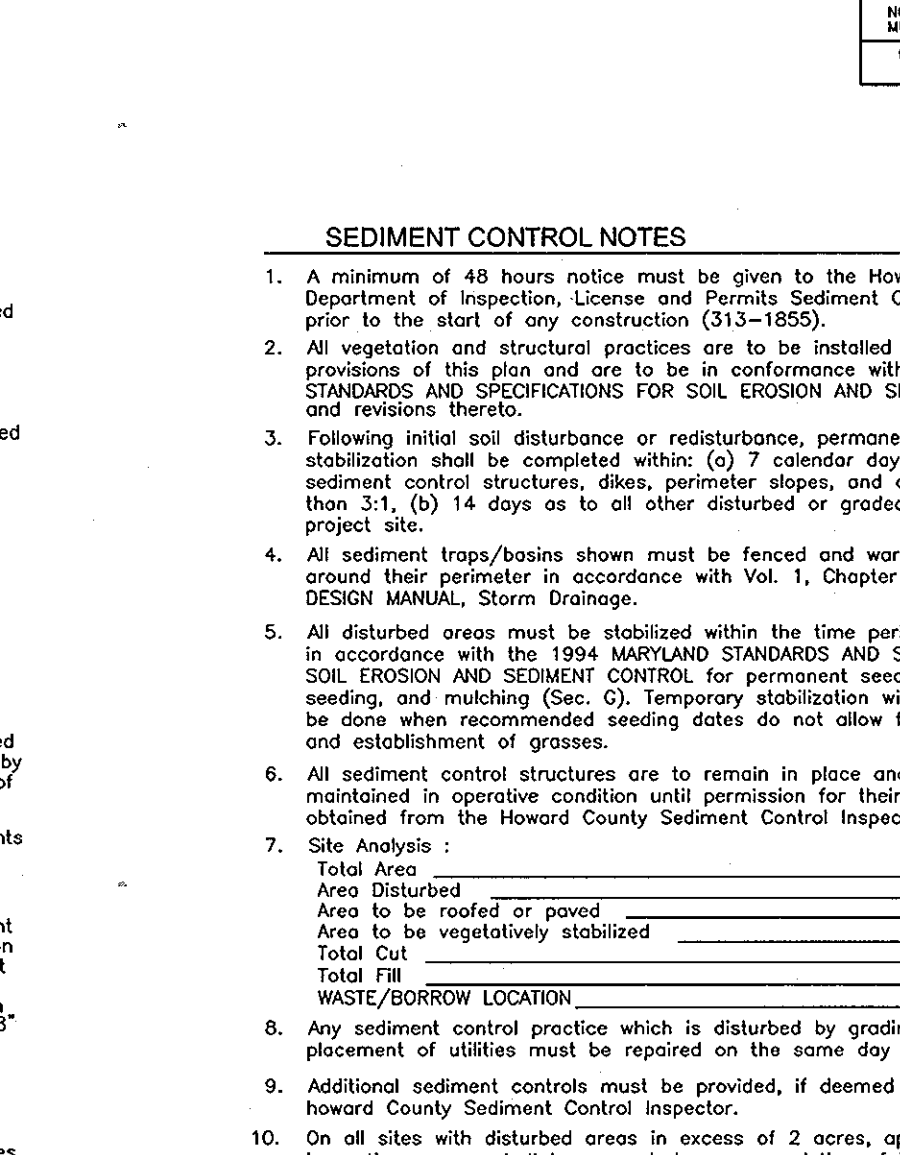
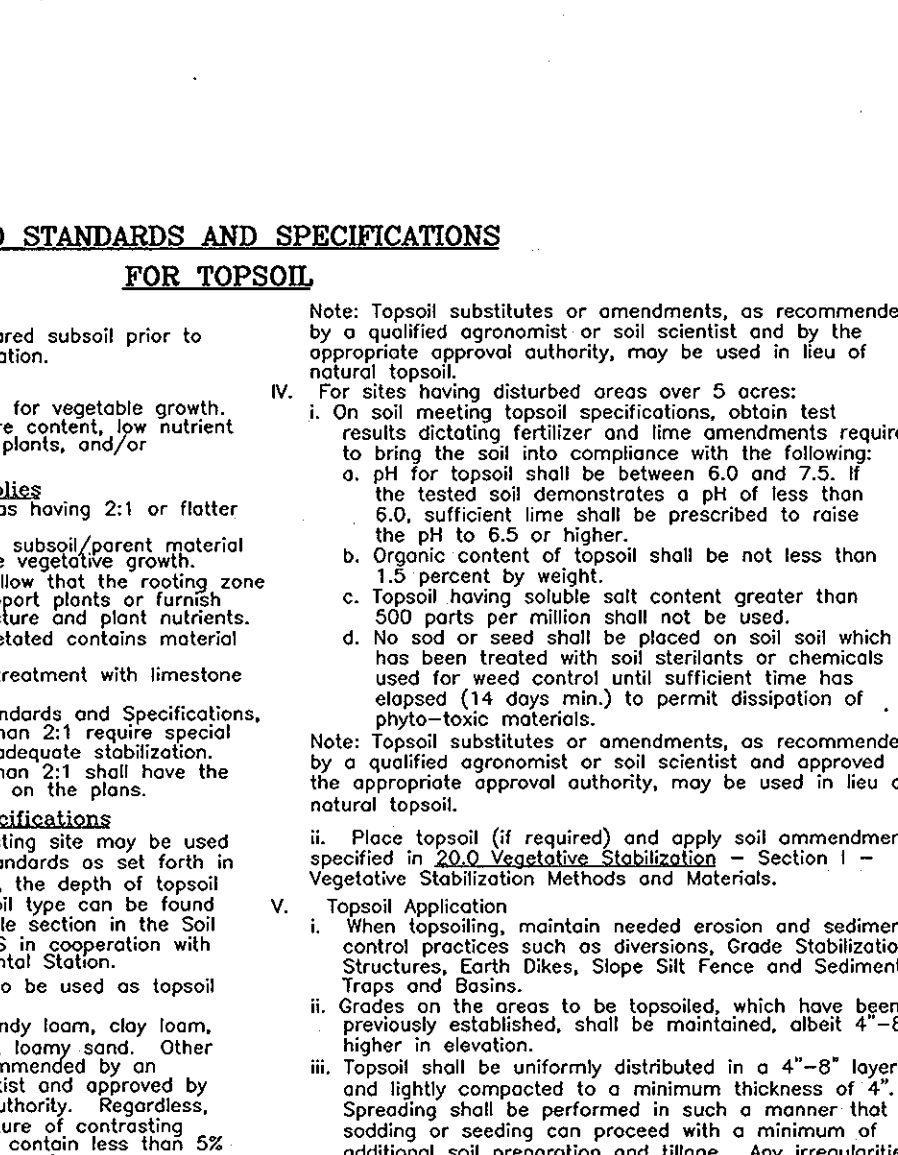
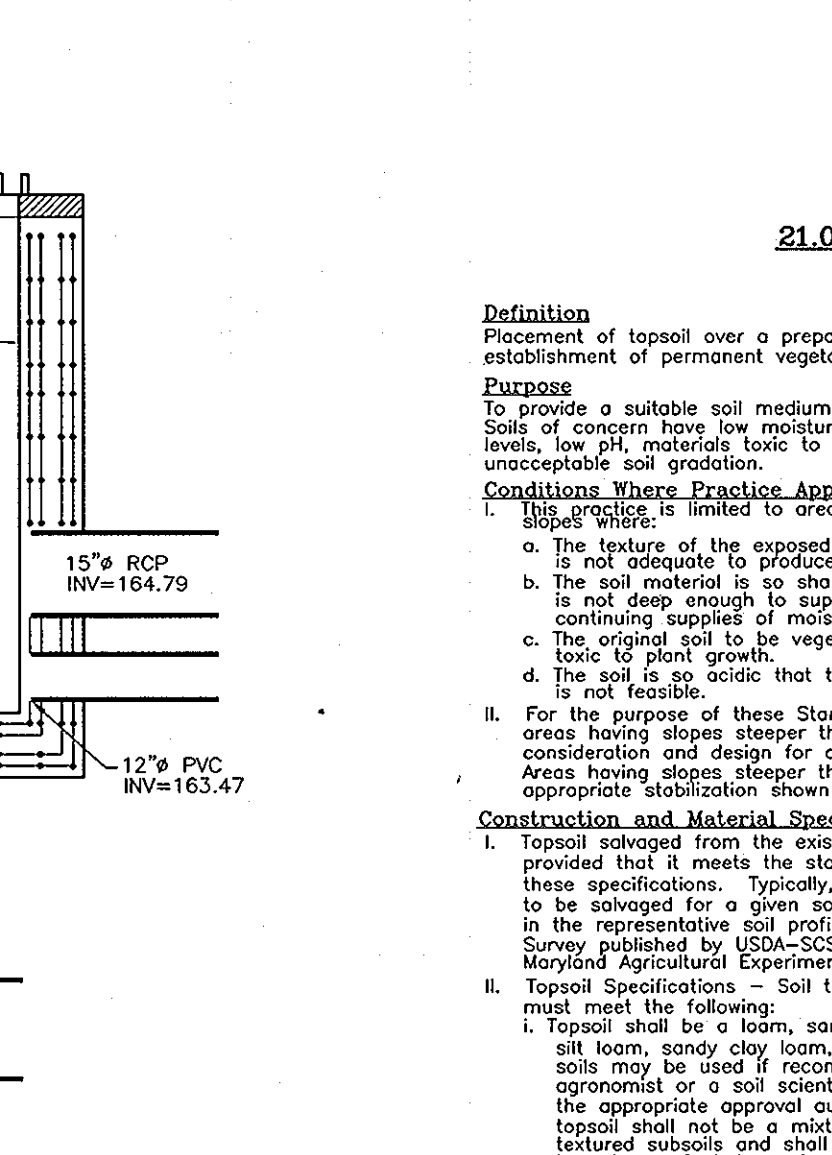
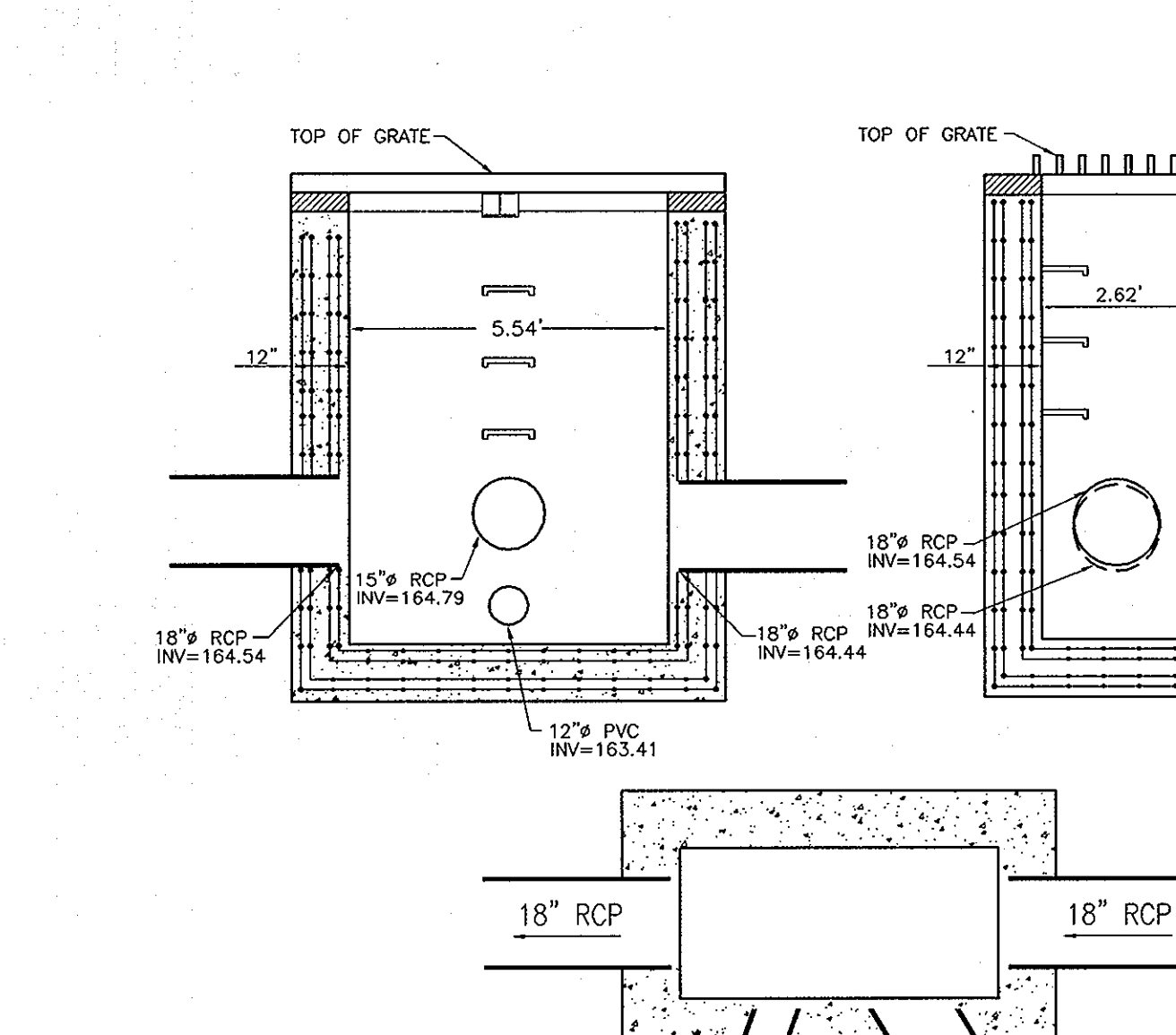
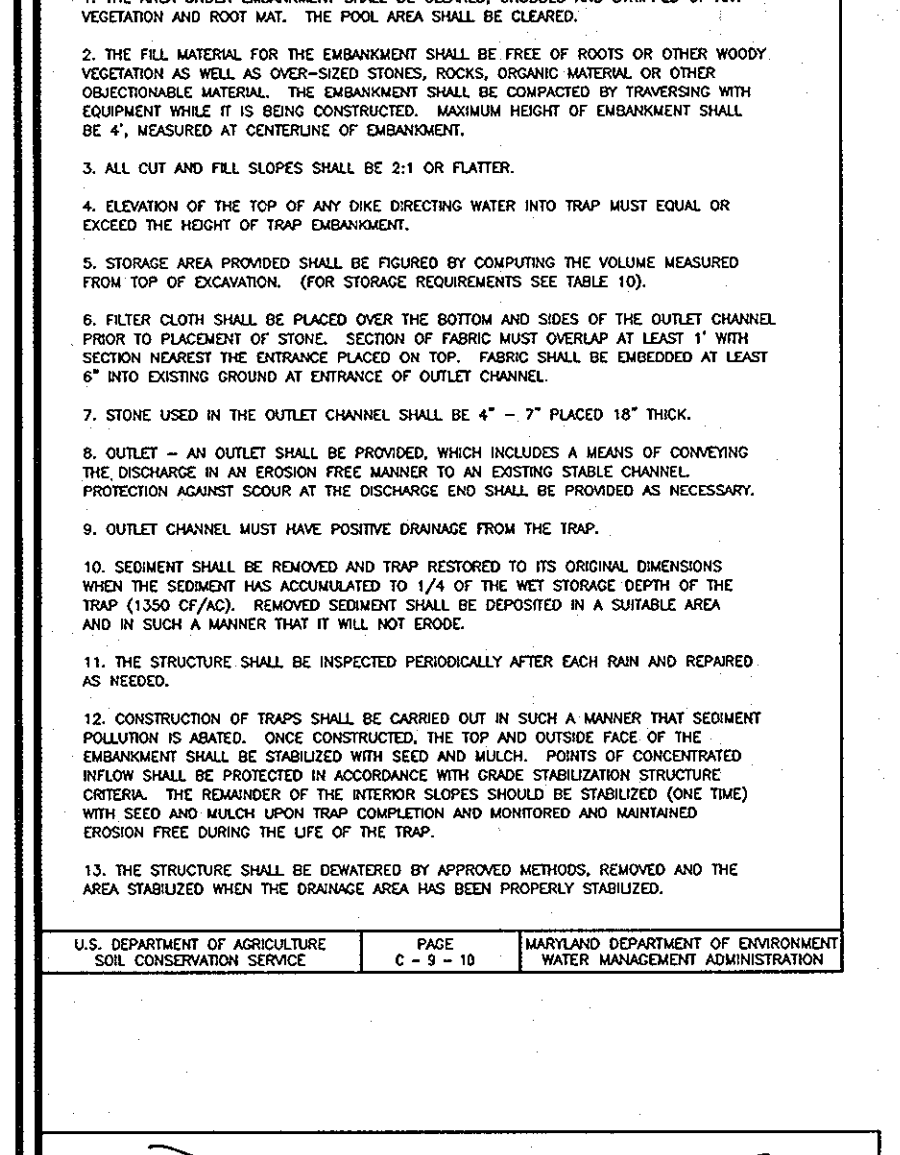
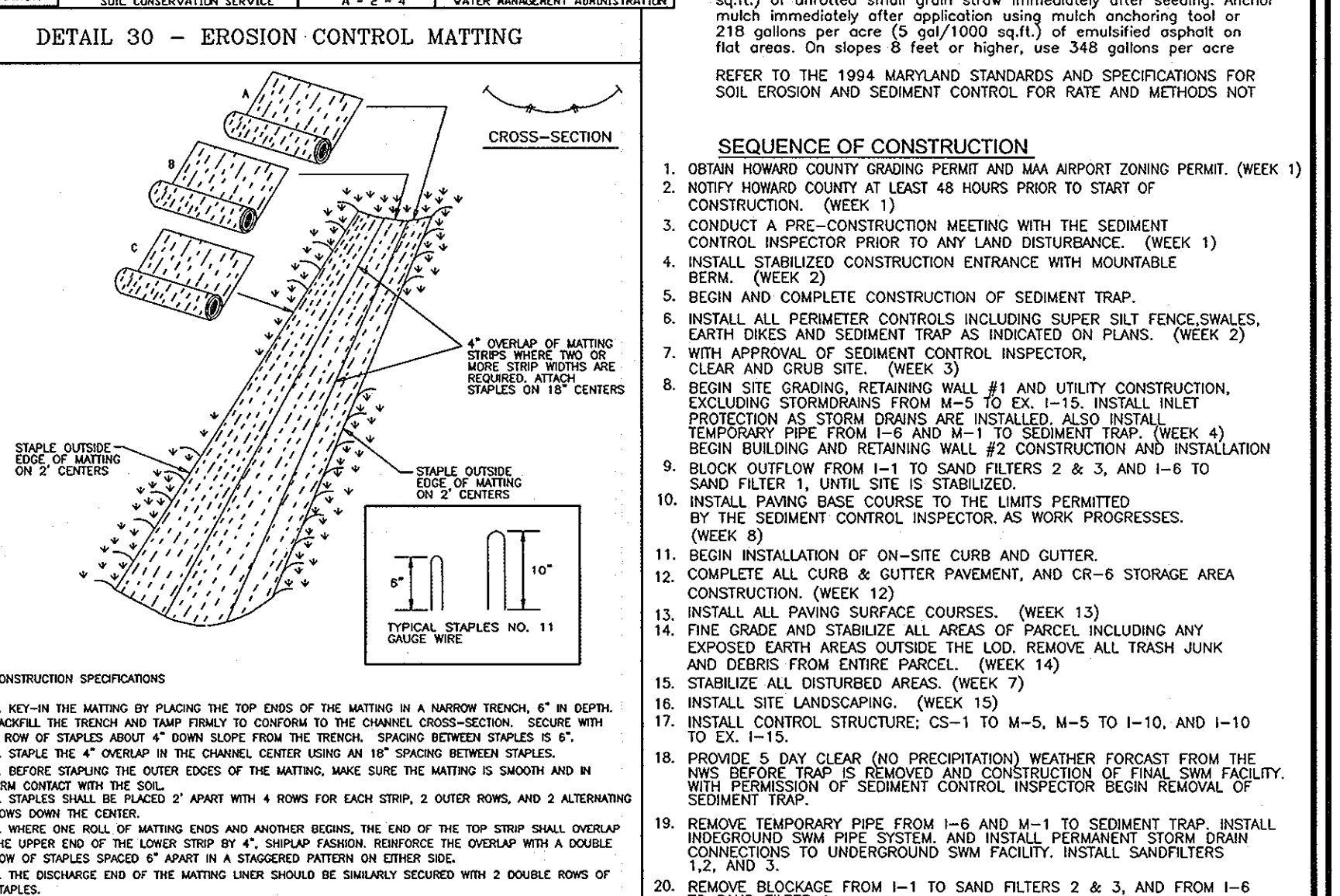
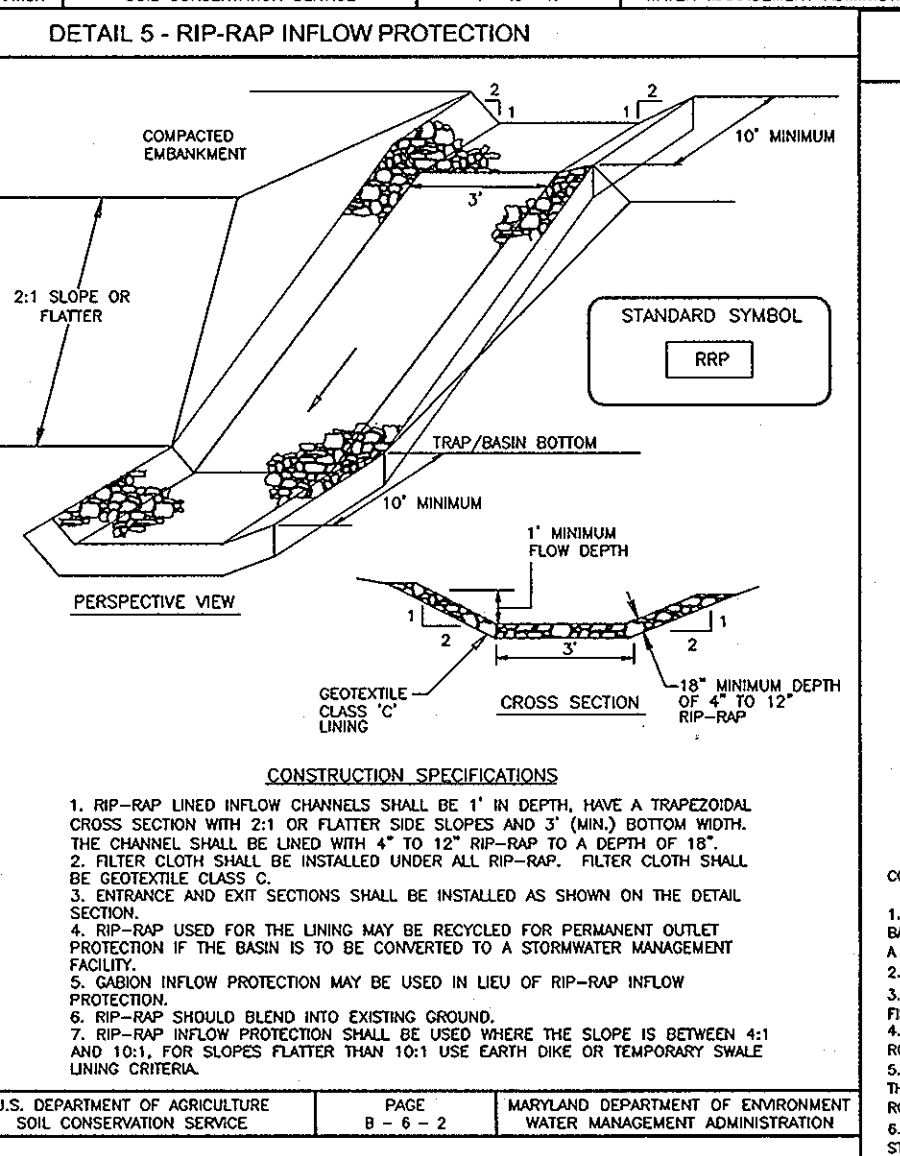
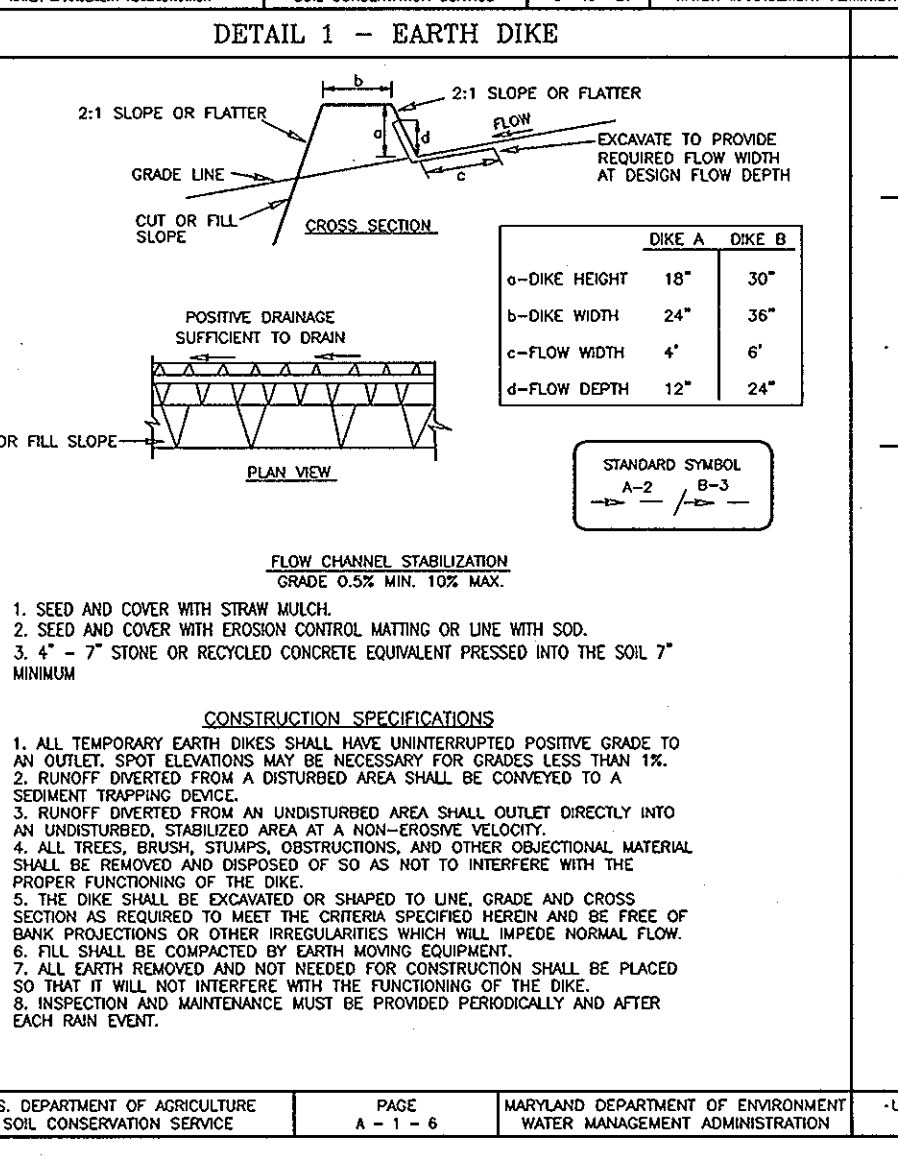
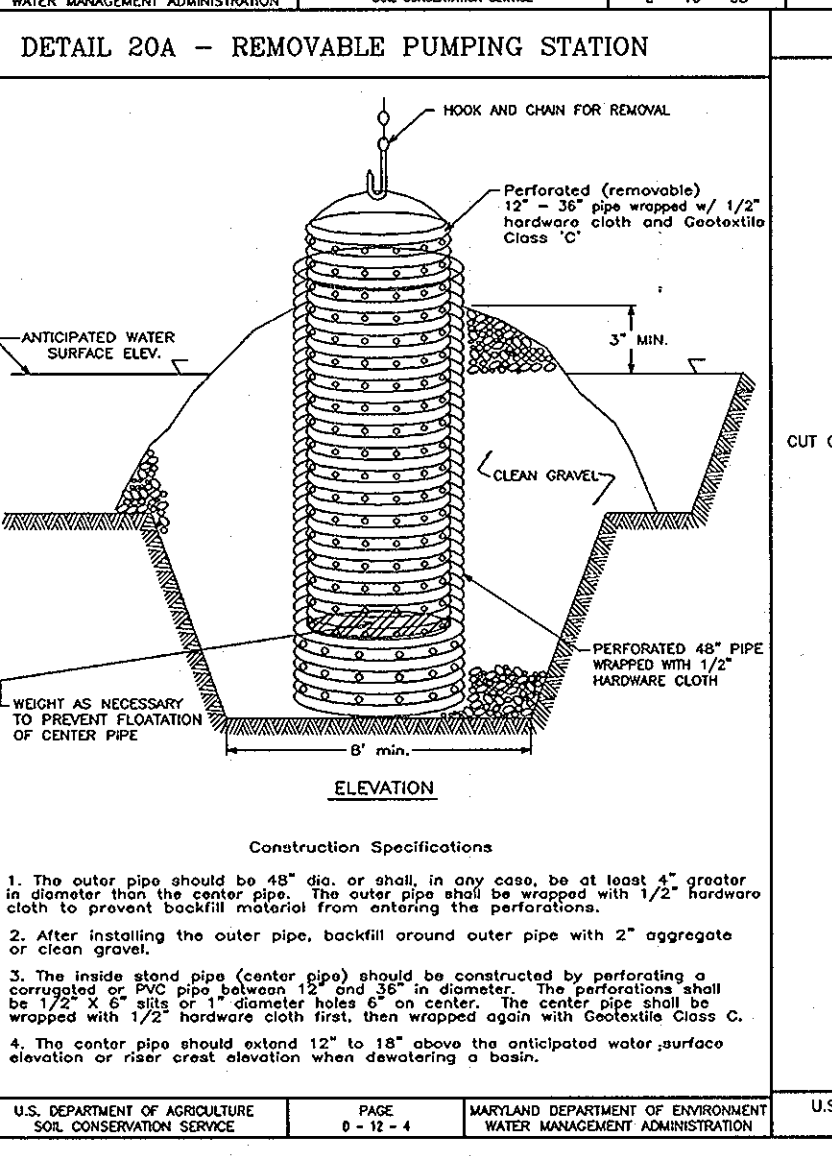
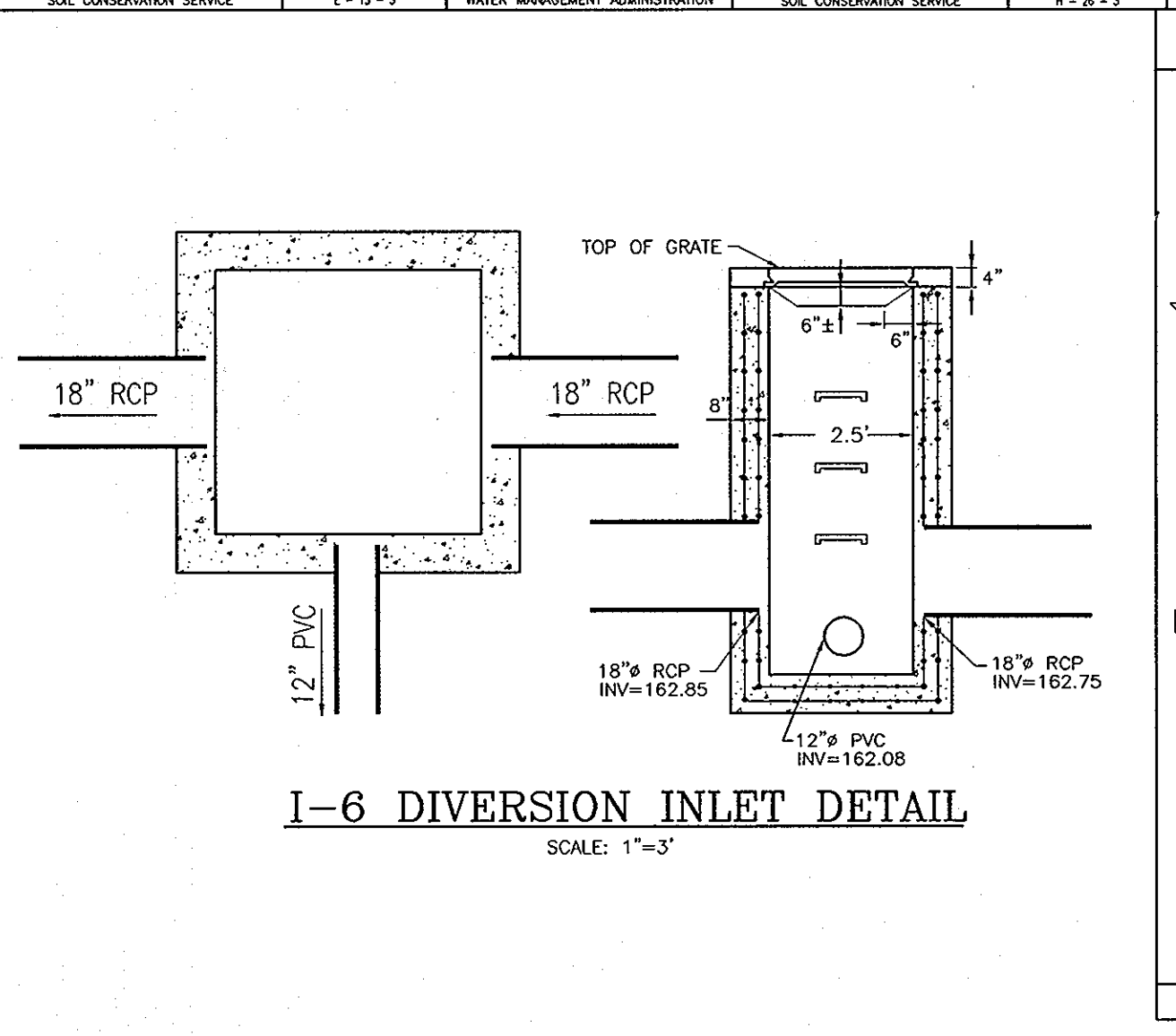
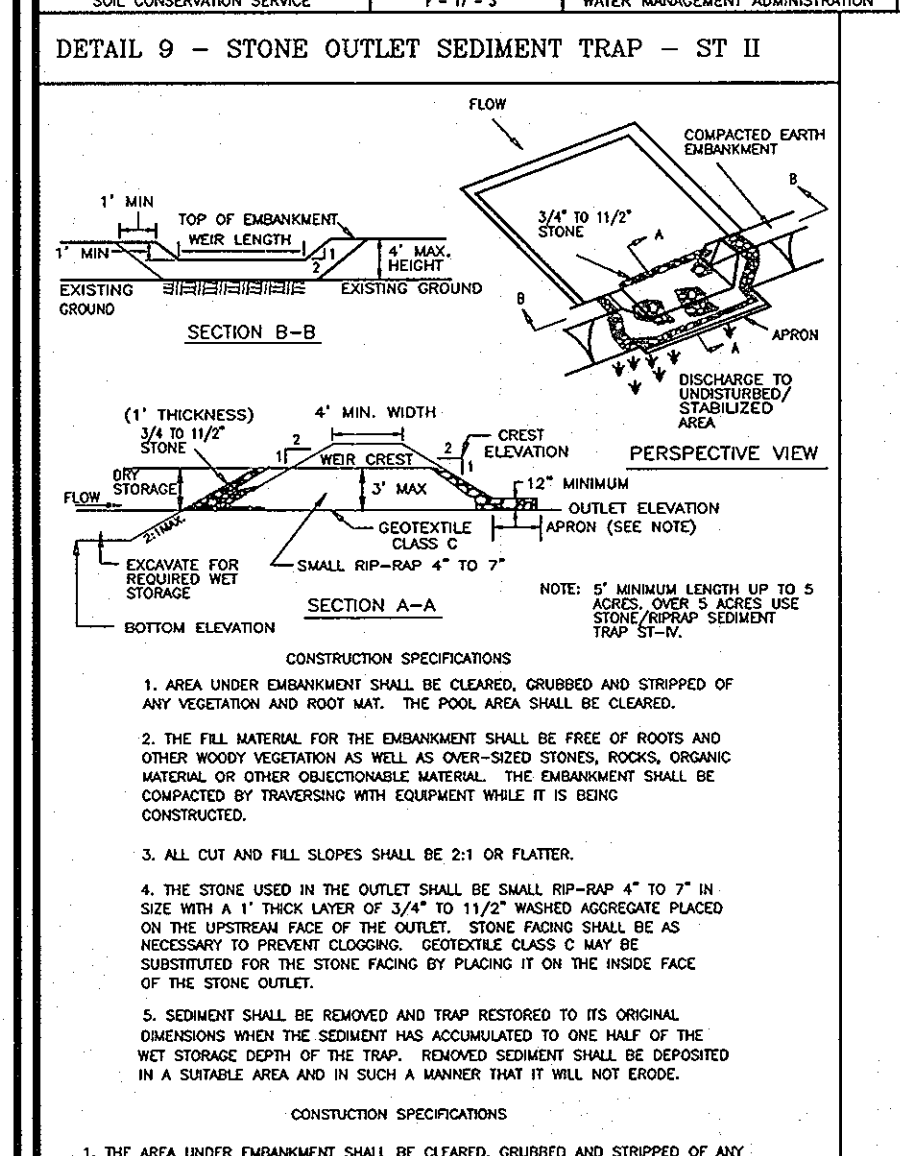
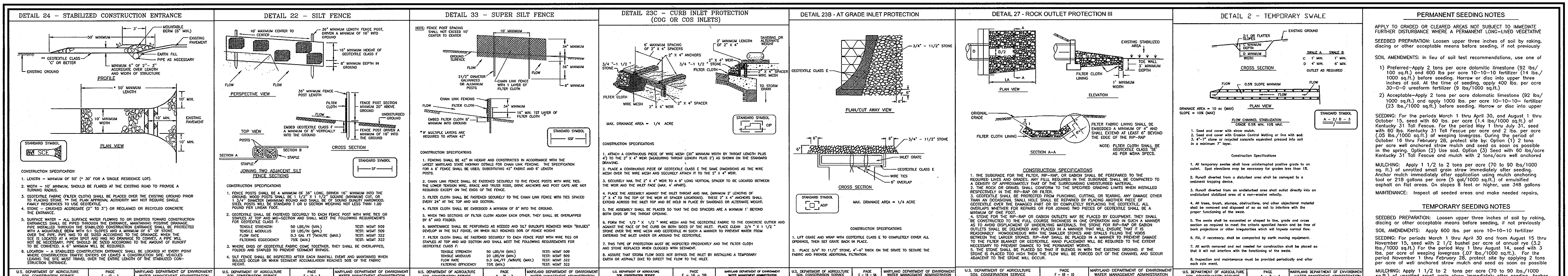
DATE: 7/10/08

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: 7/10/08

DAVID L. GLASS  
SHARON L. GLASS  
TAX MAP 38 PARCEL 802  
WARTHEN PROPERTY  
LOT 3  
ZONED: R-12  
USE: RESIDENTIAL  
PLAT 10870

CHARLES F. WARTHEN  
RUTH A. WARTHEN  
TAX MAP 38 PARCEL 802  
WARTHEN PROPERTY  
LOT 2  
ZONED: R-12  
USE: RESIDENTIAL  
PLAT 10870



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

USDA-NATURAL RESOURCES CONSERVATION SERVICE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 7/10/08

BY THE DEVELOPER:

DATE: 7/10/08

DATE: 8/18/08

DATE: 8/18/08

BY THE ENGINEER:

DATE: 7/10/08

DATE: 7/10/08

DATE: 7/10/08

DATE: 7/10/08

DATE: 7/10/08

DATE: 7/10/08

PROFESSIONAL CERTIFICATE

DESIGN BY: [Signature]

DRAWN BY: [Signature]

CHECKED BY: [Signature]

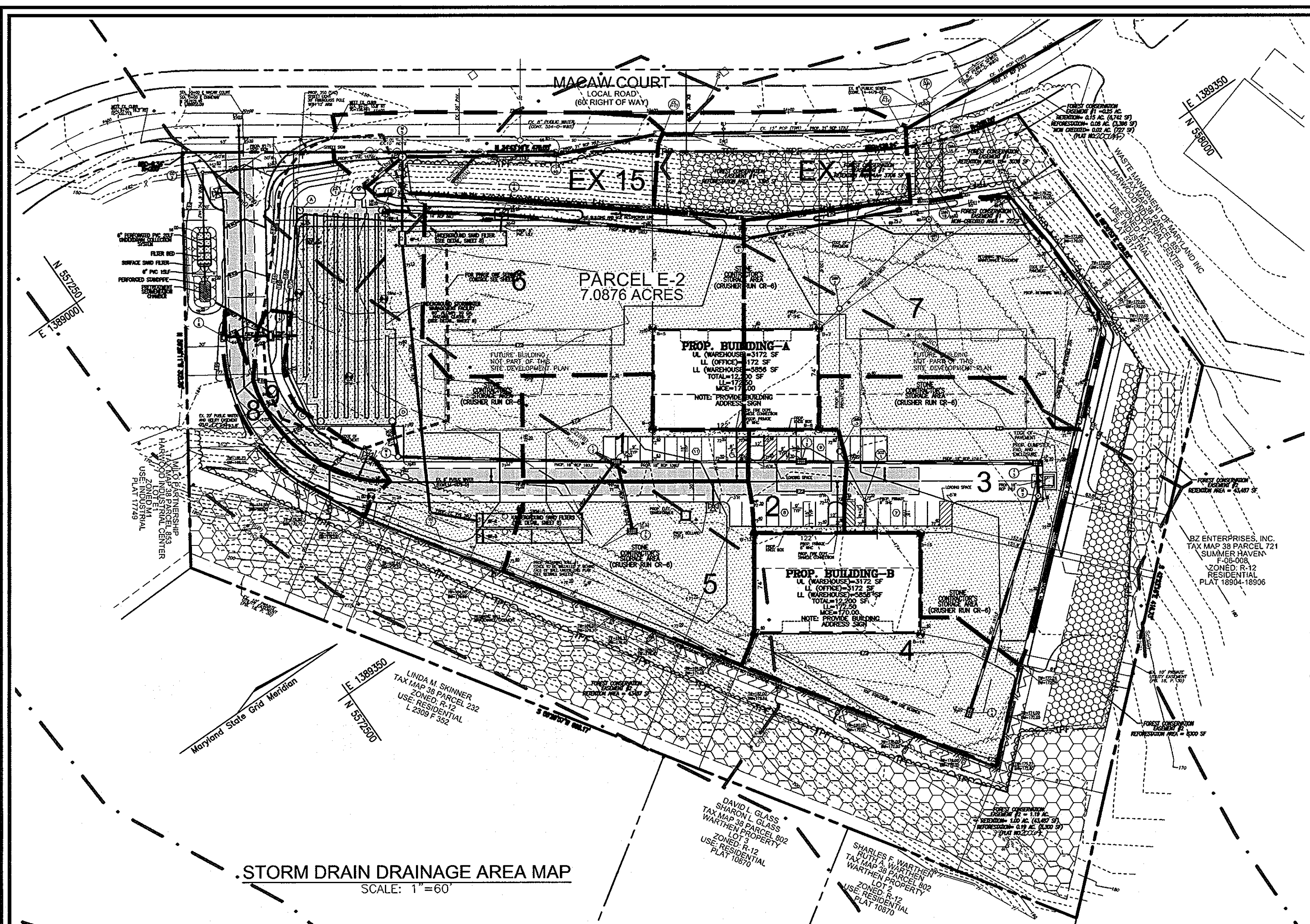
DATE: JULY 2008

SCALE: AS SHOWN

W.O. NO.: 05-110

4 SHEET OF 12

SDP-07-094



STORM DRAIN DRAINAGE AREA MAP  
SCALE: 1"=60'

**AREA AND "C" FACTOR TABULATION**

INLET#	AREA (ac)	"C" FACTOR (C)	% IMPERVIOUS (P)
I-1	0.23	0.87	100
I-2	0.12	0.84	95
I-3	0.58	0.87	100
I-4	0.49	0.87	100
I-5	0.41	0.82	100
I-6	0.73	0.82	92
I-7	0.78	0.87	92
I-8	0.08	0.69	100
I-9	0.08	0.69	70
EX (I-14)	0.31	0.42	75
EX (I-15)	0.32	0.49	75
(I-10)	0.10	0.21	0

**PIPE SCHEDULE - PRIVATE**

SIZE	TYPE	LENGTH
8"	PVC-SEWER	30 LF
6"	WHC	90 LF
6"	SHC	319 LF
15"	RCP, CLIV	274 LF
18"	RCP, CLIV	875 LF
24"	RCP, ASTM 361, CLC.26	37 LF
60"	AL-CMP, 10 GA	1425 LF
12"	PVC	288 LF
8"	PVC	190 LF
21"	RCP, CLIV	574 LF

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

USDA-NATURAL RESOURCES CONSERVATION SERVICE

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

HOWARD S.C.D. DATE: 8/8/08

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 7/20/08

DATE: 8/8/08

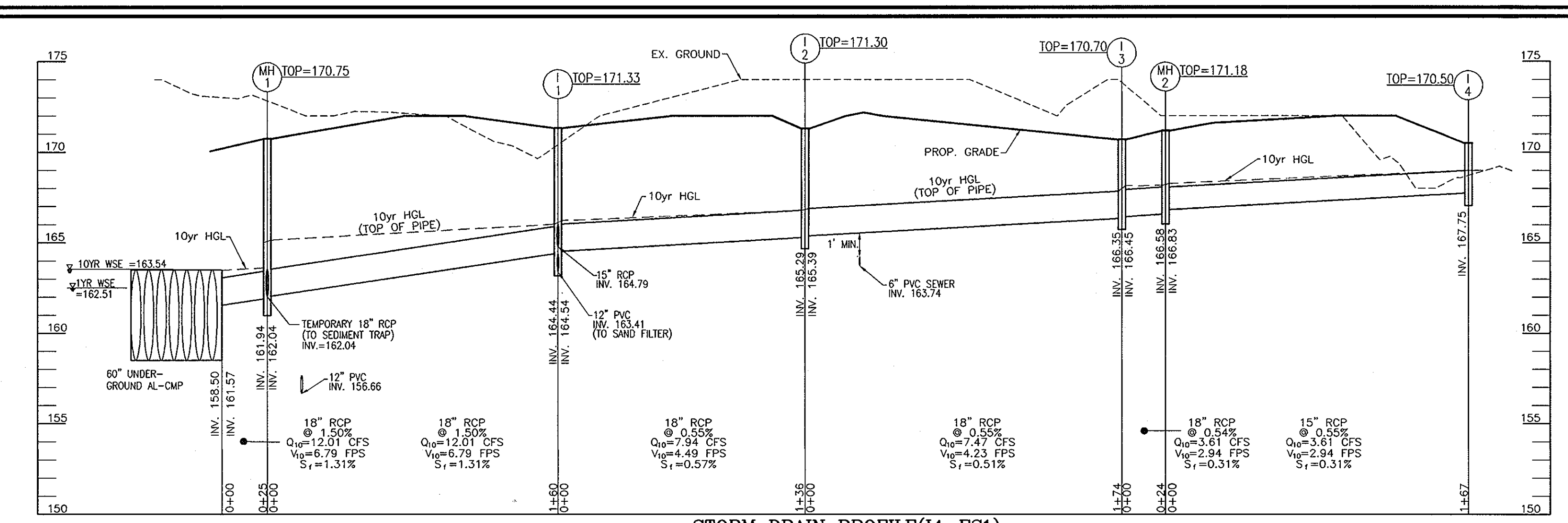
DATE: 8/8/08

BY THE DEVELOPER:

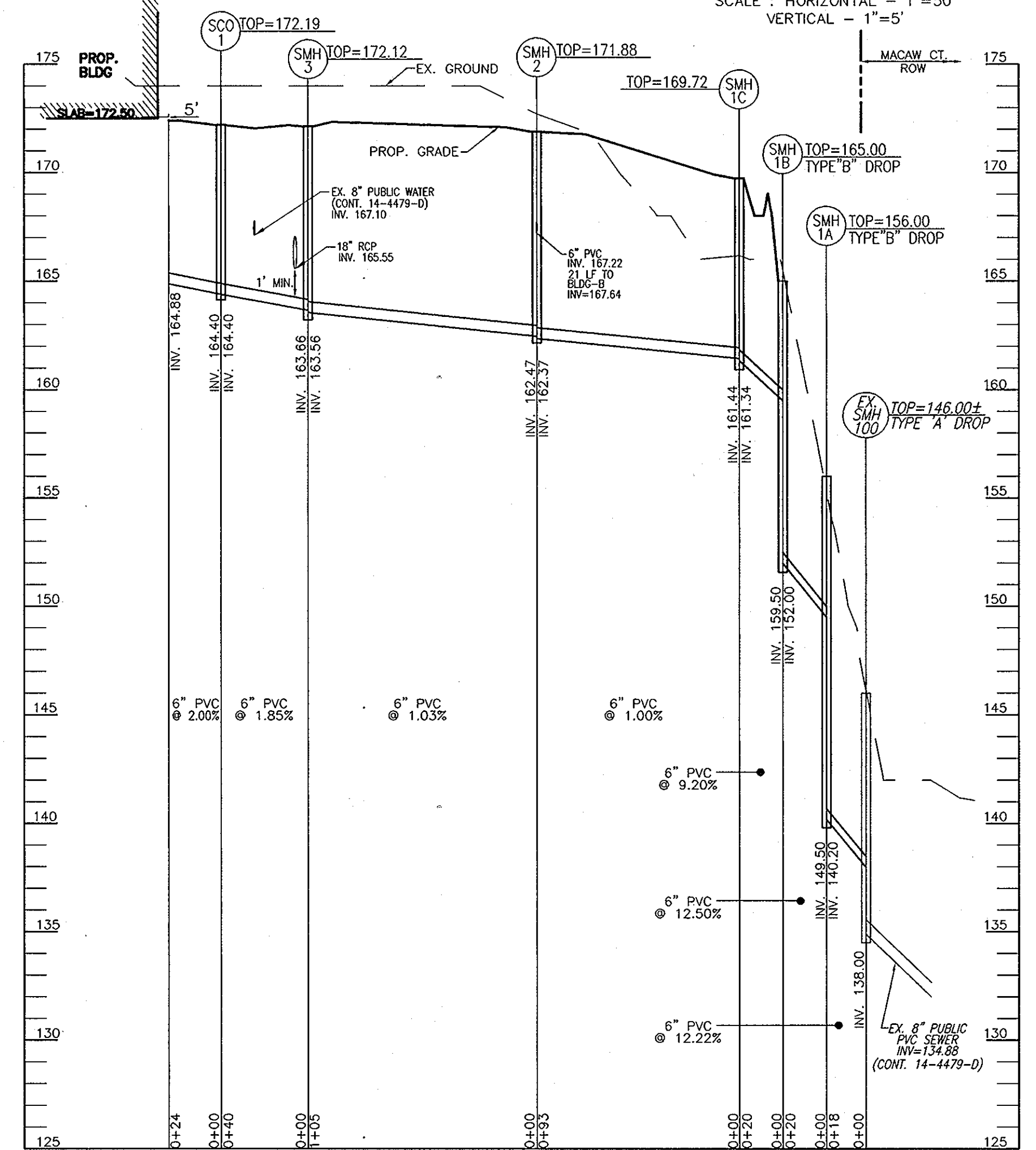
DATE: 7/1/08

BY THE ENGINEER:

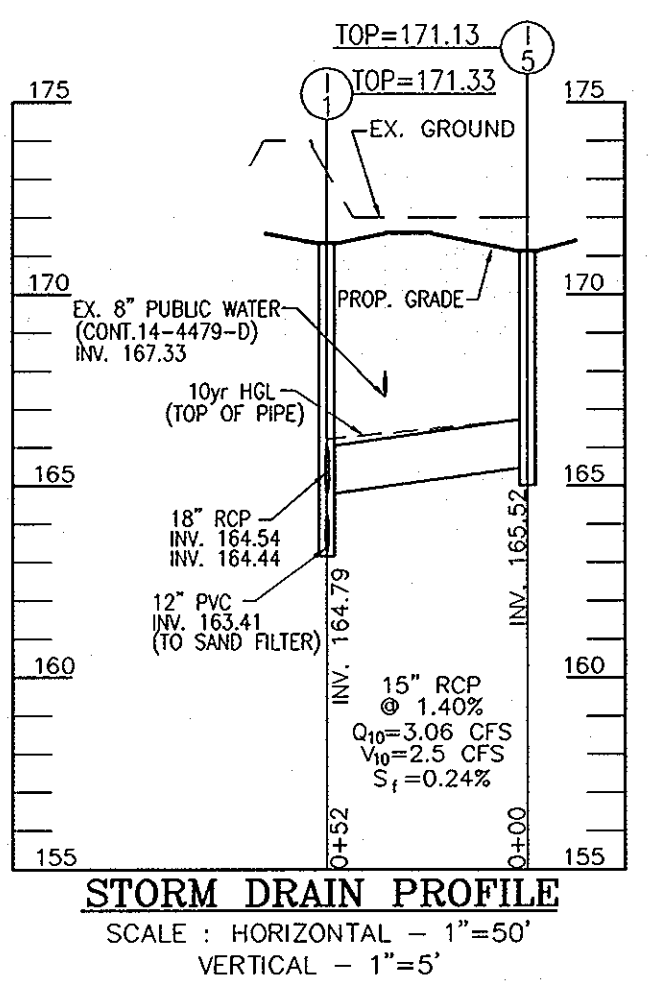
DATE: 7/1/08



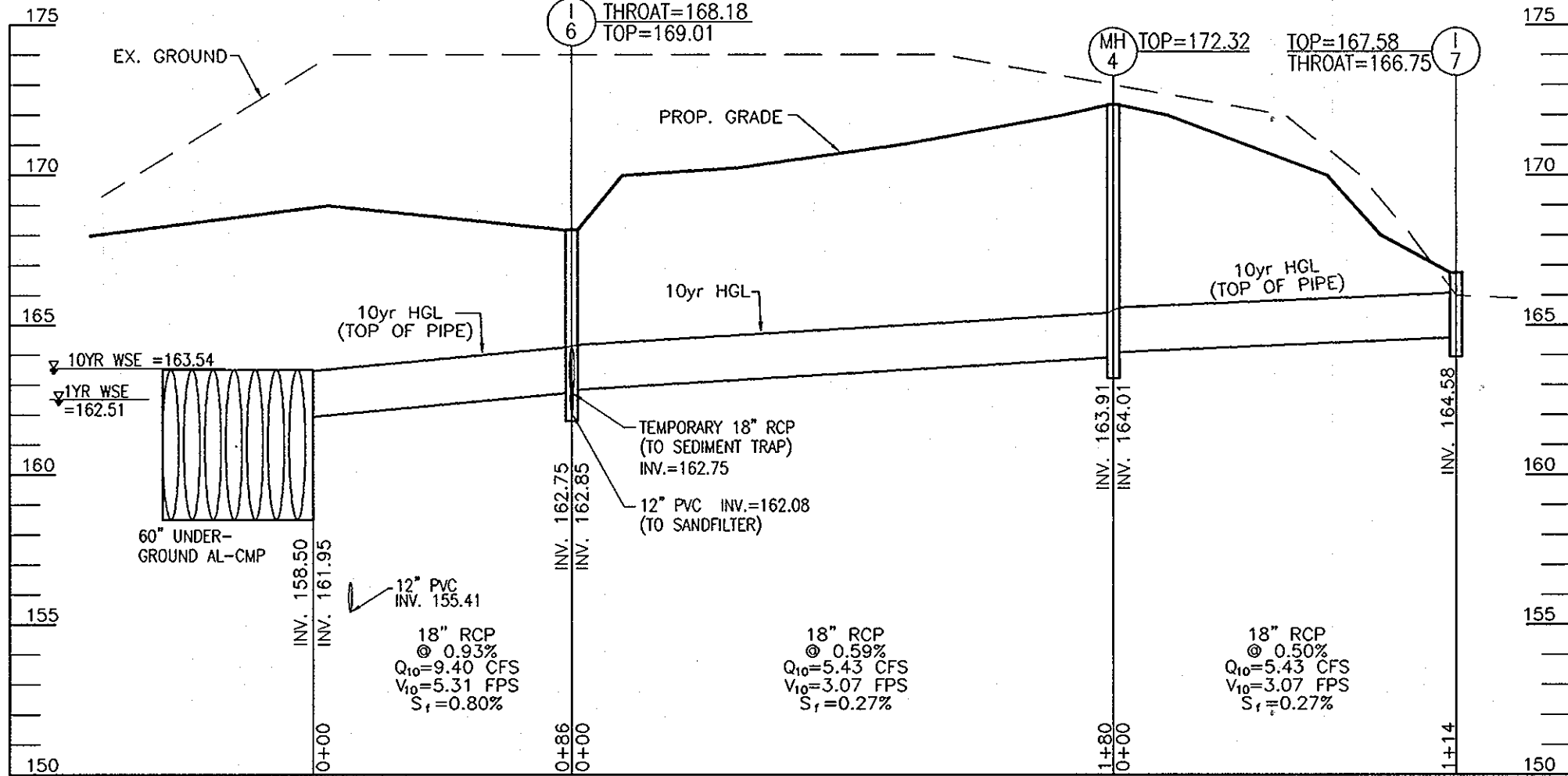
STORM DRAIN PROFILE (14-ES1)  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



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



STORM DRAIN PROFILE (17-ES2)  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



STORM DRAIN PROFILE (18-ES3)  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**STRUCTURE SCHEDULE**

NO.	TYPE	LOCATION	TOP ELEV.	THROAT ELEV.	INV. IN	INV. OUT	COMMENTS
I-1	DOUBLE TYPE 'S' INLET (MODIF.)	N 557908 E 1389323	171.33	164.29	164.44	164.44	SEE DETAIL SHEET 4
I-2	DOUBLE TYPE 'S' INLET	N 557620 E 1389399	171.30	165.39	165.29	165.29	HO. CO. STD D-4.23
I-3	DOUBLE TYPE 'S' INLET	N 557761 E 1389499	170.70	166.45	166.35	166.35	HO. CO. STD D-4.23
I-4	DOUBLE TYPE 'S' INLET	N 557761 E 1389499	170.50	167.75	167.45	167.45	HO. CO. STD D-4.23
I-5	DOUBLE TYPE 'S' INLET	N 557489 E 1389370	171.13	165.52	165.52	165.52	HO. CO. STD D-4.23
I-6	TYPE 'D' INLET-4 OPENING	N 557543 E 1389125	169.01	168.18	162.85	162.85	HO. CO. STD D-4.10
I-7	TYPE 'D' INLET-4 OPENING	N 557784 E 1389288	167.58	166.75	164.58	164.58	HO. CO. STD D-4.10
I-8	TYPE 'A-5' INLET	N 557326 E 1389083	164.58	164.00	161.33	161.33	HO. CO. STD D-4.01
I-9	TYPE 'A-5' INLET	N 557352 E 1389101	164.58	164.00	161.01	161.01	HO. CO. STD D-4.01
I-10	TYPE 'D' INLET, 3' OPENINGS	N 557601 E 1389111	157.29	156.46	147.45	147.45	HO. CO. STD D-4.10
MH-1	4'-0" STANDARD PRECAST MANHOLE	N 557379 E 1389228	170.75	162.04	161.94	161.94	HO. CO. STD. G-5.12
MH-2	4'-0" STANDARD PRECAST MANHOLE	N 557748 E 1389519	171.18	166.83	166.58	166.58	HO. CO. STD. G-5.12
MH-4	4'-0" STANDARD PRECAST MANHOLE	N 557680 E 1389241	172.32	164.01	163.91	163.91	HO. CO. STD. G-5.12
MH-5	6'-0" STANDARD PRECAST MANHOLE	N 557482 E 1389031	161.00	153.33	153.27	153.27	HO. CO. STD. G-5.12
CS-1	CAST-IN-PLACE CONTROL STRUCTURE (SEE SHEET 7)	N 557422 E 1389111	169.06	158.50	158.00	158.00	SEE DETAIL SHEET 7
SMH-1C	STANDARD PRECAST MANHOLE	N 557798 E 1389306	169.72	161.44	161.34	161.34	HO. CO. STD. G-5.12
SMH-2	STANDARD PRECAST MANHOLE	N 557707 E 1389323	171.88	162.22	162.37	162.37	HO. CO. STD. G-5.12
SMH-3	STANDARD PRECAST MANHOLE	N 557639 E 1389420	172.12	163.66	163.56	163.56	HO. CO. STD. G-5.12
SMH-1B	TYPE 'B' DROP MANHOLE	N 557707 E 1389323	165.00	159.50	152.00	152.00	HO. CO. STD. S-1.32
SMH-1A	TYPE 'B' DROP MANHOLE	N 557639 E 1389420	156.00	149.50	140.20	140.20	HO. CO. STD. S-1.32

NOTE: 1. Top elevations are at center top of headpiece for Type 'A-5', 'A-10' and Double Type 'S' Comb. Inlets at center top of grate for Double Type 'S' and Type 'K' Inlets and top of Manhole cover for Precast Manholes.  
2. For top slab slopes see grading plan.  
3. See Architectural plans for roof drain details.  
4. All custom and non-standard structures to be designed by a qualified structural engineer.

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED

OWNER/PETITIONER  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**  
**STORM DRAIN DRAINAGE AREA MAP, WATER AND SEWER PROFILES**  
**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

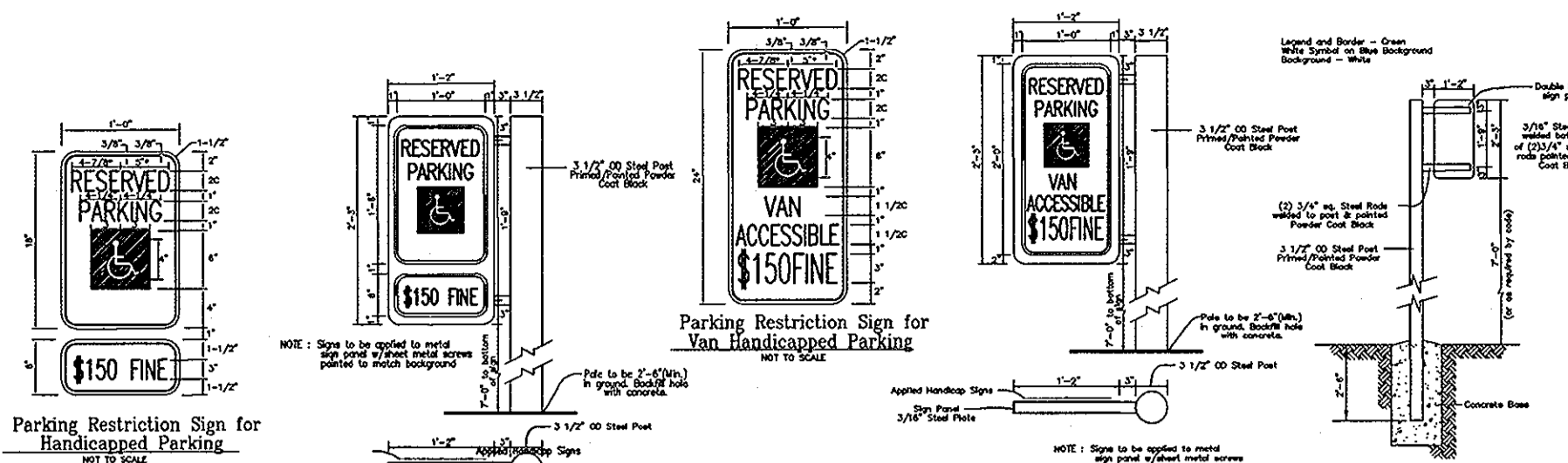
PARCEL E-2  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET  
ELICOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.8966

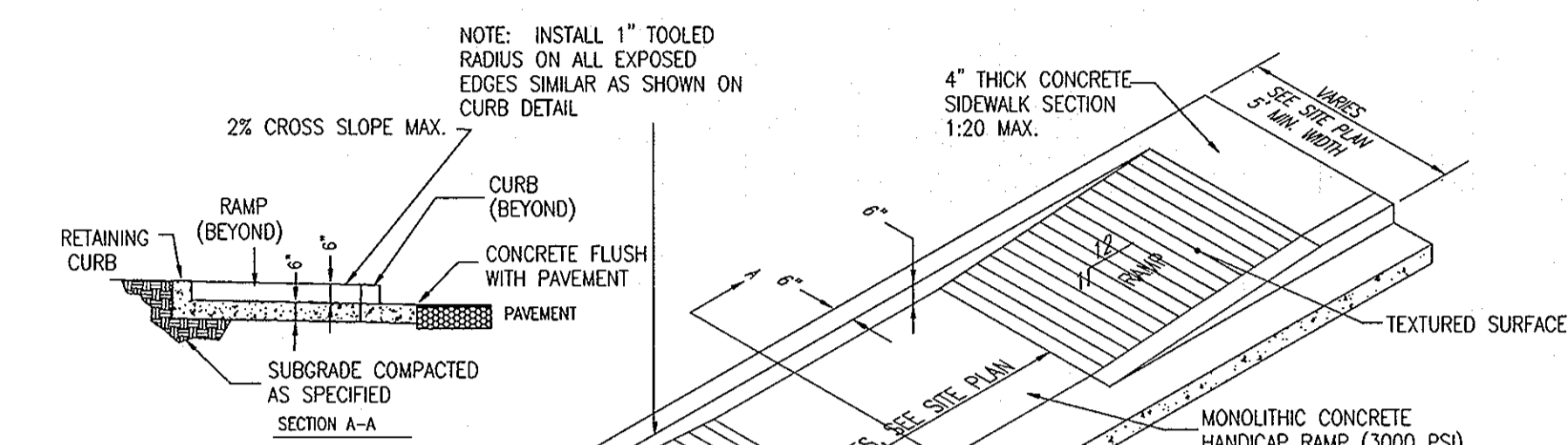
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DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
DATE: JULY 2008  
SCALE: AS SHOWN  
W.O. NO.: 05-10

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2008

5 SHEET OF 12

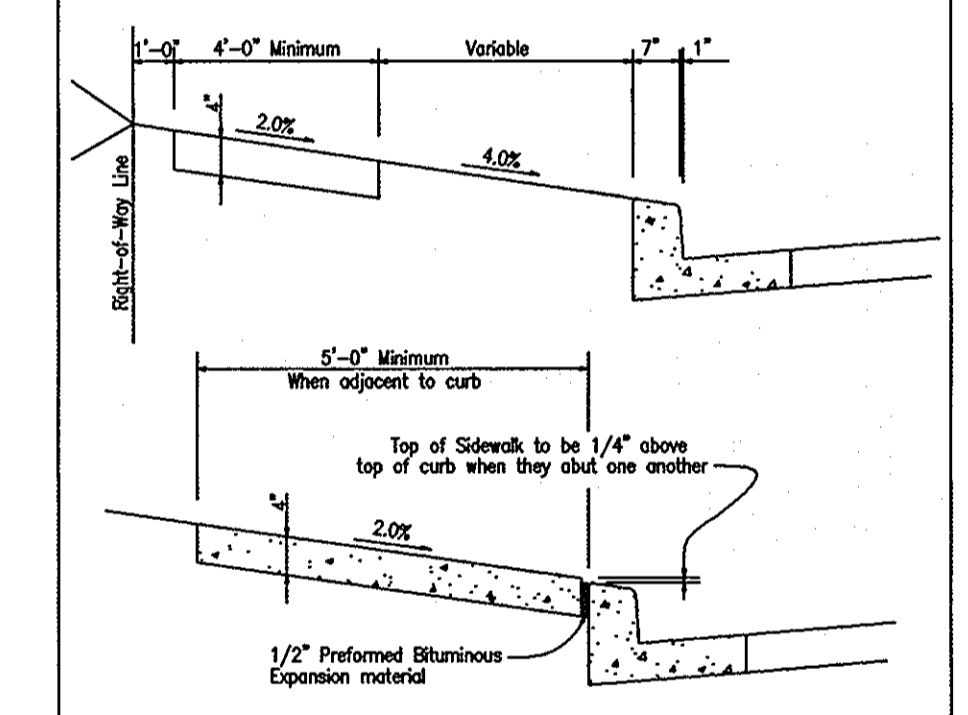


**HANDICAP PARKING SIGNS**  
(NOT TO SCALE)

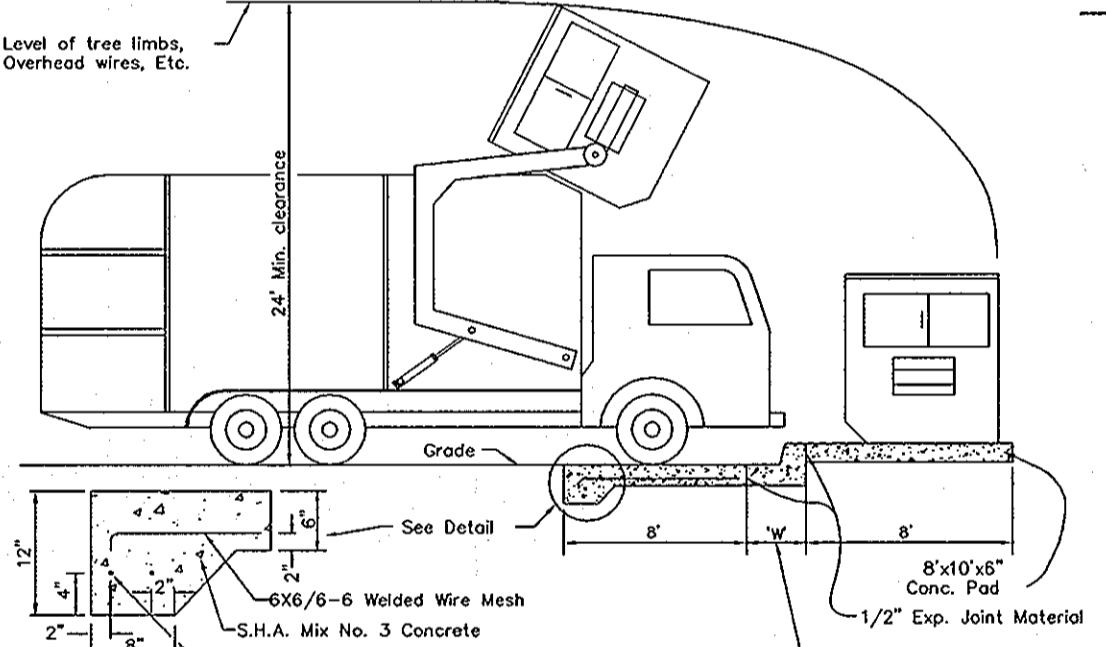


**SIDEWALK HANDICAP RAMP DETAIL**  
NOT TO SCALE

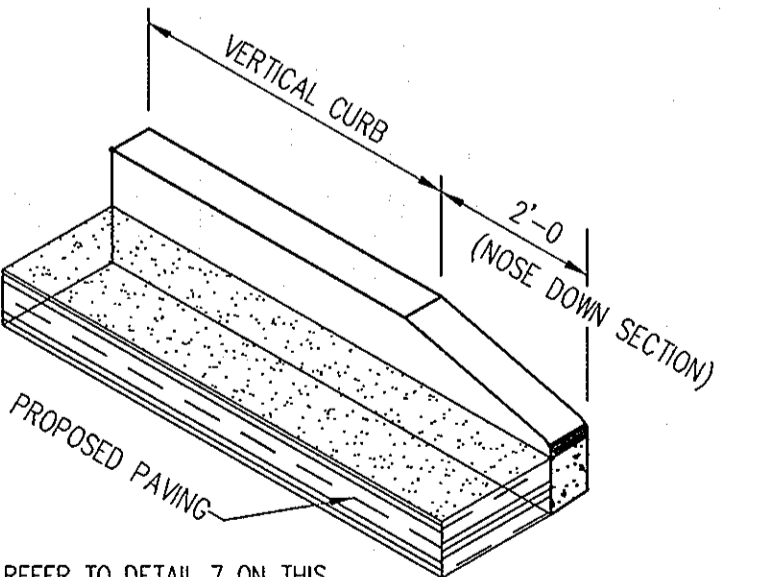
**CONCRETE SIDEWALK HOWARD COUNTY STANDARD DETAIL R3.05**



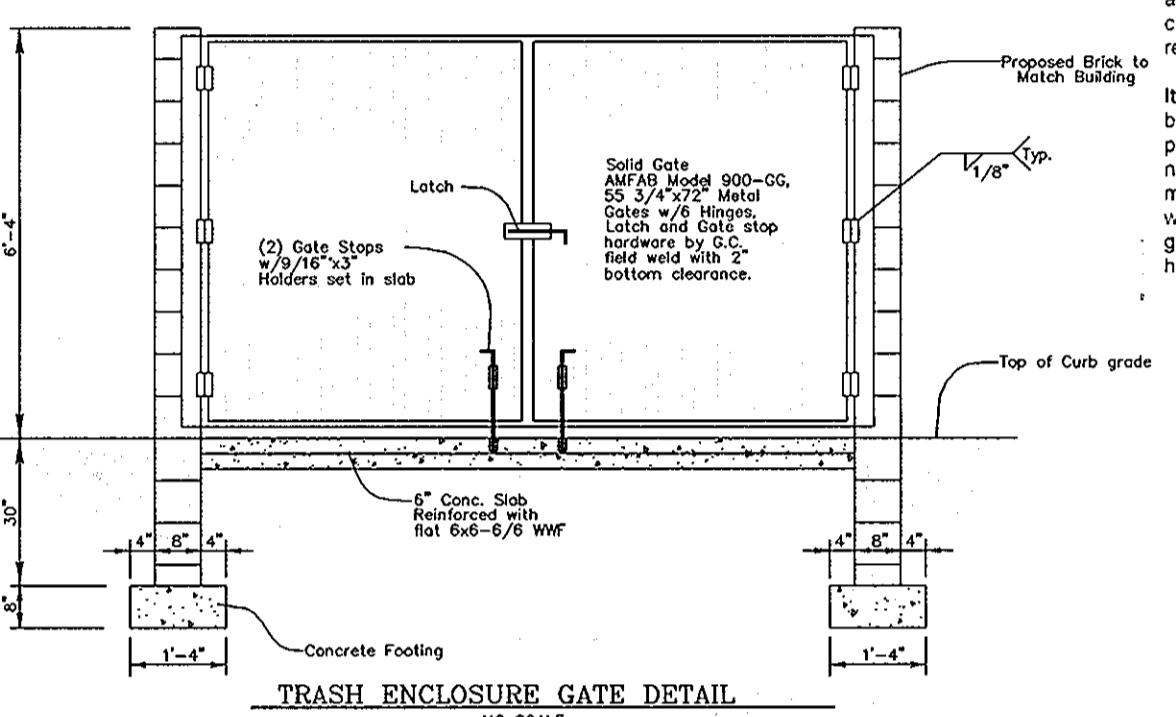
- Sidewalk to be scrubbed in 5'-0" maximum squares.
- Expansion joints across the sidewalk shall be more than 15' apart.
- 1/2" Preformed Bituminous Expansion material in expansion joints to be kept 1/4" below surface of sidewalk.
- Concrete to be mix number 2.
- Where sidewalk abuts curb, sidewalk shall be 1/4" above curb with 1/2" Preformed Bituminous Expansion material between sidewalk and curb.
- On longitudinal expansion joints of 5' or greater, a concrete header, 6" thick and 6" deep above the surface of sidewalk, shall be constructed for the full width of the joint. The headers shall be placed at expansion joint locations and shall be monolithic with the curb.
- Sidewalk width adjacent to curb shall be 5'-0" minimum except sidewalk adjacent to curb on 5'-0" wide bridge may be 4'-0" wide.
- Sidewalk width 2' or more from curb may be 4'-0" in width with a 5'-0" paved section from curb to edge.



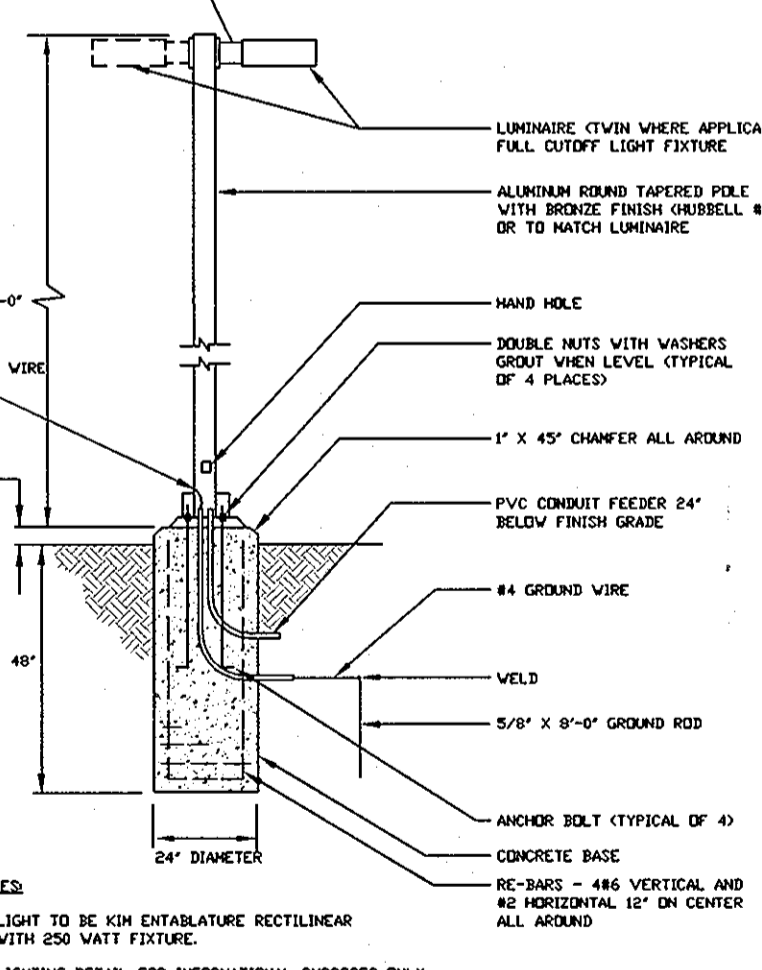
**SOLID WASTE SERVICE PAD**  
HOWARD COUNTY STD. R 11.01  
NOT TO SCALE



**CONCRETE CURB - NOSE DOWN**  
NOT TO SCALE



**TRASH ENCLOSURE GATE DETAIL**  
NO SCALE



**POLE BASE DETAIL**  
(NOT TO SCALE)

**DEWATERING STRATEGY**

Dewatering refers to the act of removing and discharging water from excavated areas on construction sites or from sediment traps or basins on construction sites. Standards and specifications for dewatering practices are as follows:

These standards apply to removal and discharge of water from any excavated area or sediment trap or basin at any construction site. Given the unique conditions of any particular construction site, any or all of the practices may apply. Regardless of the practices listed herein, operators are required to use acceptable procedures for maintenance and dewatering. In all cases, every effort shall be made to eliminate sediment pollution associated with dewatering.

Designs shall specify the preferred procedure for dewatering on plans. In particular, designers should identify procedures for dewatering sediment traps and basins prior to elimination of the soil sediment control facility on the site or prior to conversion of sediment control facilities to stormwater management facilities. Recommended procedures shall be consistent with these standards. Actual site conditions may require innovative dewatering designs. Dewatering measures not referenced in this standard may be used with the consent of the approval authority.

Designers shall specify on plans, and in sequences of construction included on plans, procedures for dewatering of excavated areas. Plan reviewers shall check to see that procedures for dewatering are included on plans.

A. In all cases, water removed from excavated areas shall be discharged such that it shall pass through a sediment control device prior to entering receiving waters. Sediment control devices include sediment traps and basins, in addition to the practices in this section.

Approved Practices for Dewatering of Excavated Areas

- Pumping of water to an existing sediment basin or trap in which the entire volume of water from the area to be dewatered can be contained without discharging to receiving waters.
- Pumping of water to an existing sediment basin or trap such that the entire volume of water from the area to be dewatered can be managed without exceeding the design outflow from the sediment control structure.
- Removable Pumping Station. Standards and specifications for Removable Pumping Station are on Detail 20A.
- Use of a Sump Pit. Standards and specifications for a sump pit are on Detail 20B.
- Sediment Tank. Standards and specifications for a sump pit are on Detail 21.

Dewatering of Sediment Traps and Basins

Designs shall specify on plans, and in sequences of construction included on plans, the practices for dewatering of traps and basins. Plan reviewers shall check to see that procedures for dewatering are included on plans. In all cases, water removed from traps and basins shall be discharged so that it passes through a sediment control device prior to entering receiving waters.

Approved Practices for Dewatering of Traps and Basins

- Immediately prior to placing the crushed stone base for the pavement or building slab, rework the subgrade as necessary to a firm, unyielding condition and in roadway areas: to a minimum 100 percent of the AASHTO T-99 maximum dry density and in the slab area, to a minimum 95 percent of the AASHTO T-99 maximum dry density.

**EARTHWORK CONSTRUCTION**

For building, roadway, and stormwater construction, we recommend the following procedures:

A. Building Areas

- In building pad areas, strip all vegetation, topsoil, and otherwise unstable materials to expose undisturbed native soils.
- Protect the soil surface with a loaded tandem dump truck, delineating any soft, yielding, or otherwise unstable areas.
- Investigate the yielding areas and further undercut to more competent ground, or if appropriate, stabilize the surface by working in crushed aggregate or undercutting and replacing with aggregate fill over a geotextile. The method of correction would best be determined at the time of construction.
- On the stabilized approved grade, place controlled compacted fill in accordance with APPENDIX I, COMPACTED FILL to subgrade elevation.

B. Roadways and Utilities

Prepare the surface and place controlled compacted fill as outlined above for the building pads with the exception that the controlled fill need only extend 2 to 3 feet beyond the back of the curb for pavement area.

C. Stormwater Management

Prior to excavating the core trench and placing embankment fill, strip vegetation, topsoil, and otherwise unstable materials from the embankment area to expose competent native soils. Place controlled compacted core trench, clam core, and embankment fill and principal spillover backfill as per MDOT'S 2003 specifications.

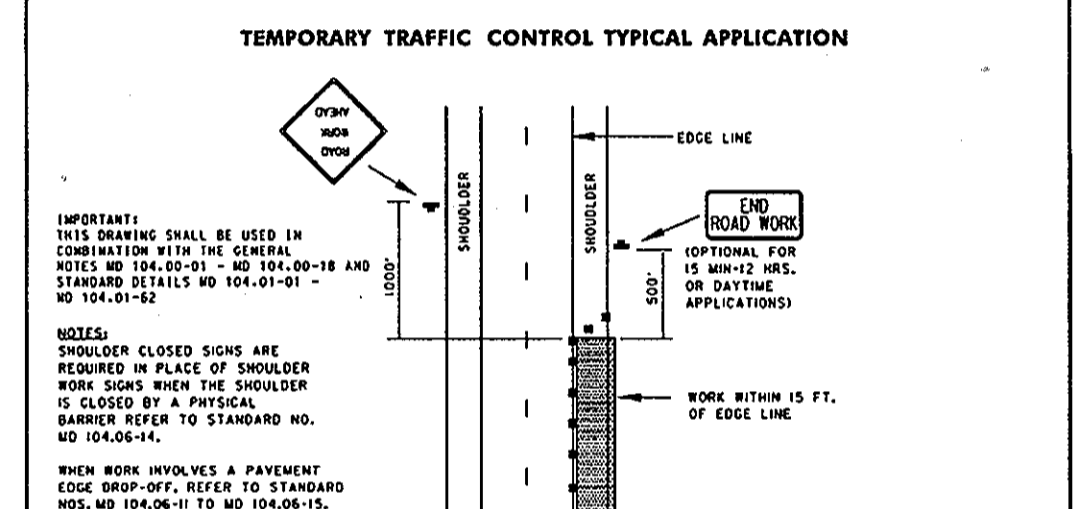
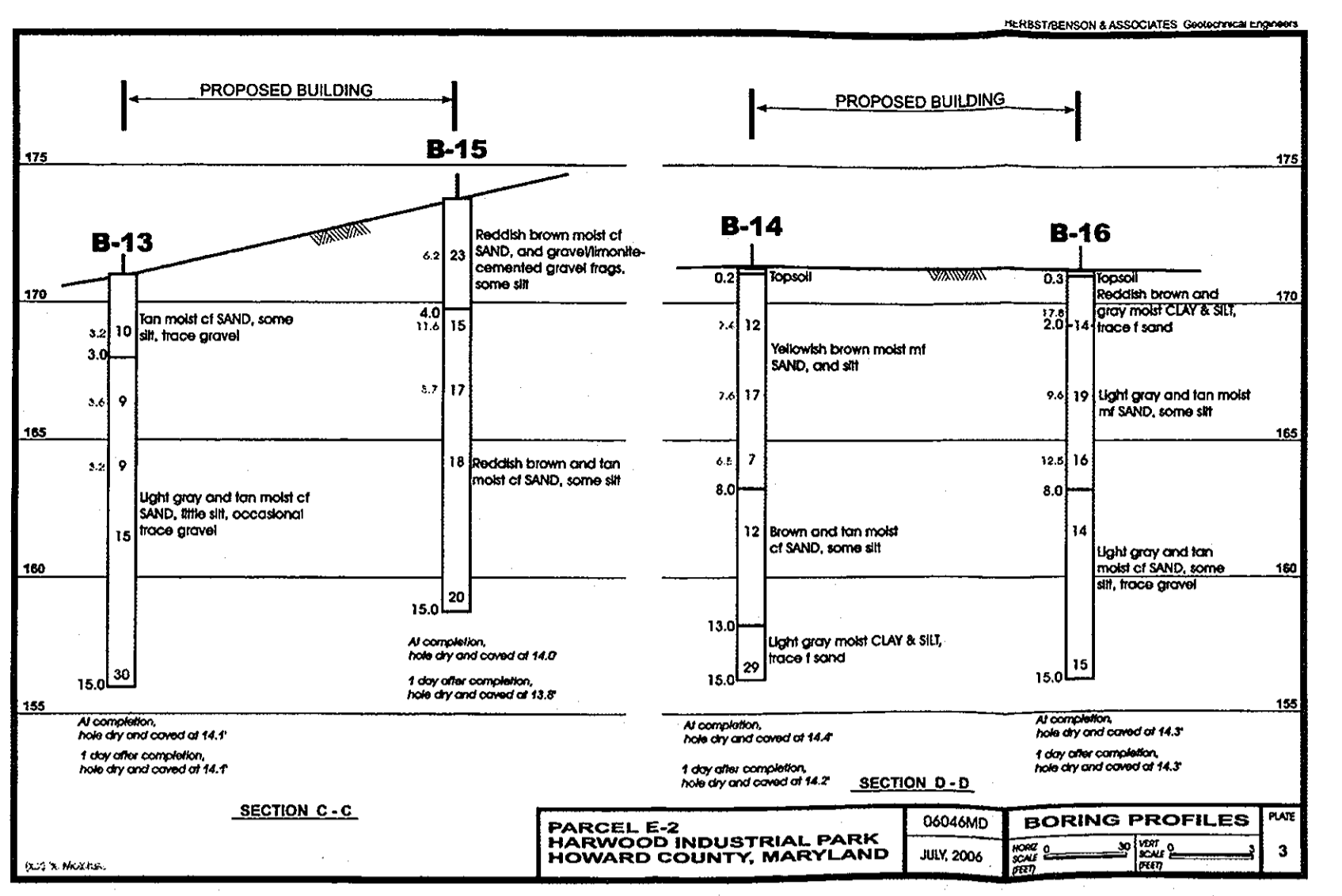
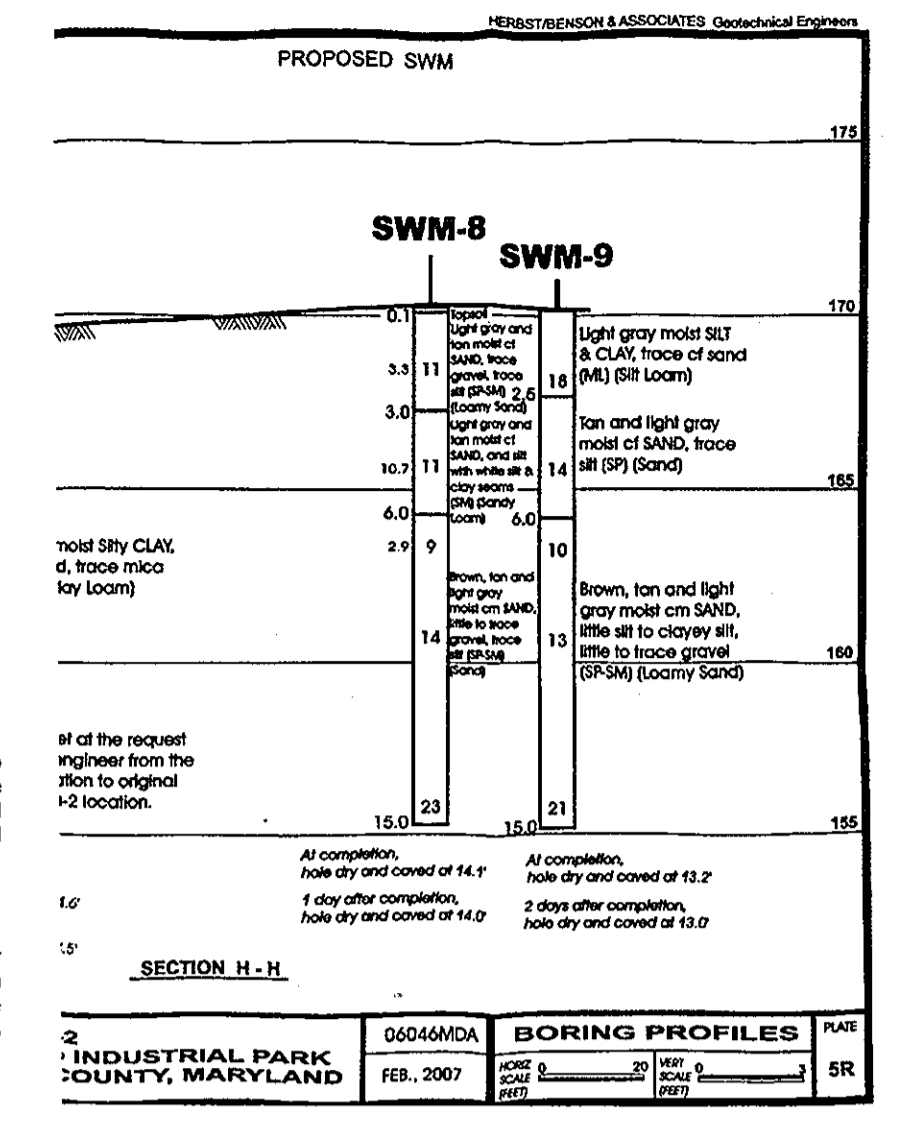
D. Slab and Roadway Subgrades

Immediately prior to placing the crushed stone base for the pavement or building slab, rework the subgrade as necessary to a firm, unyielding condition and in roadway areas: to a minimum 100 percent of the AASHTO T-99 maximum dry density and in the slab area, to a minimum 95 percent of the AASHTO T-99 maximum dry density.

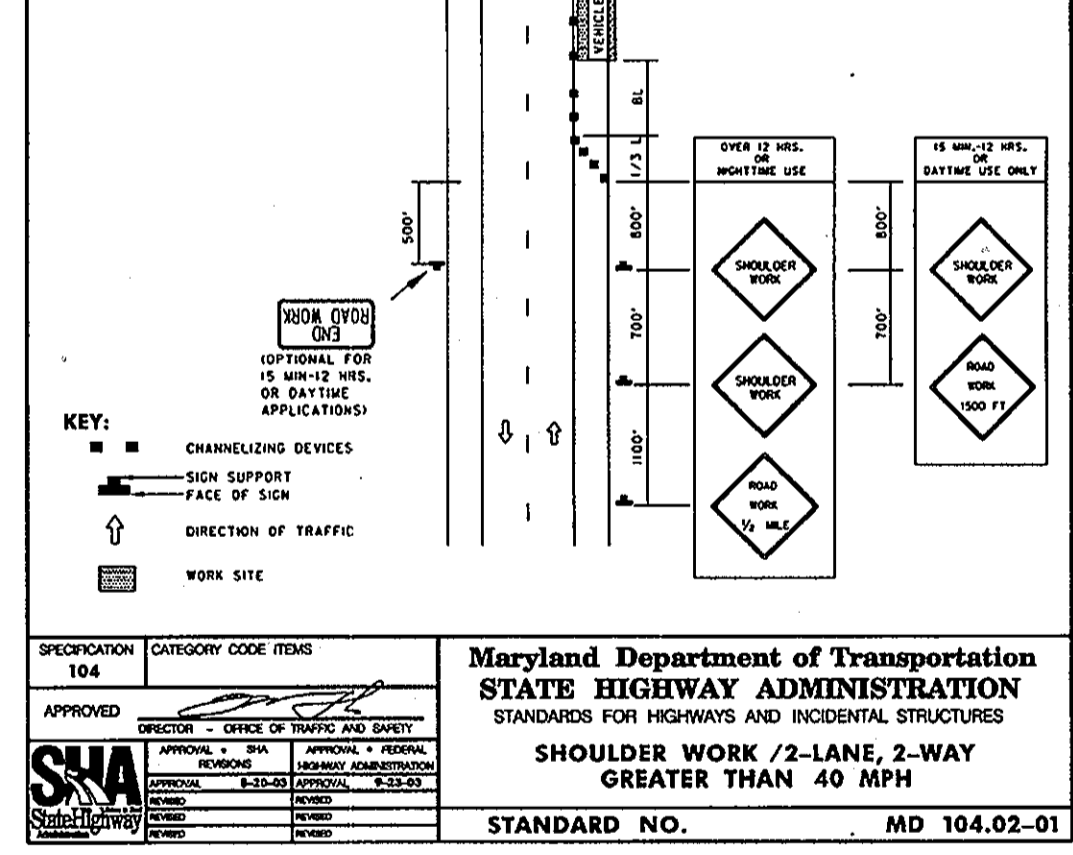
**SUITABILITY OF SITE SOILS FOR RE-USE AS CONTROL FILL**

A review of SHEETS 1 through 4 shows that the tested soil types are suitable for re-use as controlled compacted building and roadway embankment fill, having maximum compacted dry densities exceeding 100 PCF. The existing moisture at the time of testing were also close to the optimum for most efficient compaction; thus, at the tested moisture, little moisture adjustment will be required after spreading but prior to compaction.

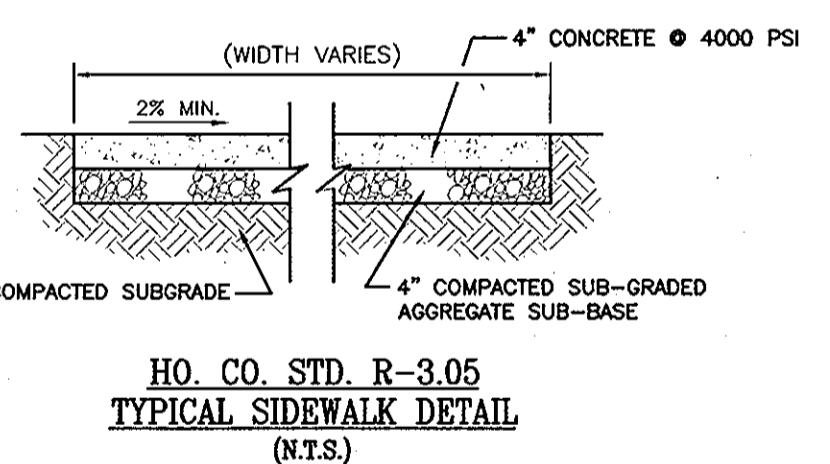
It should be noted that the moisture represent conditions at the time of the test boring program. Soil moisture will vary with changes in season and precipitation. We recommend that earthwork construction occur during the normally warmer, dryer summer and early fall construction season, when moisture adjustment by aeration is more feasible. Construction during the cooler weather seasons of the year may result in saturation or freezing of exposed grades requiring undercutting and replacing with more suitable materials. Also, high moisture soils, if encountered, cannot be readily dried for use as fill.



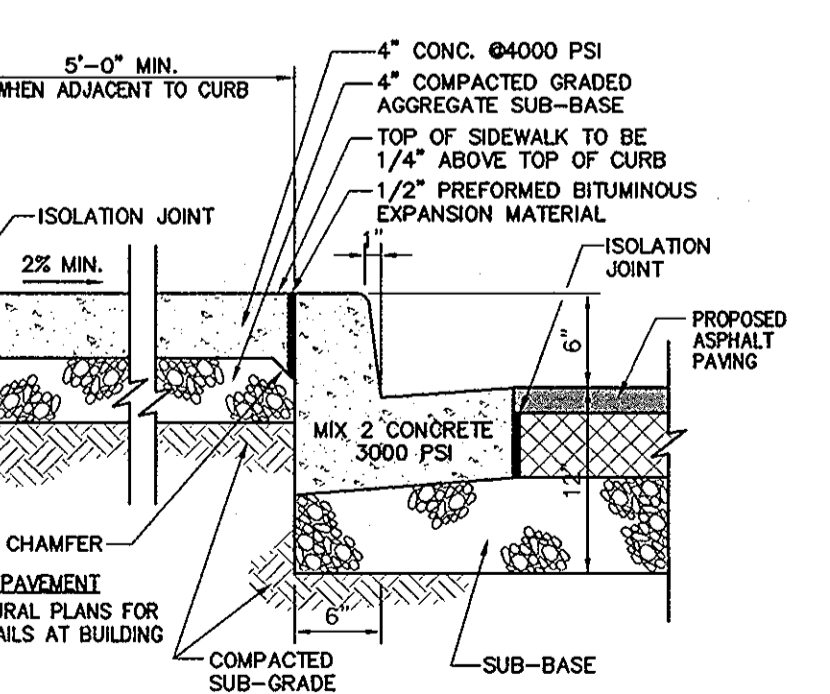
**TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION**



**SHOULDER WORK 1/2-LANE, 2-WAY GREATER THAN 40 MPH**  
STANDARD NO. MD 104.02-01



**HO. CO. STD. R-3.05 TYPICAL SIDEWALK DETAIL (N.T.S.)**



**HO. CO. STD. R-3.05 TYPICAL SIDEWALK AT BUILDING (N.T.S.)**

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**  
**STORMWATER MANAGEMENT NOTES AND DETAILS; SITE DETAILS**  
**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2  
TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND

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

**PROFESSIONAL CERTIFICATE**  
DESIGN BY: DZ  
DRAWN BY: DZ  
CHECKED BY: RHV  
DATE: JULY 2008  
SCALE: AS SHOWN  
S.W.O. NO.: 05-10

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. 18193, EXPIRATION DATE 09-27-2008.

6 SHEET OF 12

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

USDA-NATURAL RESOURCES CONSERVATION SERVICE

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

HOWARD S.C.D.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

7/30/08  
5/15/08  
8/13/08

BY THE DEVELOPER:

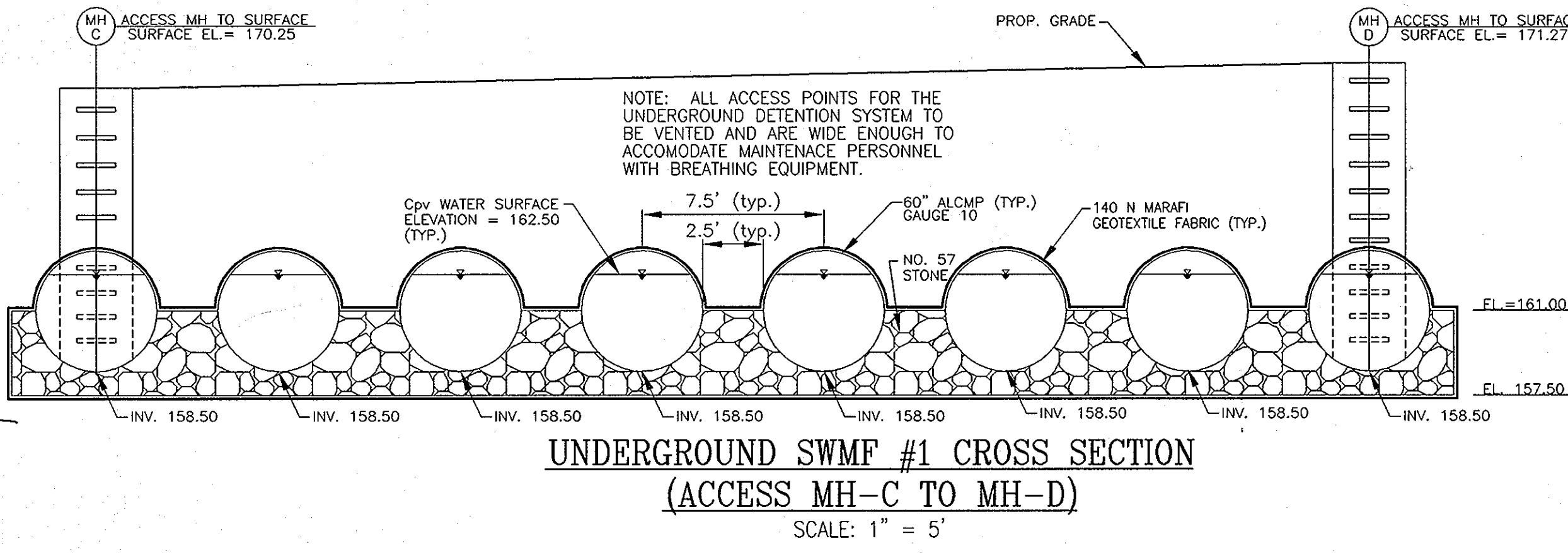
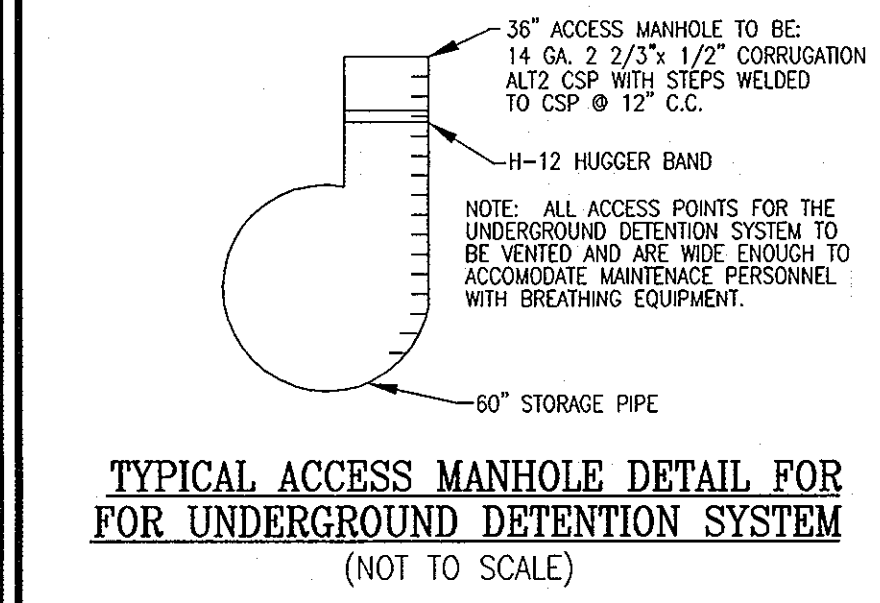
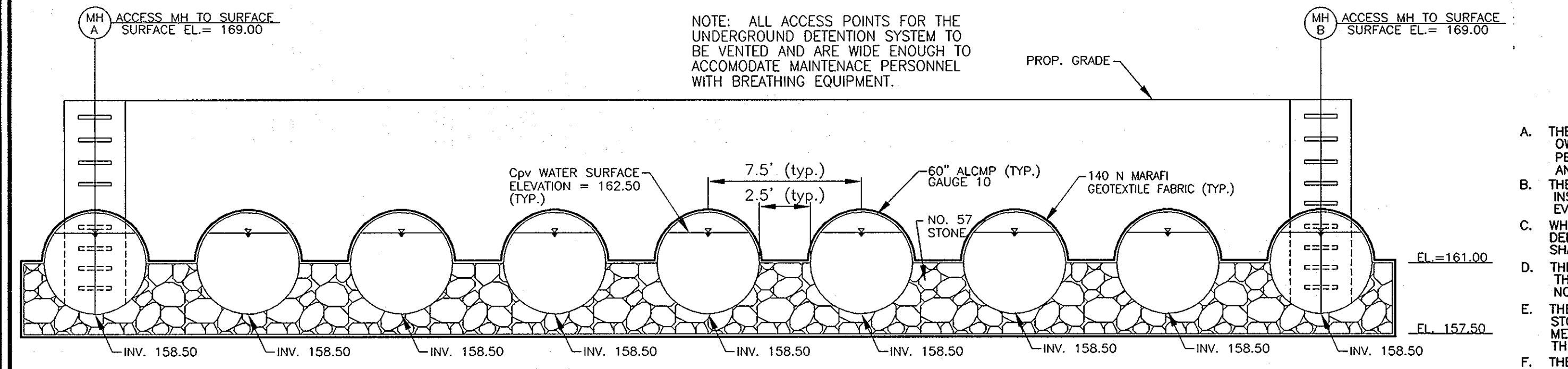
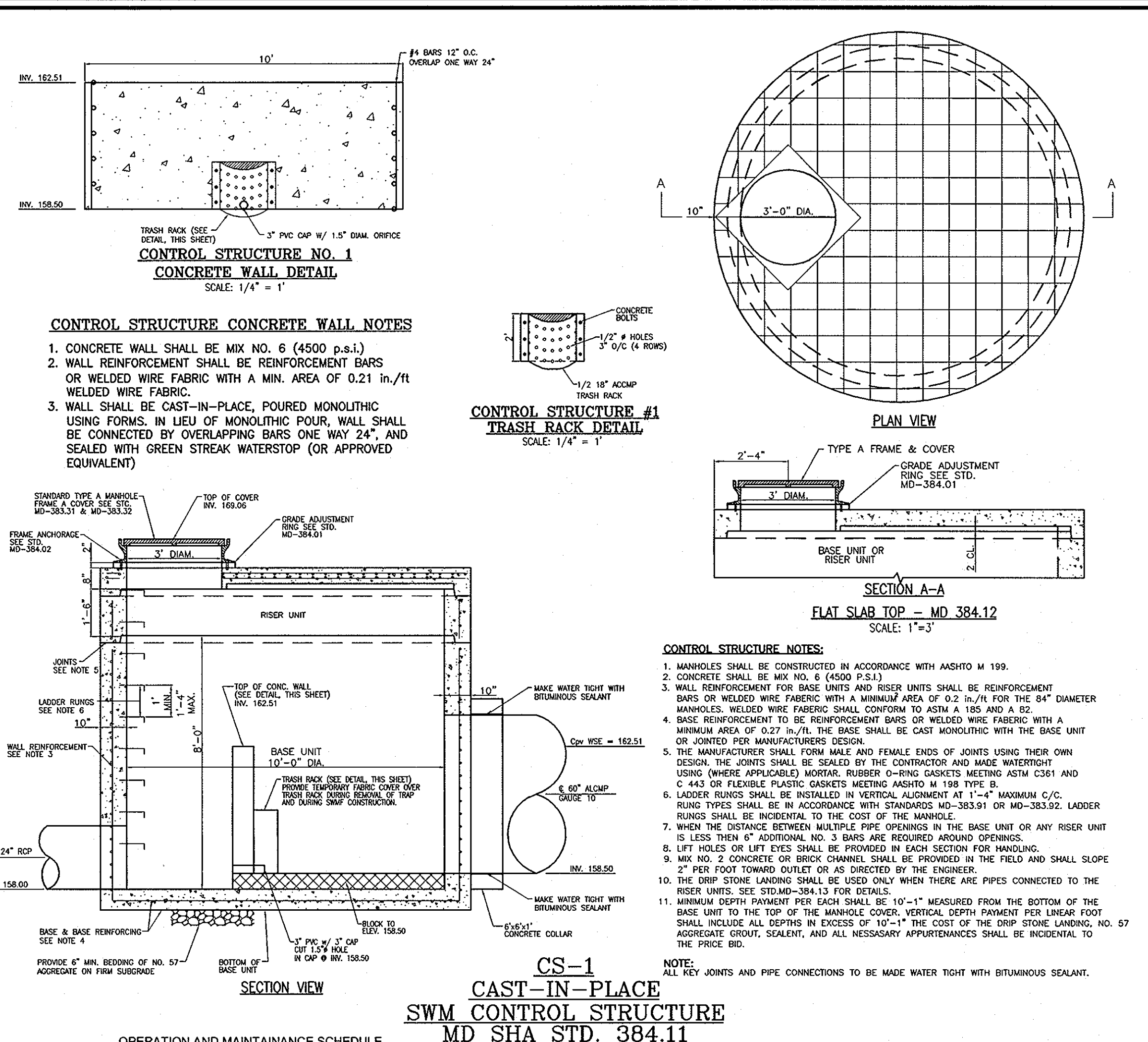
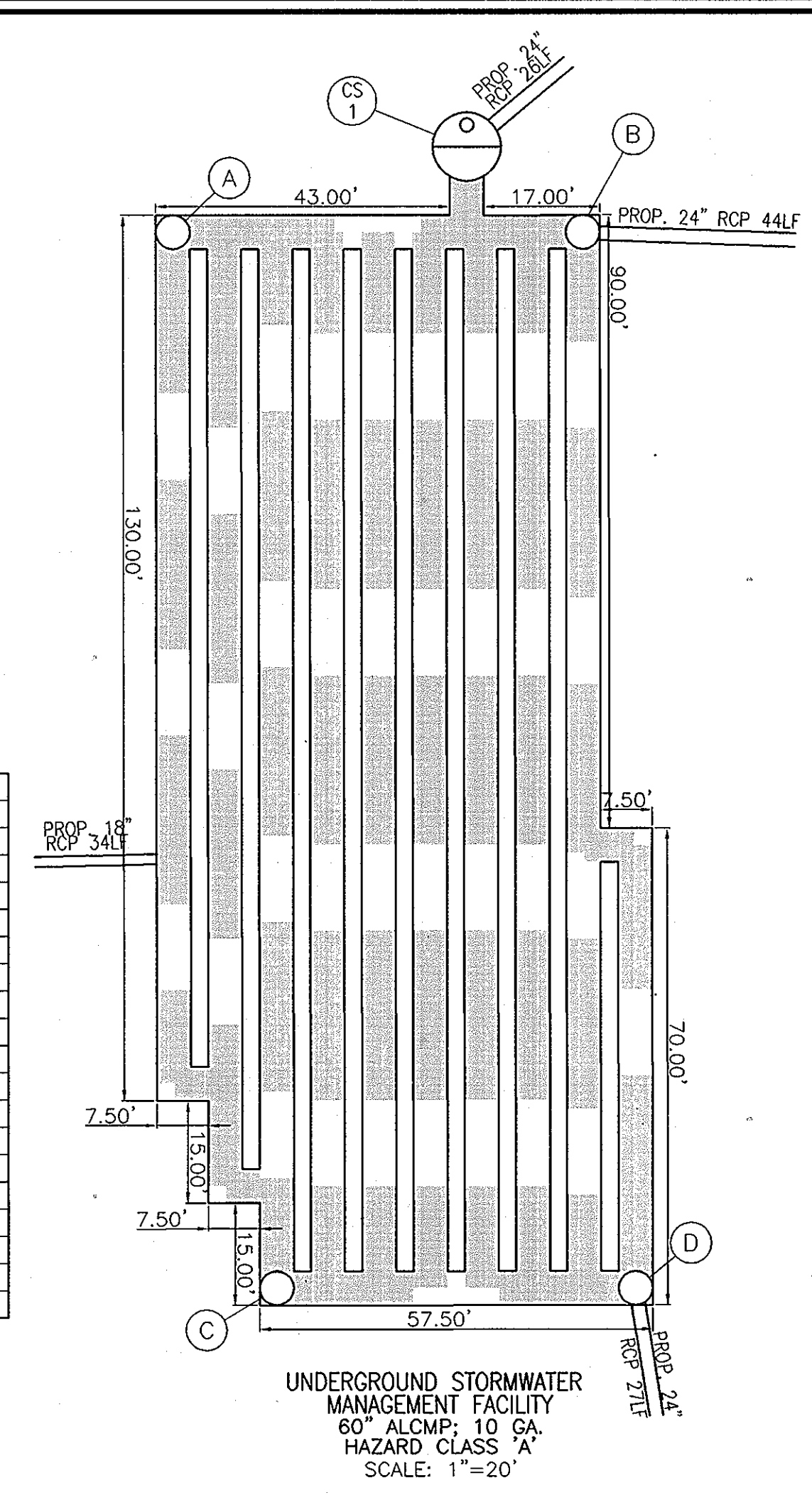
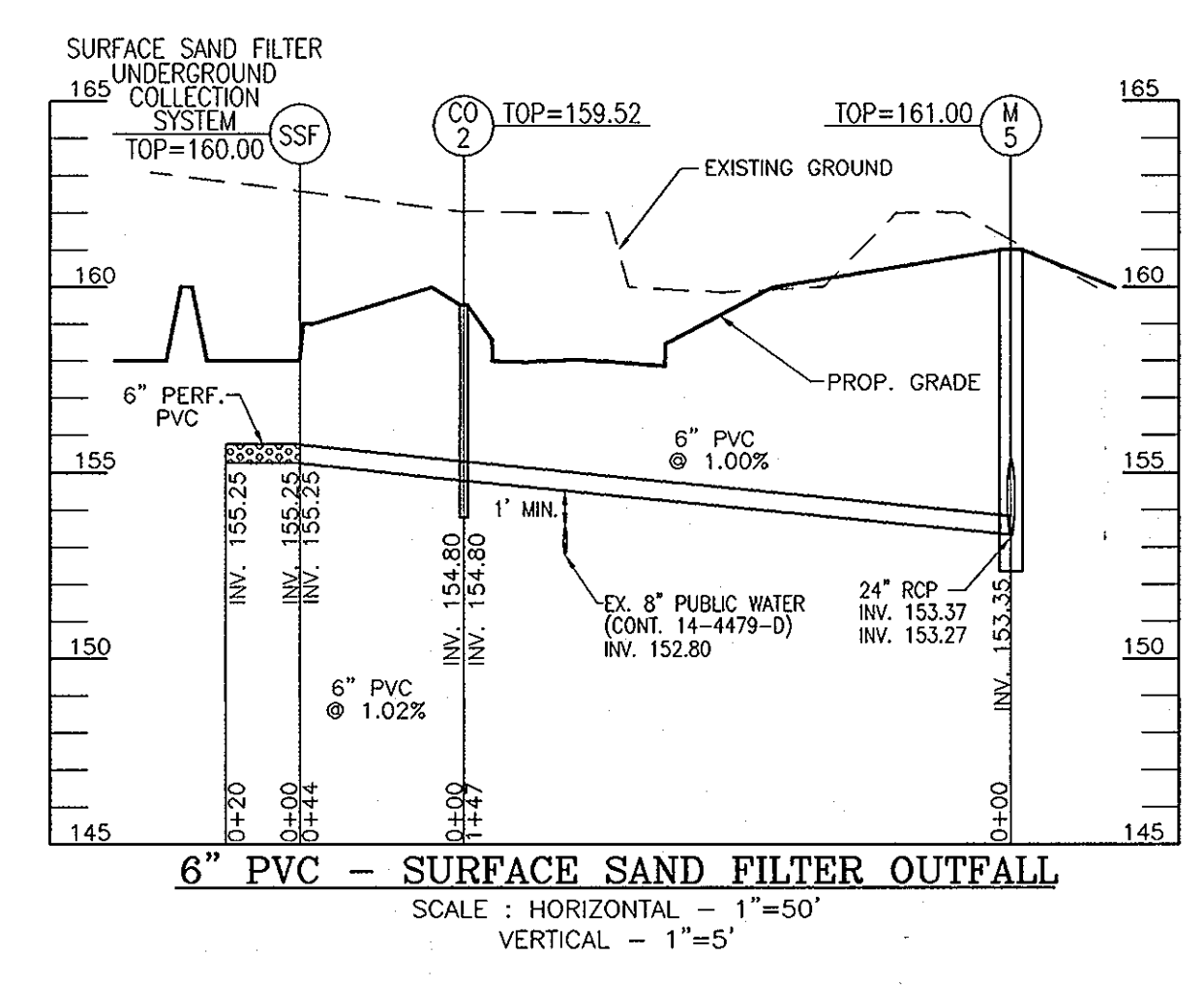
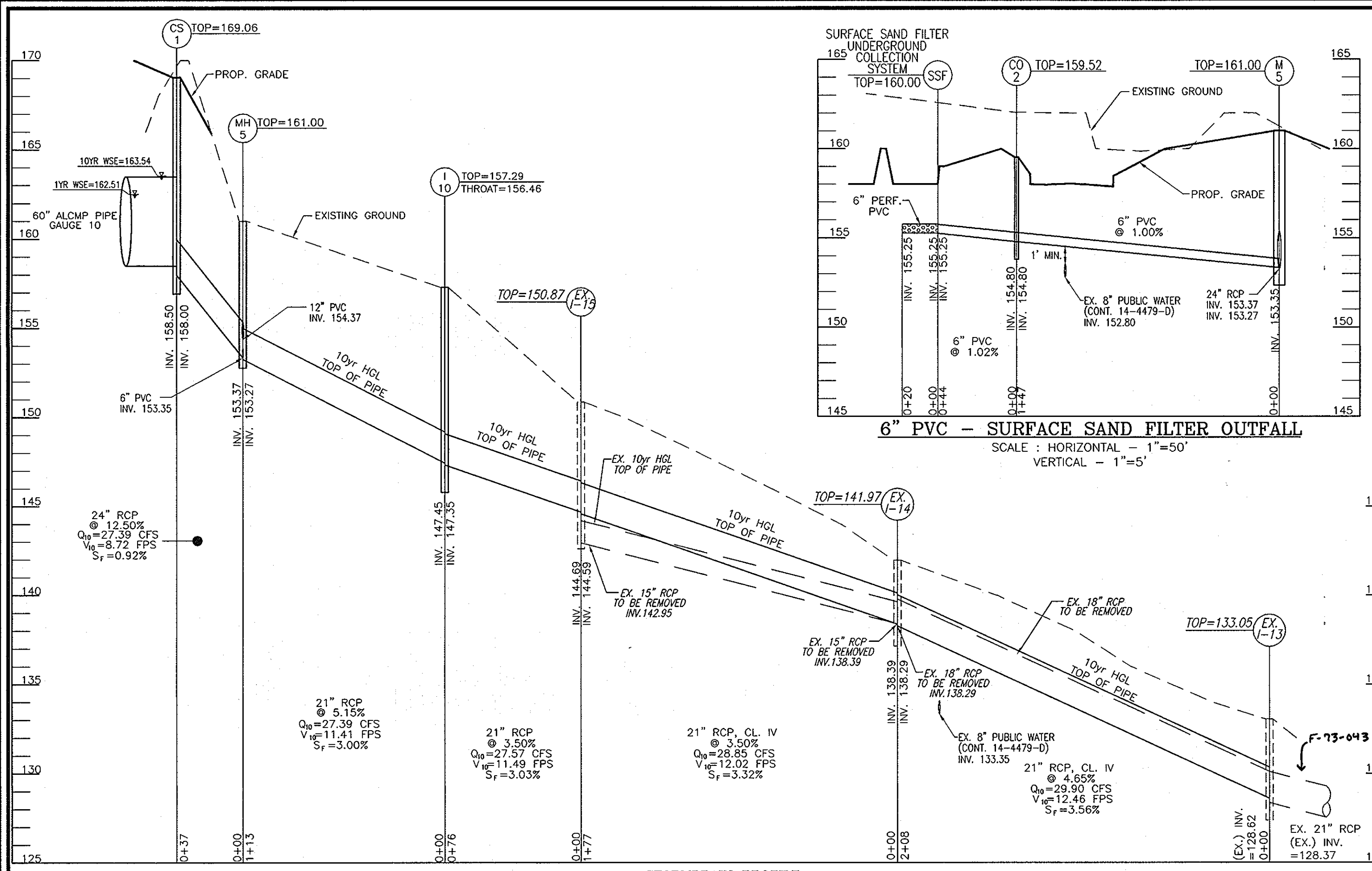
I, David McCall, CERTIFY THAT THIS DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR EROSION AND SEDIMENT CONTROL AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM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

7/1/08

BY THE ENGINEER:

I, Robert H. Vogel, 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.

7/1/08



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

- A. 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.
- B. THE UNDERGROUND STORMWATER MANAGEMENT FACILITY SHALL BE INSPECTED YEARLY AT A MINIMUM AND AFTER ESPECIALLY SEVERE STORM EVENTS.
- C. WHEN SEDIMENT ACCUMULATION OF MORE THAN 2" IS OBSERVED OR ANY DEBRIS THAT MIGHT OBSTRUCT THE OUTFALL IS OBSERVED, THE FACILITY SHALL BE CLEANED.
- D. 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.
- E. 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.
- F. 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.

**NOTE: CONTRACTOR SHALL ENSURE THAT THE S.W.M. FACILITY IS WATER-TIGHT.**

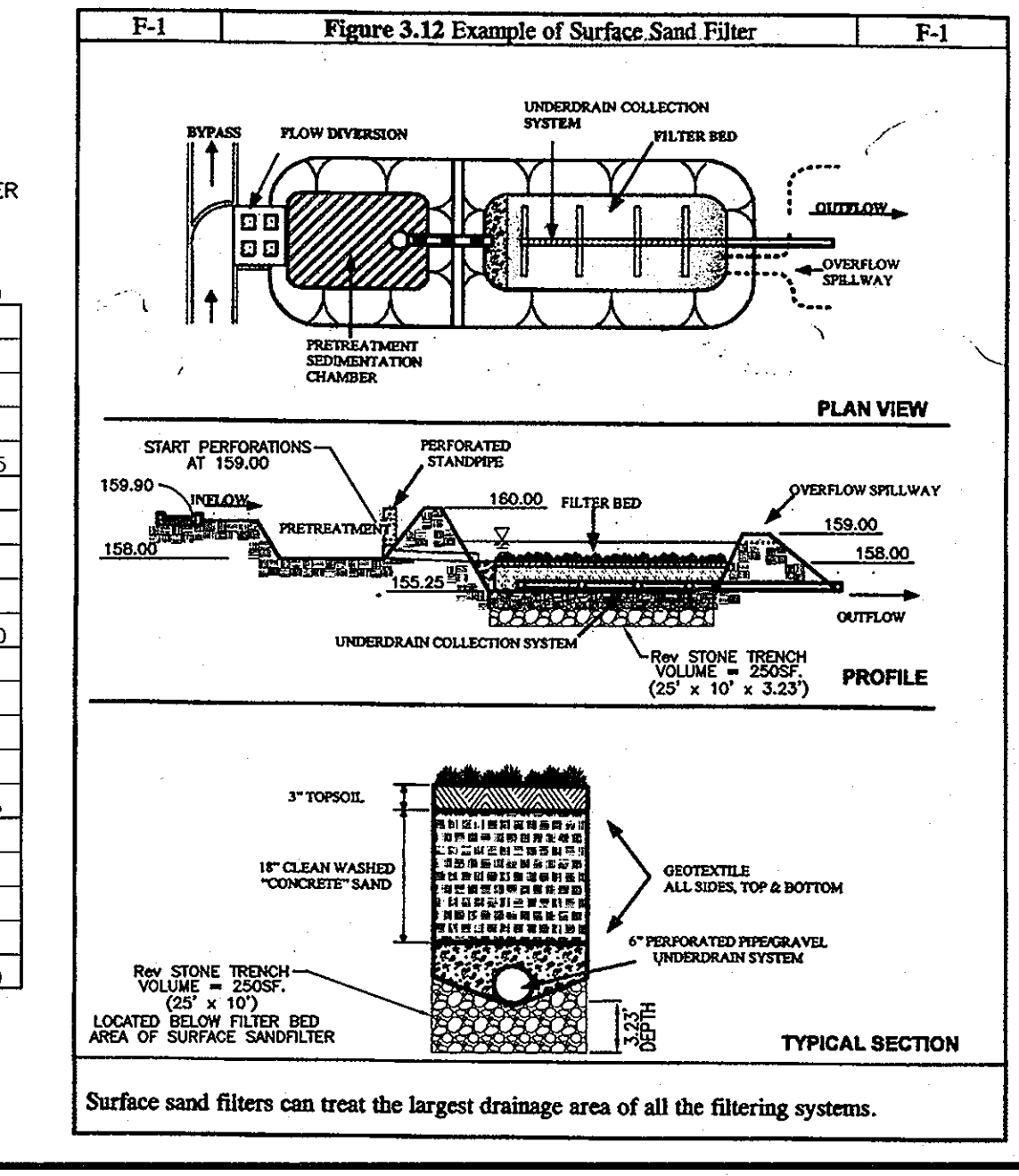
1. ALL PIPE CONNECTIONS AT STRUCTURES SHALL BE CEMENTED TO ENSURE WATER-TIGHT CONNECTION.
2. ALL ALCMP PIPE JOINTS SHALL USE 12" WIDE HUGGER BAND WITH "O" RING GASKETS.
3. TEES AND ELBOWS TO BE FACTORY FABRICATED WELDS, ONE PIECE.
4. TRENCH BEDDING TO BE IN ACCORDANCE WITH RECOMMENDATIONS FROM THE GEOTECHNICAL ENGINEER IN THE FIELD.
5. PROVIDE WATER-TIGHT JOINTS AT ALL PIPE CONNECTIONS. (FOR REINFORCED CONCRETE PIPE, ASTM C-361, RUBBER GASKET PIPE).

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SURFACE STORMWATER FILTRATION SYSTEMS (F-1, F-4, AND F-5)**

1. THE STORMWATER WETLAND FACILITY 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 TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF ONCE PER YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
3. FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED A MINIMUM OF THREE (3) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
4. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
5. VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
6. REMOVE SILT WHEN IT EXCEEDS FOUR (4) INCHES DEEP IN THE FOREBAY.
7. WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
8. A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
9. THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
10. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

**STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED**

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 7/2/08

CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 5/5/08

DIRECTOR  
DATE: 5/8/08

BY THE DEVELOPER:

DATE: 7/10/08

BY THE ENGINEER:

DATE: 7/7/08

**SITE DEVELOPMENT PLAN**  
**STORMWATER MANAGEMENT DETAILS**  
**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

PARCEL E-2  
HOWARD COUNTY, MARYLAND

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

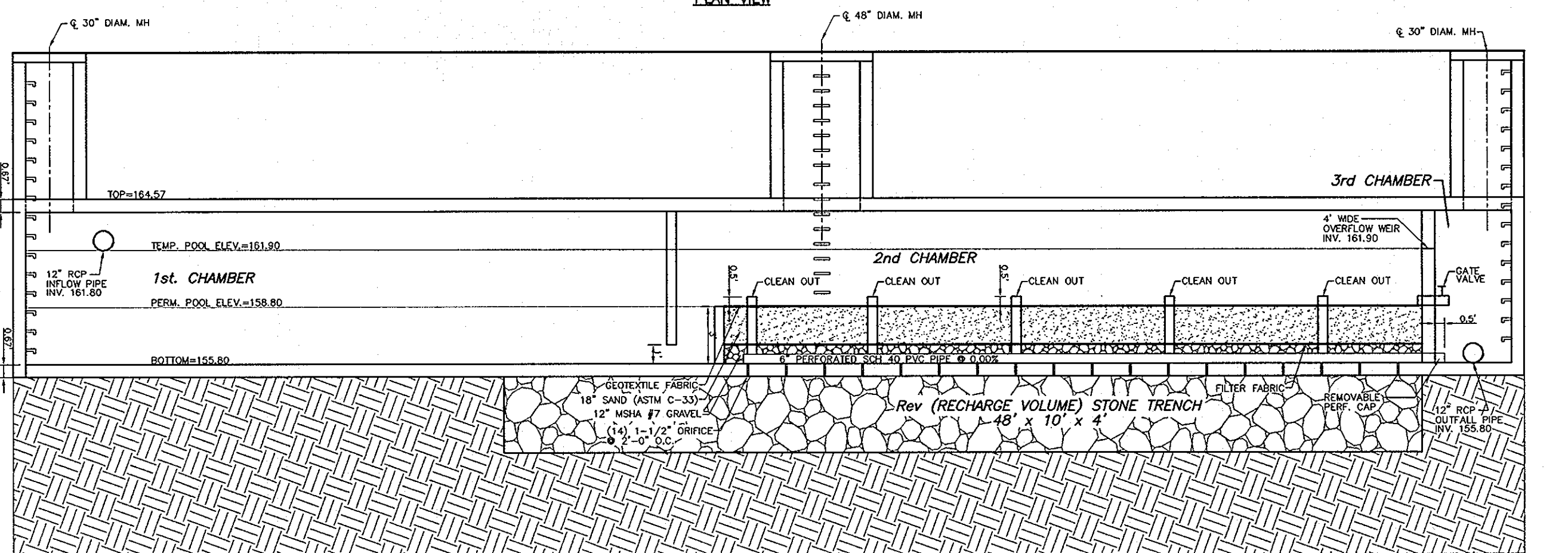
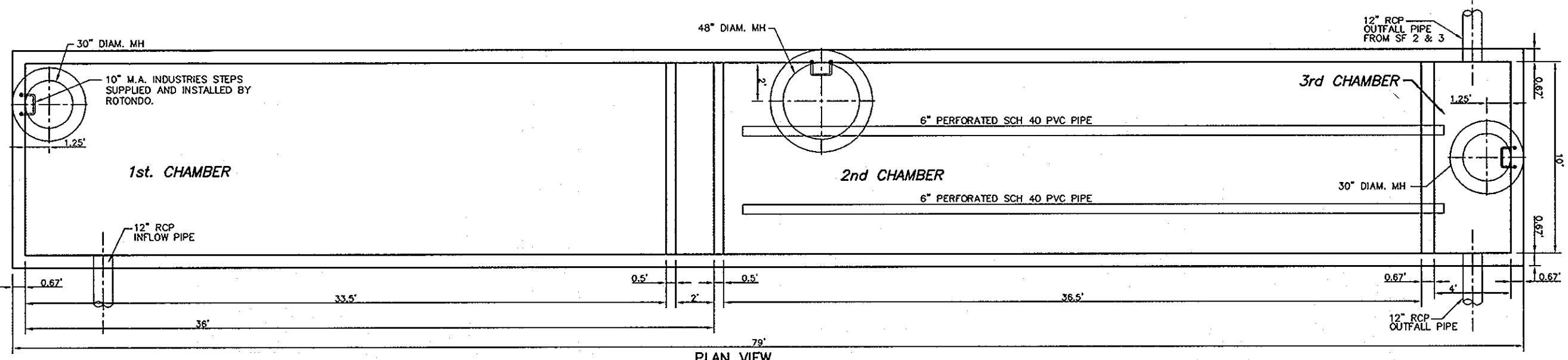
PROFESSIONAL CERTIFICATE

DESIGN BY: \_\_\_\_\_ DZ.  
DRAWN BY: \_\_\_\_\_ DZ.  
CHECKED BY: \_\_\_\_\_ RHV.  
DATE: JULY 2008  
SCALE: AS SHOWN  
W.O. NO.: 05-10

1. 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: 06-27-2008

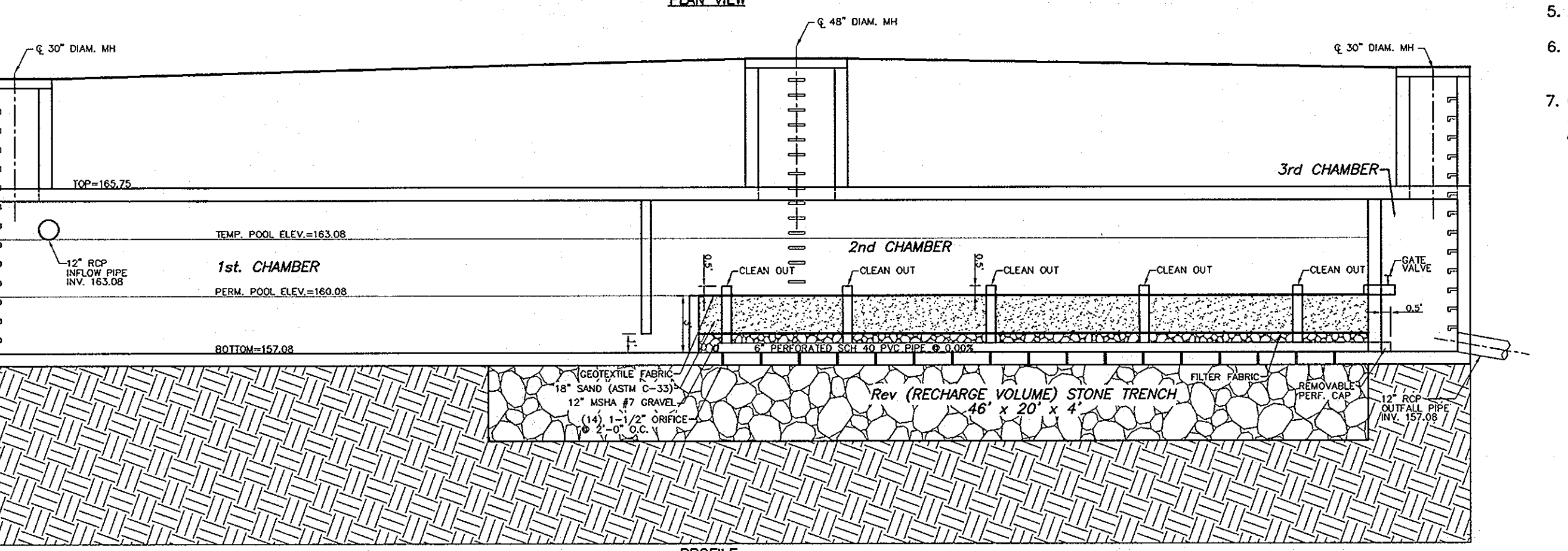
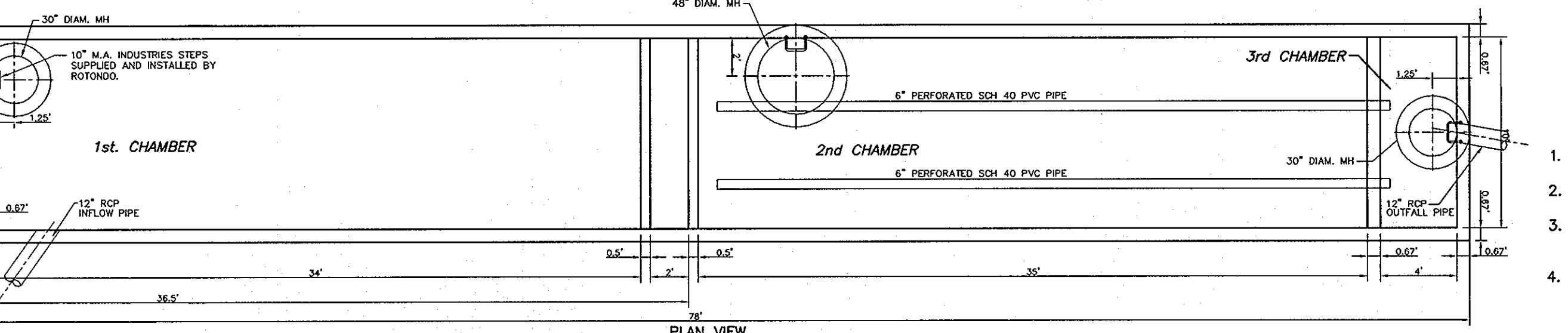
7 SHEET OF 12

SDP-07-094



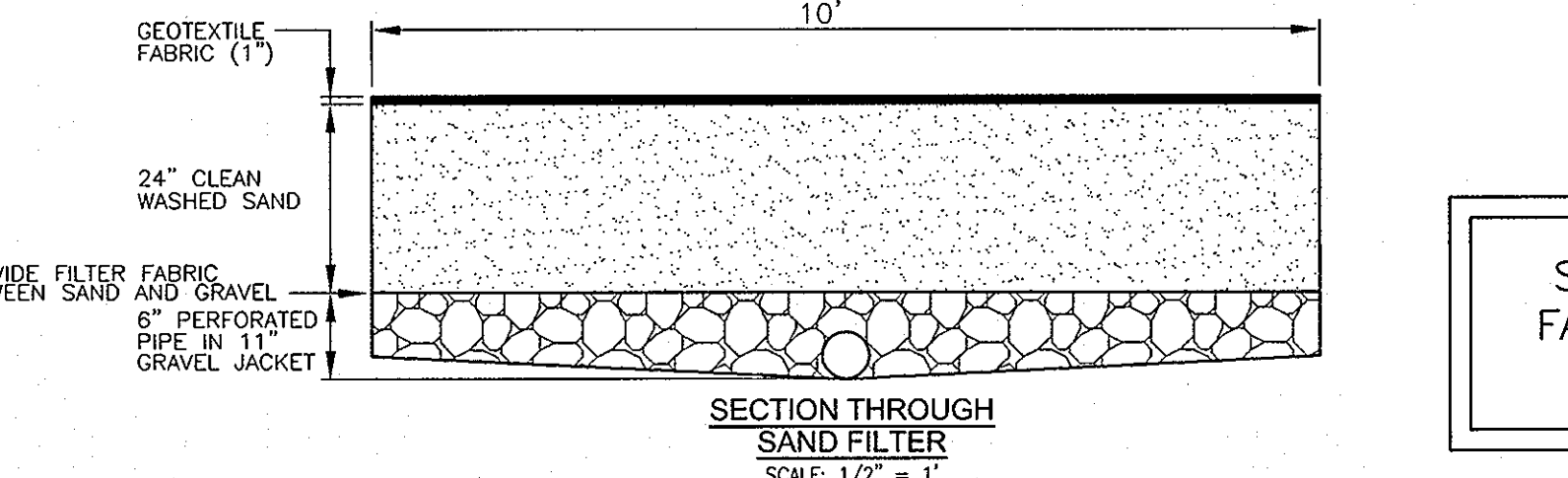
PROFILE PRECAST SANDFILTER 1  
SCALE: 1"=6'

NOTE: PRE-CAST SANDFILTERS MUST BE ENGINEERED AND CERTIFIED PRIOR TO CONSTRUCTION



PROFILE PRECAST SANDFILTERS 2 & 3  
SCALE: 1"=6'

NOTE: PRE-CAST SANDFILTERS MUST BE ENGINEERED AND CERTIFIED PRIOR TO CONSTRUCTION



SECTION THROUGH SAND FILTER  
SCALE: 1/2" = 1'

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED UNDERGROUND STORMWATER FILTRATION SYSTEM (E-2)

1. THE SEDIMENT CHAMBER OUTLET DEVICES SHALL BE CLEANED AND/OR REPAIRED WHEN DRAW-DOWN TIMES WITHIN THE CHAMBER EXCEED 36 HOURS.
2. DEBRIS AND LITTER SHALL BE REMOVED AS NECESSARY TO ENSURE PROPER OPERATION OF THE SYSTEM.
3. SEDIMENT SHALL BE CLEANED OUT OF THE SEDIMENTATION CHAMBER WHEN IT ACCUMULATES TO A DEPTH OF 6 INCHES. VEGETATION WITHIN THE SEDIMENT CHAMBER SHALL BE LIMITED TO A HEIGHT OF 18 INCHES.
4. WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
5. A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
6. THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO ENSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
7. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

STONE OUTLET SEDIMENT BASIN

PROPOSED D.A. =	4.25 AC.
STORAGE REQUIRED =	15300 CF.
STORAGE PROVIDED =	55412 CF.
WET STORAGE =	7650 CF.
DRY STORAGE =	7650 CF.
1 YR STORAGE (ABOVE DRY STORAGE) =	40112
DRY STORAGE ELEV. =	162.02
1 YR STORAGE ELEV. =	165.98
WET STORAGE EL. =	160.40
VOLUME AT DEWATERING ELEV. =	7650 CF.
WEIR WIDTH =	3825 CF.
TOP OF DAM =	167.00
BOTTOM DIM. =	25'x85'
BOTTOM OF EL. =	158.00
WEIR CREST EL. =	166.00
TOTAL STORAGE DEPTH =	4'-8"
SIDE SLOPES =	2:1 & 3:1
C/O EL. =	161.20

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED

SUMMARY TABLE AREA A (SITE)

SP#1	REQUIREMENT	VOLUME REQUIREMENT (W/O CREDITS)	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WOV	0.48 AC.FT.	FOREST CONSERVATION EASEMENT CREDITS	0.368 AC-F.T.	0.368 AC-F.T PROVIDED IN SAND FILTERS
2	RECHARGE VOLUME REV	1.09 AC.	N/A	N/A	REV IS PROVIDED BELOW SAND FILTERS
3	CHANNEL PROTECTION VOLUME CVF	0.46	N/A	0.46	UNDERGROUND SWM FACILITY
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	EXTREME FLOOD VOLUME, Q10P
5		N/A	N/A	N/A	

B.3.A SAND FILTER SPECIFICATIONS

1. MATERIAL SPECIFICATIONS FOR SAND FILTERS  
THE ALLOWABLE MATERIALS FOR SAND FILTER CONSTRUCTIONS ARE DETAILED IN TABLE B.3.1.
2. SAND FILTER TESTING SPECIFICATIONS  
UNDERGROUND SAND FILTERS, FACILITIES WITHIN SENSITIVE GROUNDWATER AQUIFERS, AND FILTERS DESIGNED TO SERVE URBAN HOT SPOTS ARE TO BE TESTED FOR WATER TIGHTNESS PRIOR TO PLACEMENT OF FILTER MEDIA. ENTRANCES AND EXITS SHOULD BE PLUGGED AND THE SYSTEM COMPLETELY FILLED WITH WATER TO DEMONSTRATE WATER TIGHTNESS. WATER TIGHTNESS MEANS NO LEAKAGE FOR A PERIOD OF 8 HOURS.  
ALL OVERFLOW WEIRS, MULTIPLE ORIFICES AND FLOW DISTRIBUTE SLOTS ARE TO BE FIELD-TESTED TO VERIFY ADEQUATE DISTRIBUTION OF FLOWS.
3. SAND FILTER CONSTRUCTION SPECIFICATIONS  
PROVIDE SUFFICIENT MAINTENANCE ACCESS (I.E., 12-FOOT-WIDE ROAD WITH LEGALLY RECORDED EASEMENT). VEGETATED ACCESS SLOPES ARE TO BE A MAXIMUM OF 10%; GRAVEL SLOPES TO 15%; PAVED SLOPES TO 25%.  
ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED.  
SURFACE OF FILTER BED IS TO BE LEVEL.  
ALL UNDERGROUND SAND FILTERS SHOULD BE CLEARLY DELINEATED WITH SIGNS SO THAT THEY MAY BE LOCATED WHEN MAINTENANCE IS DUE.  
SURFACE SAND FILTERS MAY BE PLANTED WITH APPROPRIATE GRASSES; SEE APPENDIX A.  
"POCKET" SAND FILTERS (AND RESIDENTIAL BIOTREATMENT FACILITIES TREATING AREAS LARGER THAN AN ACRE) SHALL BE SIZED WITH AN UNDERGROUND AND BELOW GRADE STRUCTURES. MANHOLES SHALL BE IN COMPLIANCE WITH STANDARD SPECIFICATIONS FOR EACH COUNTY BUT DIAMETERS SHOULD BE 30" MINIMUM (TO COMPLY WITH OSHA CONFINED SPACE REQUIREMENTS). ALUMINUM AND STEEL LOUVERED DOORS ARE ALSO ACCEPTABLE. TEN INCH WIDE (MINIMUM) MANHOLE STEPS (12" O.C.) SHALL BE CAST IN PLACE OR DRILLED AND MORTARED INTO THE WALL BELOW EACH MANHOLE. A 5" MINIMUM HEIGHT CLEARANCE (FROM THE TOP OF THE SAND LAYER TO THE BOTTOM OF THE UPPER/SURFACE SLAB) IS REQUIRED FOR ALL PERMANENT UNDERGROUND STRUCTURES. LIFT RINGS ARE TO BE SUPPLIED TO REMOVE/REPLACE TOP SLABS ON PRE-FABRICATED STRUCTURES. MANHOLE COVERS SHOULD ALLOW FOR PROPER VENTILATION.  
UNDERGROUND SAND FILTERS SHOULD BE CONSTRUCTED WITH AGATE VALVE LOCATED JUST ABOVE THE FILTER BED FOR DEWATERING IN THE EVENT THAT CLOGGING OCCURS.  
UNDERGROUND SAND BEDS SHALL BE PROTECTED FROM TRASH ACCUMULATION BY A WIDE MESH GEOTEXTILE SCREEN TO BE PLACED ON THE SURFACE OF THE SAND BED. SCREEN IS TO BE ROLLED UP, REMOVED, CLEANED AND RE-INSTALLED DURING MAINTENANCE OPERATIONS.
4. SPECIFICATIONS PERTAINING TO UNDERGROUND SAND FILTERS (F-2)  
PROVIDE MANHOLE AND/OR GRATES TO ALL UNDERGROUND AND BELOW GRADE STRUCTURES. MANHOLES SHALL BE IN COMPLIANCE WITH STANDARD SPECIFICATIONS FOR EACH COUNTY, BUT DIAMETERS SHOULD BE 30" MINIMUM (TO COMPLY WITH OSHA CONFINED SPACE REQUIREMENTS). ALUMINUM AND STEEL LOUVERED DOORS ARE ALSO ACCEPTABLE. TEN INCH WIDE (MINIMUM) MANHOLE STEPS (12" O.C.) SHALL BE CAST IN PLACE OR DRILLED AND MORTARED INTO THE WALL BELOW EACH MANHOLE. A 5" MINIMUM HEIGHT CLEARANCE (FROM THE TOP OF THE SAND LAYER TO THE BOTTOM OF THE UPPER/SURFACE SLAB) IS REQUIRED FOR ALL PERMANENT UNDERGROUND STRUCTURES. LIFT RINGS ARE TO BE SUPPLIED TO REMOVE/REPLACE TOP SLABS ON PRE-FABRICATED STRUCTURES. MANHOLE COVERS SHOULD ALLOW FOR PROPER VENTILATION.

MATERIALS SPECIFICATIONS FOR BIO-RETENTION

MATERIAL	SPECIFICATION	SIZE	NOTES
SAND	CLEAN MASHO-M-6 OR ASTM-C-33 CONCRETE SAND	0.075" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DUNGE AND GRANISTONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR ORGANIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK BUT" CAN BE USED FOR SAND.
PEAT	ASH CONTENT: < 10% PH NUMBER: 5.2 TO 4.0 LOOSE BULK DENSITY 0.12 TO 0.15 g/cc	N/A	THE MATERIAL MUST BE REE-SEDE HEMIC PEAT, SHREDED, UNCOMPACTED, UNFROZEN, AND CLEAN.
LEAF COMPOST		N/A	
UNDERGROUND GRAVEL	MASHO M-43	0.375" TO 0.75"	
GEOTEXTILE FABRIC (IF REQUIRED)	ASTM-D-4833 (PUNCTURE STRENGTH - 125 LB) (TENSILE STRENGTH - 300 LB) ASTM-D-4832 (TENSILE STRENGTH - 150 LB/FT) (WATER ABSORPTION - 4% TO 24% MASS)	0.06" THICK (IF REQUIRED) CLASS C 30 MIL THICKNESS	MUST MAINTAIN 125 GPM PER SQ. FT. FLOW RATE. NOTE: A 4" PEEL GRAVEL LAYER MUST BE DISTRIBUTED FOR GEOTEXTILES MEANT TO "SEPARATE" SAND FILTER LAYERS. LINER TO BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHOULD BE USED TO PROTECT THE LINER FROM FRACTURE.
UNDERGROUND PIPING	F 750, TYPE PS 28 OOR MASHO M-270	4" TO 6" BIDD SCHEDULE 40 PVC OR 304S	3/8" PERF. @ 6" O.C. 4 HOLES PER RING. MAX. OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERGROUND PIPES
CONCRETE (CAST-IN-PLACE)	MSHA STANDARDS AND SPECS SECTION 802, MIN. NO. 3, FC=3500psi NORMAL WEIGHT, AIR-ENTRANCED, RE-REINFORCING TO MEET ASTM-A113-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONCRETE REQUIRED: 28 DAY STRENGTH AND SLUMP TEST. ALL CONCRETE DESIGN (CAST-IN-PLACE OR PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND
CONCRETE (PRE-CAST)	PER PRE-CAST MANUFACTURER	N/A	SEE ABOVE NOTE
NON-BEARING STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM-A-123

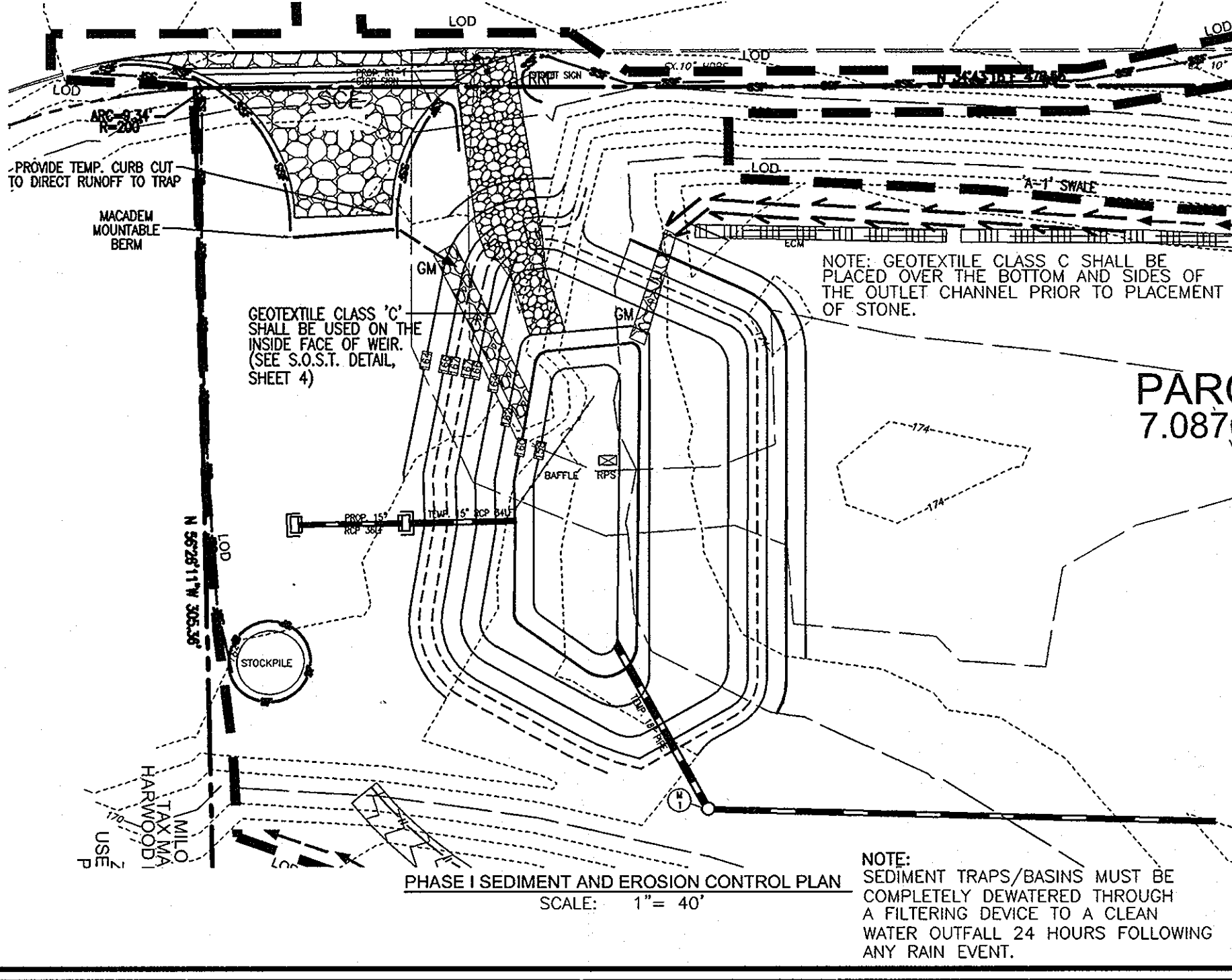
OWNER/PETITIONER  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

REVIEWED FOR HOWARD S.C.D. & MEETS TECHNICAL REQUIREMENTS.  
USDA-NATURAL RESOURCES CONSERVATION SERVICE  
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
DATE: 7/1/08  
HOWARD S.C.D.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 7/2/08  
DATE: 8/5/08  
DATE: 8/3/08

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.  
DATE: 7/1/08

BY THE ENGINEER:  
I/WE 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: 7/1/08



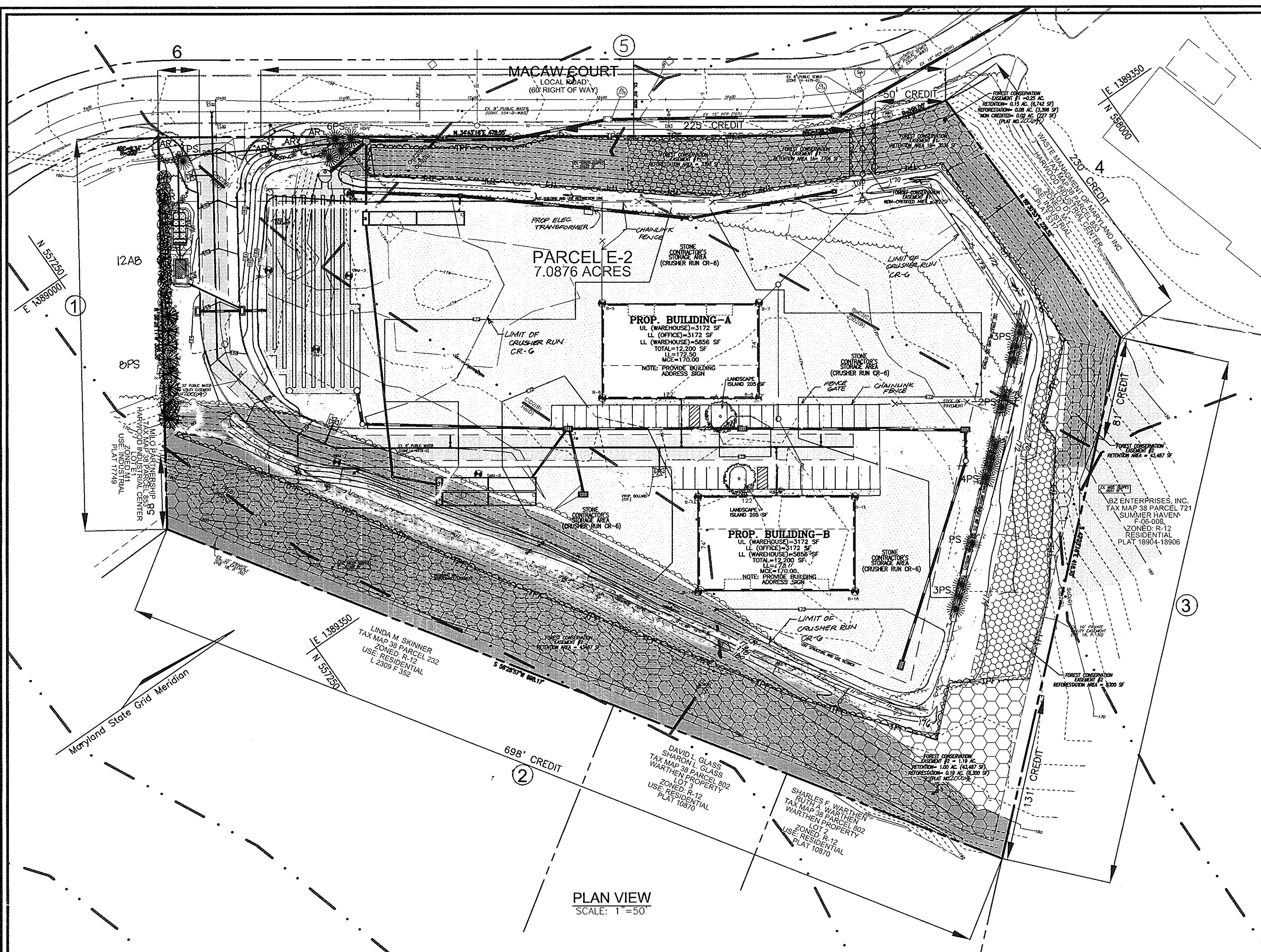
NO.	REVISION	DATE

SITE DEVELOPMENT PLAN  
STORMWATER MANAGEMENT  
DETAILS, STORM DRAIN PROFILES;  
PHASE I SEDIMENT AND EROSION CONTROL PLAN  
HARWOOD INDUSTRIAL CENTER  
PARCEL E-2  
TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND

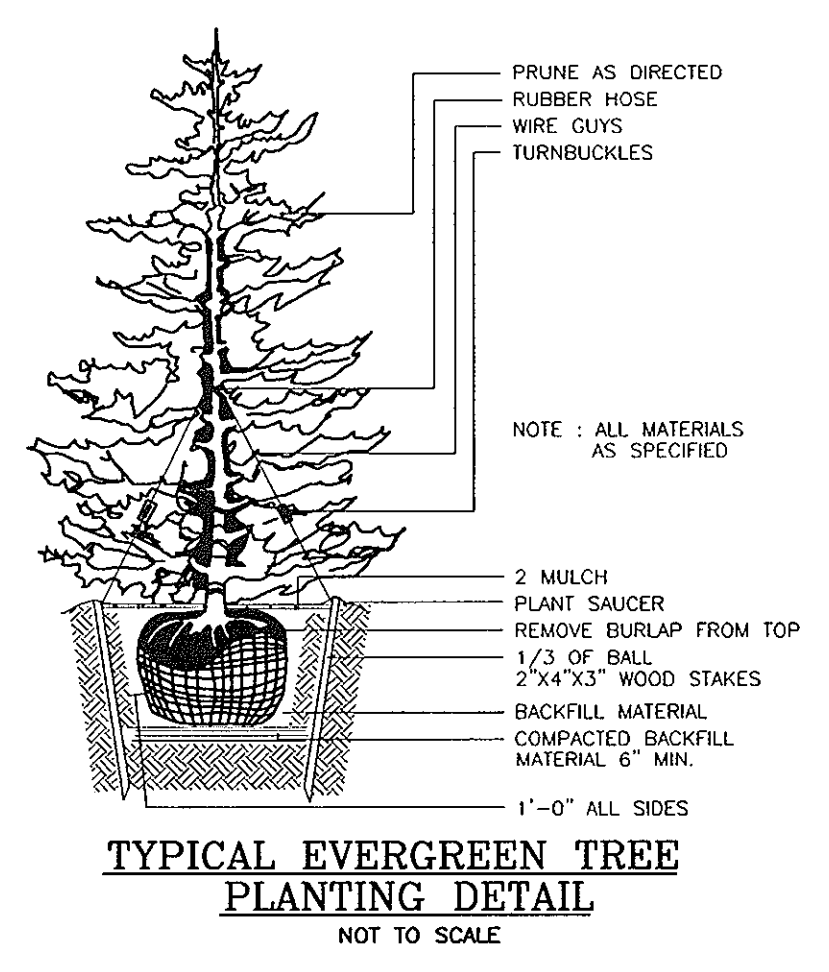
ROBERT H. VOGEL ENGINEERING, INC.  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET  
ELLCOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.8961

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2008  
DESIGN BY: DZ  
DRAWN BY: DZ  
CHECKED BY: RHY  
DATE: JULY 2008  
SCALE: AS SHOWN  
W.O. NO.: 05-10  
8 SHEET OF 12





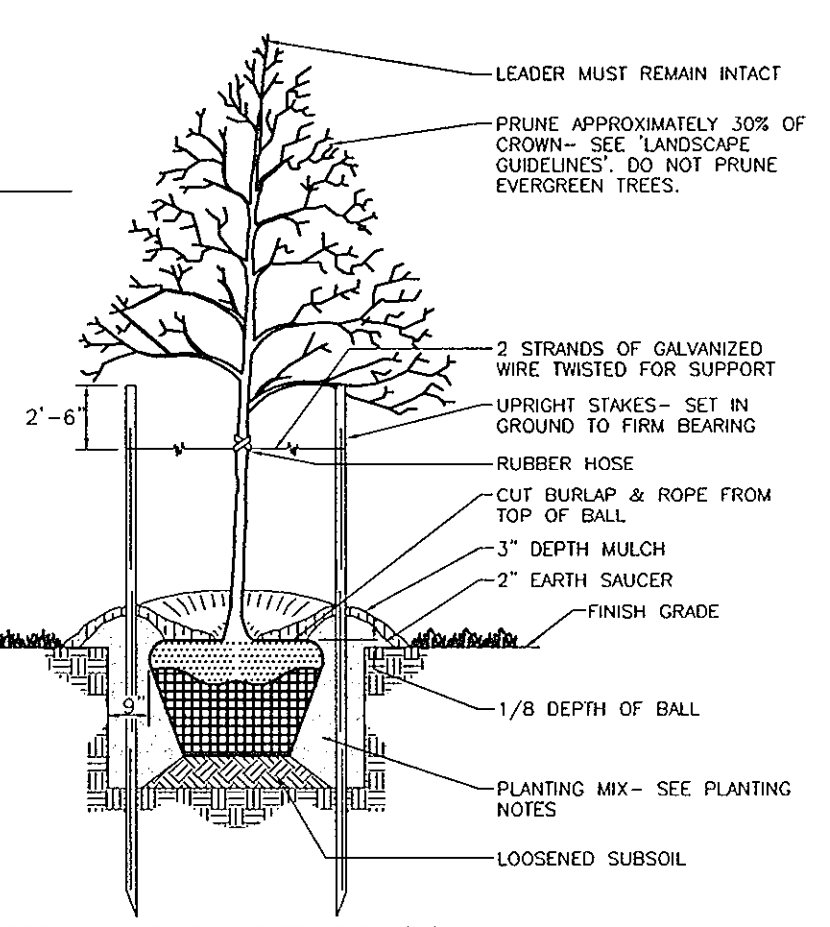
PLAN VIEW  
SCALE: 1"=50'



TYPICAL EVERGREEN TREE PLANTING DETAIL  
NOT TO SCALE

NOTES

- SEE "LANDSCAPE SPECIFICATION GUIDELINES FOR BALTIMORE-WASHINGTON METROPOLITAN AREAS" FOR ALL MATERIAL, PRODUCT, AND PROCEDURE SPECIFICATIONS.
- SEE "LANDSCAPE GUIDELINES" FOR SUPPORTING TREES LARGER THAN 2-1/2" CALIPER.
- PLACE UPRIGHT STAKES PARALLEL TO WALKS & BUILDINGS.
- KEEP MULCH 1" FROM TRUNK.
- SEE ARCHITECTURAL PLANS FOR ADDITIONAL PLANTINGS WHICH EXCEED HOWARD COUNTY MINIMUM REQUIREMENTS.
- TREES ARE NOT TO BE PLANTED OVER PRIVATE SEWAGE EASEMENT.



TREE PLANTING AND STAKING  
DECIDUOUS TREES UP TO 2-1/2" CALIPER  
NOT TO SCALE

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- PROPOSED UTILITY POLE
- EXISTING LIGHT POLE
- PROPOSED LIGHT POLE
- EXISTING MAILBOX
- PROPOSED MAILBOX
- EXISTING SIGN
- PROPOSED SIGN
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING SANITARY LINE
- PROPOSED SANITARY LINE
- EXISTING CLEANOUT
- PROPOSED CLEANOUT
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING FENCE
- PROPOSED FENCE
- PROPERTY LINE
- PROPOSED PROPERTY LINE
- RIGHT-OF-WAY LINE
- PROPOSED RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- PROPOSED SIDEWALK
- PROPOSED LIGHT POLE
- PROPOSED SHADE TREE
- PROPOSED EVERGREEN TREE
- PROPOSED SHRUBS
- LANDSCAPE PERIMETER
- STEEP SLOPES (>25% SLOPES)
- MID SLOPES (15%-25% SLOPES)
- WATER EASEMENT
- STORAGE AREA (CRUSHER RUN CR-6)
- FOREST CONSERVATION EASEMENT REFORESTATION AREA
- FOREST CONSERVATION EASEMENT FOREST RETENTION AREA
- FOREST CONSERVATION EASEMENT NON-CREDITED AREA

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED

SCHEDULE B PARKING LOT INTERNAL LANDSCAPING	
Number of parking spaces	35
Number of trees required	2
Number of trees provided	2
Shade Trees	-
Other Trees (2:1 Substitution)	-

LANDSCAPE SCHEDULE				
KEY	QUAN.	BOTANICAL NAME	SIZE	CAT
AR	7	ACER RUBRUM	2 1/2"-3" CAL.	B & B
AB	12	ARJUNIA VITAE EMERALD GREEN	Ø HT.	B & B
PS	25	PRINUS STROBUS EASTERN WHITE PINE	6'-8" HT.	B & B

SOILS LEGEND		
SYMBOL	NAME / DESCRIPTION	GROUP
BeC3	BELTSVILLE SILT LOAM, 5 TO 10% SLOPES, SEVERELY ERODED.	C
CID2	CHILLUM GRAVELLY LOAM, 10 TO 15% SLOPES, MODERATELY ERODED.	D
H4	HATBORO SILT LOAM	D
CmC2	CHILLUM SILT LOAM, 5 TO 10 % SLOPES, MODERATELY ERODED	B
ScD	SANDY AND CLAYEY LAND, MODERATELY SLOPING	C

NOTE: BASED ON HOWARD SOIL SURVEY

SCHEDULE A PERIMETER LANDSCAPE EDGE									
CATEGORY	ADJACENT TO PERIMETER AND ROADWAYS							ADJACENT TO DRIVEWAY	TOTAL
	1	2	3	4	5	6	7		
Perimeter/Frontage Designation	1	2	3	4	5	6	7		
Landscape Type	A	C	C	A	B	B	D		
Linear Feet of Roadway	305	698	417	230	516	32	34		2232
Frontage/Perimeter									
Credit for Existing Vegetation (Yes, No, Linear Feet Describe below if needed)	58	698	212	230	275	NO	NO		1473
Credit for Wall, Fence or Berm (Yes, No, Linear Feet Describe below if needed)	NO	NO	NO	NO	NO	NO	NO		-
Number of Plants Required									
Shade Trees	1:60	4	1:40	5	1:60	0	1:60	1	15
Evergreen Trees	-	1:20	0	1:20	10	-	1:40	1	17
Shrubs	-	-	-	-	-	-	-	-	-
Number of Plants Provided									
Shade Trees	1	0	0	0	0	0	1	1	5
Evergreen Trees	-	0	0	0	0	0	1	3	5
Other Trees (2:1 Substitution)	20	-	-	-	-	-	-	-	22
Shrubs (10:1 Substitution)	-	-	-	-	-	-	-	-	-
Describe Plant Substitution Credits Below, if needed									

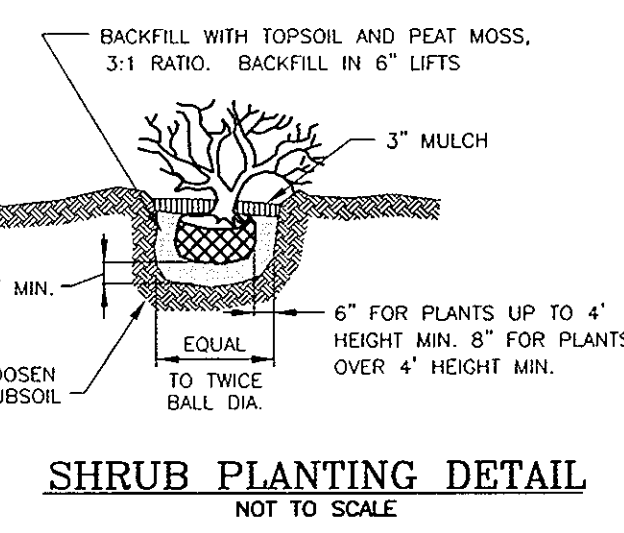
\*4 EVERGREENS SUBSTITUTED FOR 8 SHADE TREES IN PERIMETER 1 (4 EVERGREENS FROM PS & PS)  
 \*\*4 SHADE TREES ALLOCATED TO P1 AS 6 EVERGREEN TREES FROM PS, AND REMAINING 1 SHADE  
 SUBSTITUTED WITH 2 EVERGREENS IN PS  
 \*\*\* 2 SHADES AND 2 EVERGREEN TREES ALLOCATED TO P1 AS 6 EVERGREENS FROM PS

LANDSCAPE SCHEDULE NOTE:

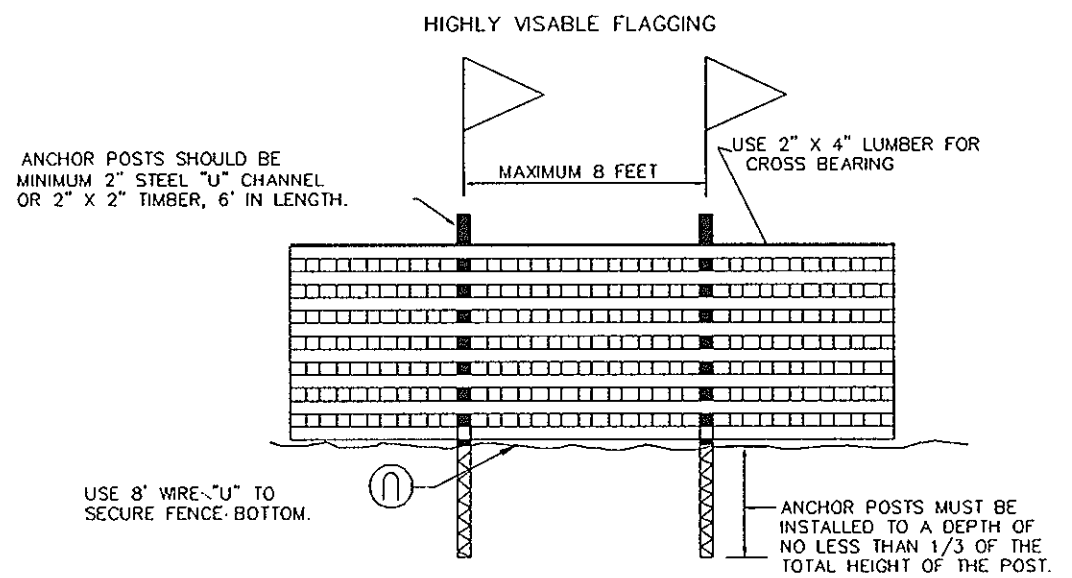
- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HRD PLANTING SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
- FINAL LOCATION OF PLANT MATERIAL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

GENERAL NOTES:

- 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.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$8,400.00 FOR THE REQUIRED 18 SHADE TREES, 20 EVERGREEN TREES AND 0 SHRUBS.



SHRUB PLANTING DETAIL  
NOT TO SCALE



BLAZE ORANGE PLASTIC MESH  
TYPICAL TREE PROTECTION FENCE DETAIL  
NO SCALE

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.

*Dwight Caswell* 7/108  
SIGNATURE OF DEVELOPER DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 7/208  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*[Signature]* 8/8/08  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE  
*[Signature]* 8/8/08  
DIRECTOR DATE

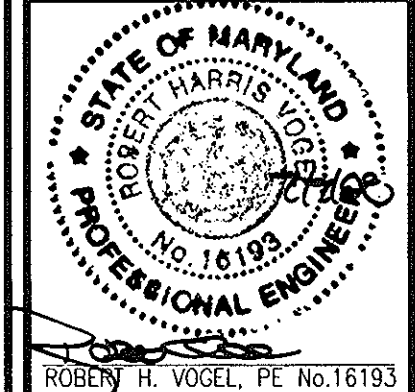
OWNER/PETITIONER  
 MIDDLE PATUXENT PROPERTIES, LLC.  
 12421 HOOPER COURT  
 FULTON, MARYLAND 20759-9645  
 240-372-9038

NO.	REVISION	DATE
1	REVISE PARKING LAYOUT AND ADD SMALL WALL AT SAND FILTER	5/20/08
	REVISE TO SHOW AS-BUILT CONDITIONS/REMOVE RETAINING WALL	

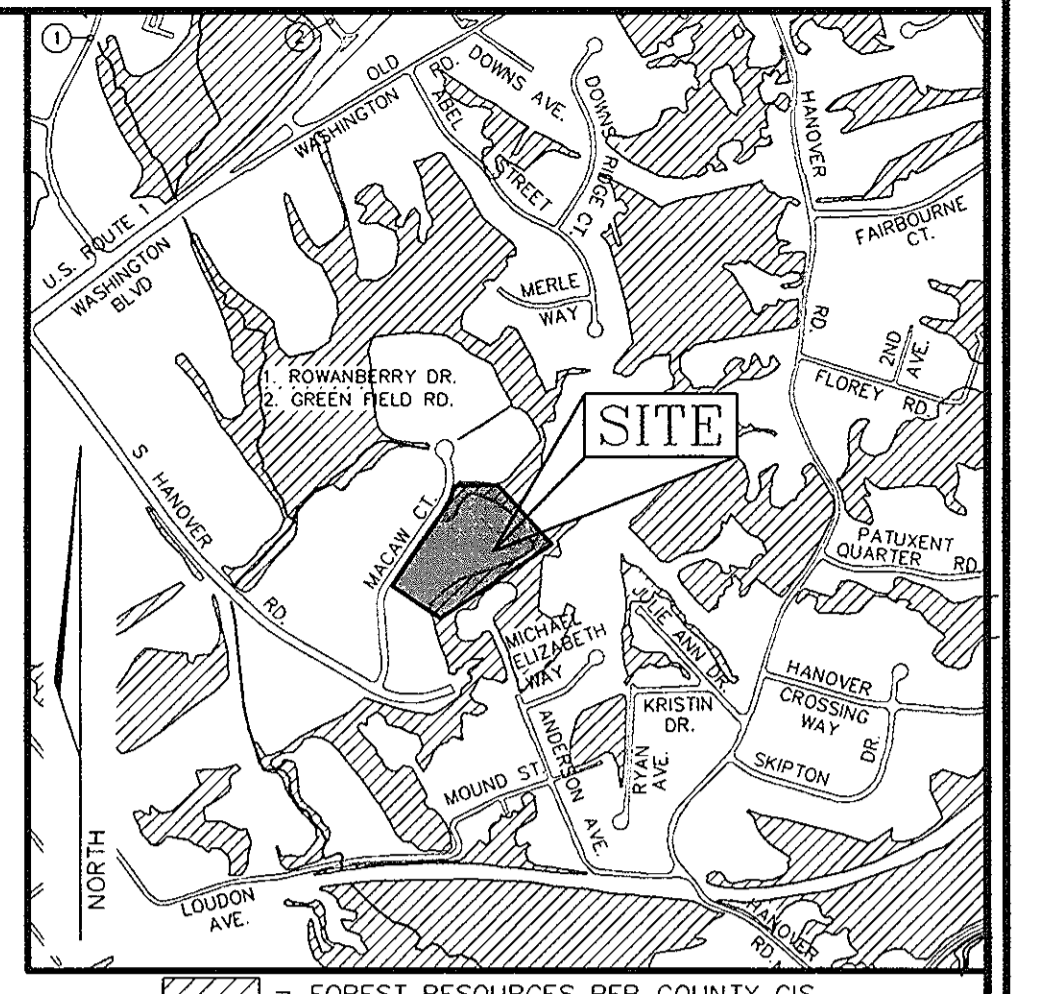
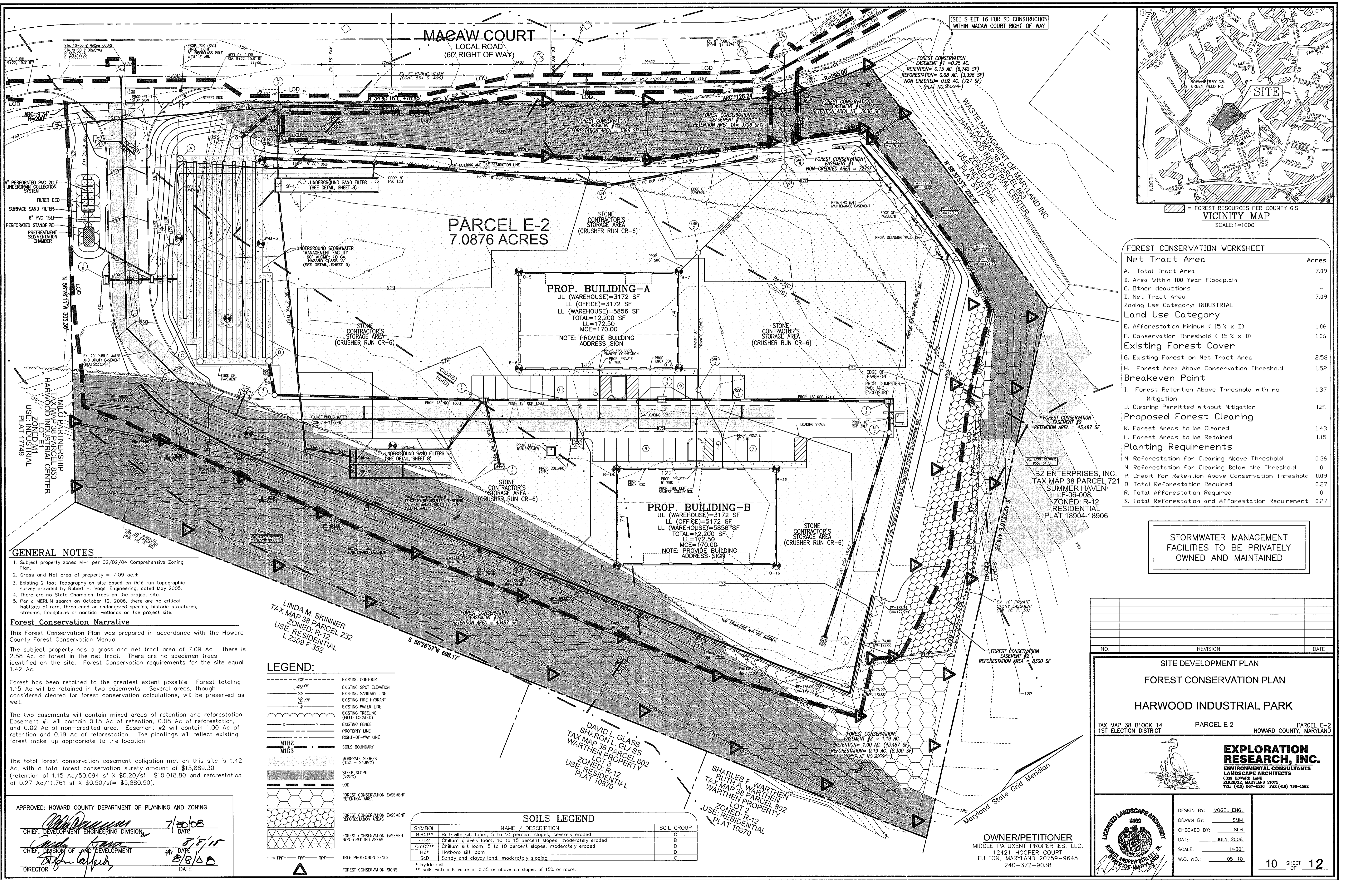
SITE DEVELOPMENT PLAN  
 SITE LANDSCAPE PLAN

HARWOOD INDUSTRIAL CENTER  
 PARCEL E-2  
 TAX MAP 38 BLOCK 14  
 1ST ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND

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



PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 05-27-2008  
 DESIGN BY: DZ  
 DRAWN BY: DZ  
 CHECKED BY: RHV  
 DATE: JULY 2008  
 SCALE: AS SHOWN  
 W.O. NO.: 05-10  
 9 SHEET OF 12



**FOREST CONSERVATION WORKSHEET**

Item	Acres
<b>Net Tract Area</b>	
A. Total Tract Area	7.09
B. Area Within 100 Year Floodplain	-
C. Other deductions	-
D. Net Tract Area	7.09
<b>Land Use Category</b>	
E. Afforestation Minimum (15% x D)	1.06
F. Conservation Threshold (15% x D)	1.06
<b>Existing Forest Cover</b>	
G. Existing Forest on Net Tract Area	2.58
H. Forest Area Above Conservation Threshold	1.52
<b>Breakeven Point</b>	
I. Forest Retention Above Threshold with no Mitigation	1.37
J. Clearing Permitted without Mitigation	1.21
<b>Proposed Forest Clearing</b>	
K. Forest Areas to be Cleared	1.43
L. Forest Areas to be Retained	1.15
<b>Planting Requirements</b>	
M. Reforestation for Clearing Above Threshold	0.36
N. Reforestation for Clearing Below the Threshold	0
P. Credit for Retention Above Conservation Threshold	0.09
Q. Total Reforestation Required	0.27
R. Total Afforestation Required	0
S. Total Reforestation and Afforestation Requirement	0.27

STORMWATER MANAGEMENT FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED

**GENERAL NOTES**

- Subject property zoned M-1 per 02/02/04 Comprehensive Zoning Plan.
- Gross and Net area of property = 7.09 ac.±
- Existing 2 foot Topography on site based on field run topographic survey provided by Robert H. Vogel Engineering, dated May 2005.
- There are no State Champion Trees on the project site.
- Per a MERLIN search on October 12, 2006, there are no critical habitats of rare, threatened or endangered species, historic structures, streams, floodplains or nontidal wetlands on the project site.

**Forest Conservation Narrative**

This Forest Conservation Plan was prepared in accordance with the Howard County Forest Conservation Manual.

The subject property has a gross and net tract area of 7.09 Ac. There is 2.58 Ac. of forest in the net tract. There are no specimen trees identified on the site. Forest Conservation requirements for the site equal 1.42 Ac.

Forest has been retained to the greatest extent possible. Forest totaling 1.15 Ac will be retained in two easements. Several areas, though considered cleared for forest conservation calculations, will be preserved as well.

The two easements will contain mixed areas of retention and reforestation. Easement #1 will contain 0.15 Ac of retention, 0.08 Ac of reforestation, and 0.02 Ac of non-credited area. Easement #2 will contain 1.00 Ac of retention and 0.19 Ac of reforestation. The plantings will reflect existing forest make-up appropriate to the location.

The total forest conservation easement obligation met on this site is 1.42 Ac, with a total forest conservation surety amount of \$15,889.30 (retention of 1.15 Ac / 50,094 sf x \$0.20/sf = \$10,018.80 and reforestation of 0.27 Ac / 11,761 sf x \$0.50/sf = \$5,889.30).

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION: *[Signature]* DATE: 7/30/08

CHIEF, DIVISION OF LAND DEVELOPMENT: *[Signature]* DATE: 8/5/08

DIRECTOR: *[Signature]* DATE: 8/8/08

**LEGEND:**

	EXISTING CONTOUR
	EXISTING SPOT ELEVATION
	EXISTING SANITARY LINE
	EXISTING FIRE HYDRANT
	EXISTING WATER LINE
	EXISTING TREE LINE (FIELD LOCATED)
	EXISTING FENCE
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	SOILS BOUNDARY
	SOILS BOUNDARY
	MODERATE SLOPES (15% - 24.99%)
	STEEP SLOPE (>25%)
	LOD
	FOREST CONSERVATION EASEMENT RETENTION AREA
	FOREST CONSERVATION EASEMENT REFORESTATION AREAS
	FOREST CONSERVATION EASEMENT NON-CREDITED AREAS
	TREE PROJECTION FENCE
	FOREST CONSERVATION SIGNS

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	SOIL GROUP
BcC3**	Beltville silt loam, 5 to 10 percent slopes, severely eroded	C
Cd2	Chillum gravelly loam, 10 to 15 percent slopes, moderately eroded	C
CmC2**	Chillum silt loam, 5 to 10 percent slopes, moderately eroded	B
Ha*	Hotboro silt loam	D
ScD	Sandy and clayey land, moderately sloping	C

\* hydric soil  
\*\* soils with a K value of 0.35 or above on slopes of 15% or more.

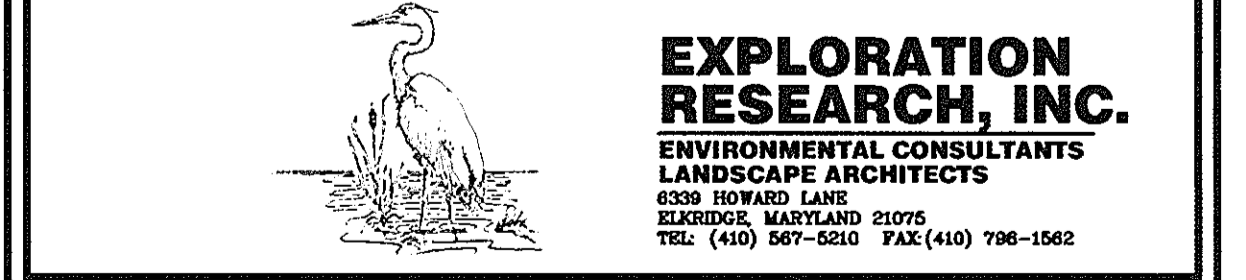
NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**

**FOREST CONSERVATION PLAN**

**HARWOOD INDUSTRIAL PARK**

TAX MAP 38 BLOCK 14 PARCEL E-2 HOWARD COUNTY, MARYLAND



DESIGN BY: VOGEL ENG.

CHECKED BY: SMH

DATE: JULY 2008

SCALE: 1"=30'

W.O. NO.: 05-10

10 SHEET OF 12

**OWNER/PETITIONER**

MIDDLE PATUXENT PROPERTIES, LLC.

12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

**Reforestation Area Planting Notes**

- Afforestation areas may be planted as soon as reasonable to do so. Late winter-early spring plantings are preferred. Earliest planting dates will vary from year to year but planting may generally begin as soon as the ground is no longer frozen. Alternate planting dates may be considered as conditions warrant.
- Soil amendments and fertilization recommendations will be made based upon the results of soil analysis for nitrogen, phosphorus, potassium, organic matter content and pH. If required, fertilizer will be provided using a slow release, soluble 16-8-16 analysis designed to last 5-8 years contained in polyethylene perforated bags such as manufactured by ADCO Works, P.O. Box 310 Hallings, N.Y. 11423 or approved equal.
- Plant materials shall be planted in accordance with the planting diagram, planting details and planting schedule.
- Plant stock must be protected from desiccation at all times prior to planting. Materials held for planting shall be moistened and placed in cool shaded areas until ready for placement.
- Planting materials shall be nursery grown and inspected prior to planting. Plants not conforming to the American Standards for Nursery Stock specifications for size, form, vigor, or roots, or due to trunk wounds, breakage, desiccation, insect or disease must be replaced.
- Newly planted trees may require watering at least once per week during the first growing season depending on rainfall in order to get established. The initial watering operation should allow for watering during installation to completely soak backfill materials.
- Mulch shall be applied in accordance with the diagram provided and shall consist of woodchips or shredded hardwood bark mulch, free of wood alcohol.
- Planting holes should be excavated to a minimum diameter of 2.5 to 3 times the diameter of the root ball or container. Mechanical angering is preferred with scarification of the sides of each hole.
- Site preparation for planting shall include moving of entire planting area, then banded tilling of 4 ft. wide bands spaced 11' o.c. and laid out in curvilinear rows. Stabilize disturbed areas with perennial rye after planting.

**Management Notes for Forest Retention Areas**

- All proposed activities shall adhere to the conditions, schedules and terms of an approved sediment control and erosion plan.
- After the boundaries of the retention area have been staked and flagged and before any disturbance has taken place on-site, a preconstruction meeting at the construction site shall take place. The developer, contractor or project manager, and appropriate County inspectors shall attend.
- Tree protection for all retained areas:
  - All retention areas within 50 feet of proposed construction activities shall be protected by highly visible, well anchored temporary protection devices (silt fence or blaze orange plastic mesh).
  - All protection devices shall be in place prior to any grading or land clearing.
  - All protection devices shall be properly maintained and shall remain in place until construction has ceased.
  - Attachment of signs, fencing or other objects to trees is prohibited.
  - No equipment, machinery, vehicles, materials or excessive pedestrian traffic shall be allowed within protected areas.
  - If the critical root zone (see detail) is affected by construction activities such as grade change, digging for foundations and roads or utility installation:
    - Prune roots with a clean cut using proper pruning equipment (see root pruning detail).
    - Water and fertilize as needed.
  - During construction phase, monitor and correct condition of retained trees for: soil compaction, root injury, flood conditions, drought conditions and other stress signs.
  - Post-Construction Phase:
    - Inspect existing trees around the perimeter of disturbed limits for evidence of soil compaction, root injury, limb injury, or other stress signs and correct with proper management techniques such as root or limb pruning, soil aeration, fertilization, crown reduction or watering. Inspection and evaluation shall be performed by a licensed arborist.
    - Inspect for dead or dying trees or limbs which may pose safety hazard and remove.
    - No burial of discarded materials will occur onsite within the conservation areas.
    - No burning within 100 feet of wooded area.
    - All temporary forest protection structures will be removed after construction. Temporary signage shall be replaced with permanent signage on posts in locations shown.
    - Following completion of construction, prior to use, the County inspector shall inspect the entire area.

**Soil Protection Zone Notes**

- The Soil Protection Zone shall include all areas contained inside the Limit of Disturbance.
- Where possible, the Soil Protection Zone shall extend to the drip line of specimen trees. For other groups of trees, the zone shall be the drip line or 40% of the height of the tree, whichever is greater.
- No construction activity is permitted within the Soil Protection Zone.
- If soil has been compacted or grading has taken place in the vicinity of the Soil Protection Zone, root pruning shall be implemented per Root Pruning detail, shown on this plan.
- Root pruning shall occur prior to the beginning of construction.
- Where the Soil Protection Zone must encroach inside the Critical Root Zone of a tree, soil disturbance shall be mitigated with vertical mulching, radial trenching, or another method approved by the ERI Forest Conservation Professional.
- Prior to construction, the Limits of Disturbance shall be marked and the ERI Professional shall determine which trees will need preventative treatment or removal.
- Tree maintenance and removal shall be undertaken by a qualified MD Tree Expert to ensure damage to surrounding trees is minimized.
- Brush and limbs removed for construction shall be chipped and spread at the edge of the Soil Protection Zone to a depth of 6 inches. This shall occur outside the Soil Protection Zone where compaction could impact otherwise unprotected Critical Root Zone.

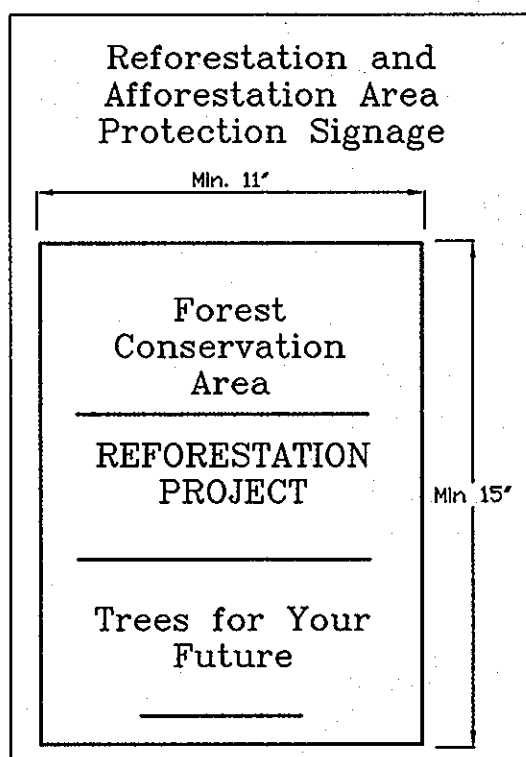
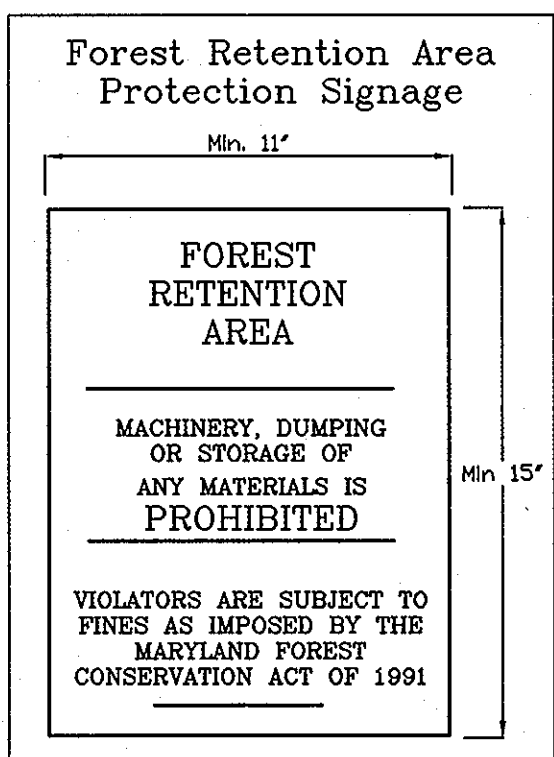
**Planting Area Monitoring Notes**

- Monthly visits during the first growing season are to assess the success of the plantings and to determine if supplemental watering, pest control, invasive plant control, mowing, deer protection or other actions are necessary. Early spring visits will document winter kill and autumn visits will document summer kill.
- The minimum survival rate shall be 75% of the total number of trees planted per acre at the end of the two year maintenance period. Wild tree seedlings from natural regeneration on the planting site may be counted up to 50% toward the total survival number if they are healthy native species at least 12 inches tall.
- Survival will be determined by a stratified random sampling of the plantings.
- Effective monitoring will assess plant survivability during the first growing season and make recommendations for reinforcement plantings if required at that time.
- A final inspection and certification by the ERI qualified professional is required after the second growing season.

**FOREST CONSERVATION EASEMENT TABLE**

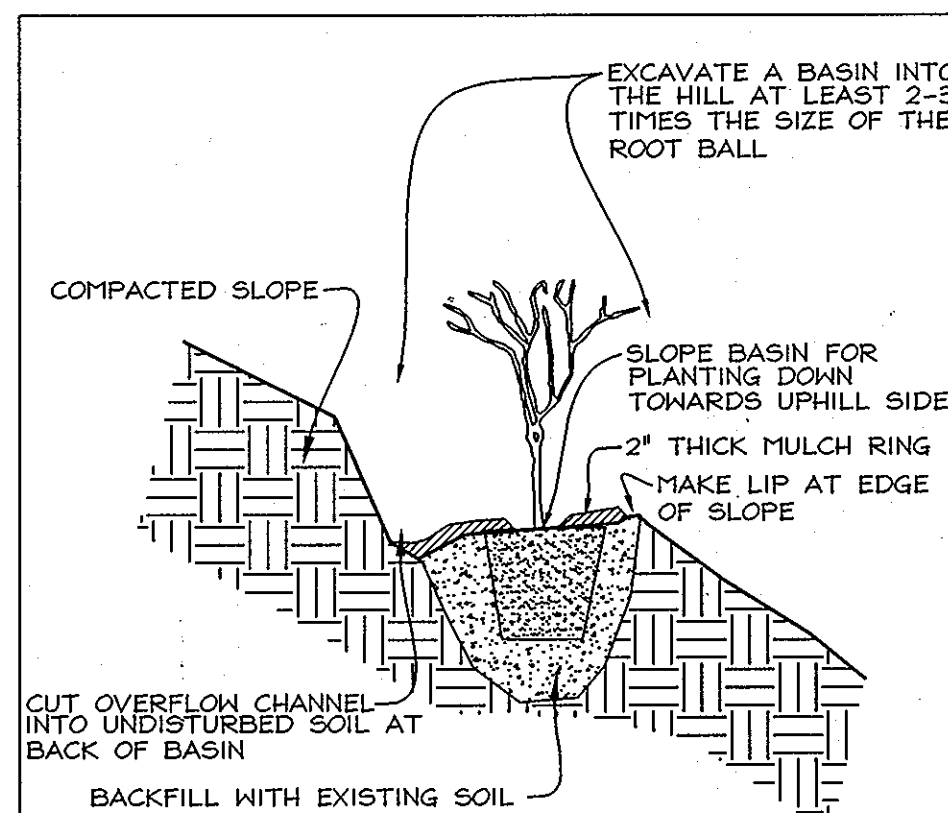
EASEMENT	TYPE	AREA (AC.)
1	Retention	0.15
	Reforestation Non-Credited	0.02
2	Retention	1.00
	Reforestation	0.19
TOTALS	Retention	1.15
	Reforestation Non-Credited	0.27
Total Easement Area		1.44

The forest conservation easements have been established to fulfill the requirements of Section 16.1200 of the Howard County Code and the Forest Conservation Manual. No clearing, grading or construction is permitted within the forest conservation easements, however, forest management practices as defined in the Deed of Forest Conservation Easement are allowed.



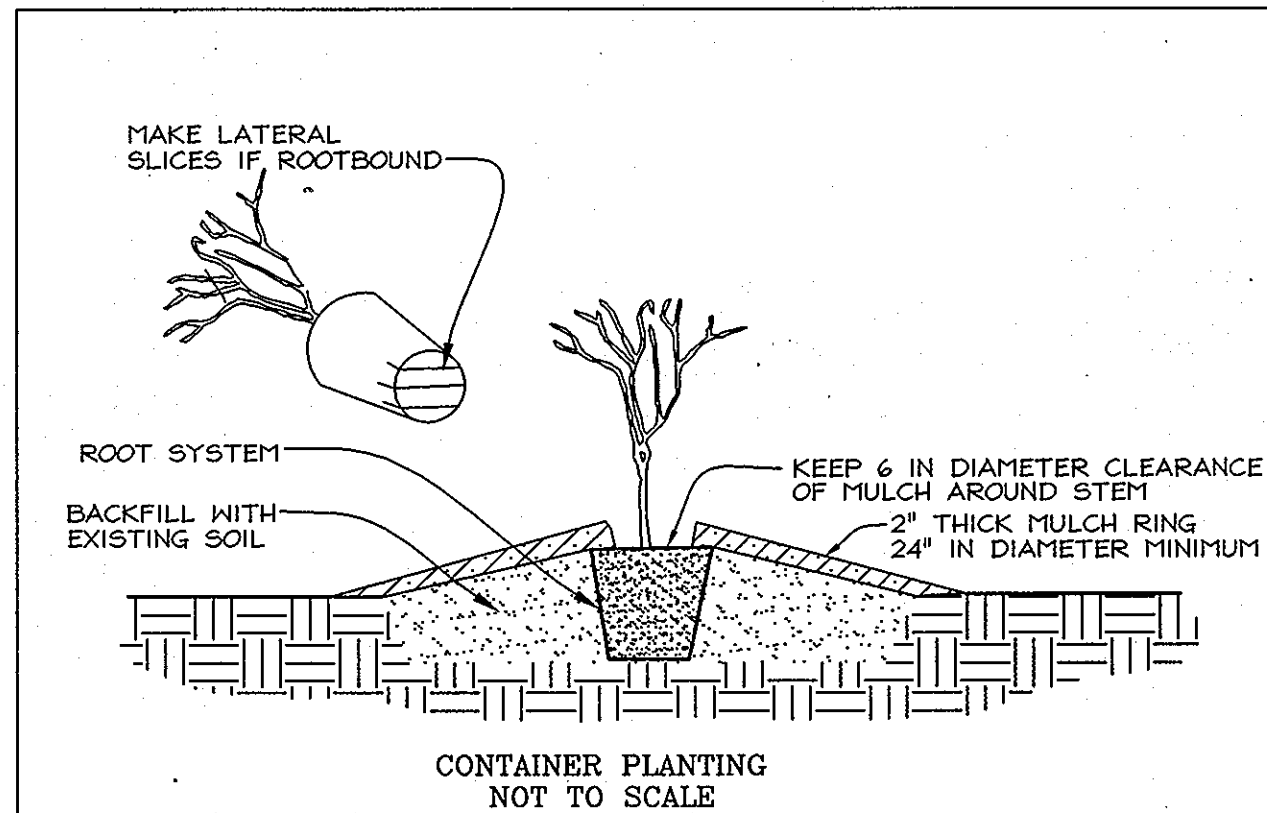
**SIGN DETAIL: PERMANENT SIGN**

SIGNAGE NOTE: ALL TREE PROTECTION SIGNS SHALL BE PLACED ON METAL 1" POSTS OR PRESSURE TREATED WOOD POLES. NO ATTACHMENT OF SIGNS TO TREES IS PERMITTED.



**PLANTING ON STEEP SLOPES NOT TO SCALE**

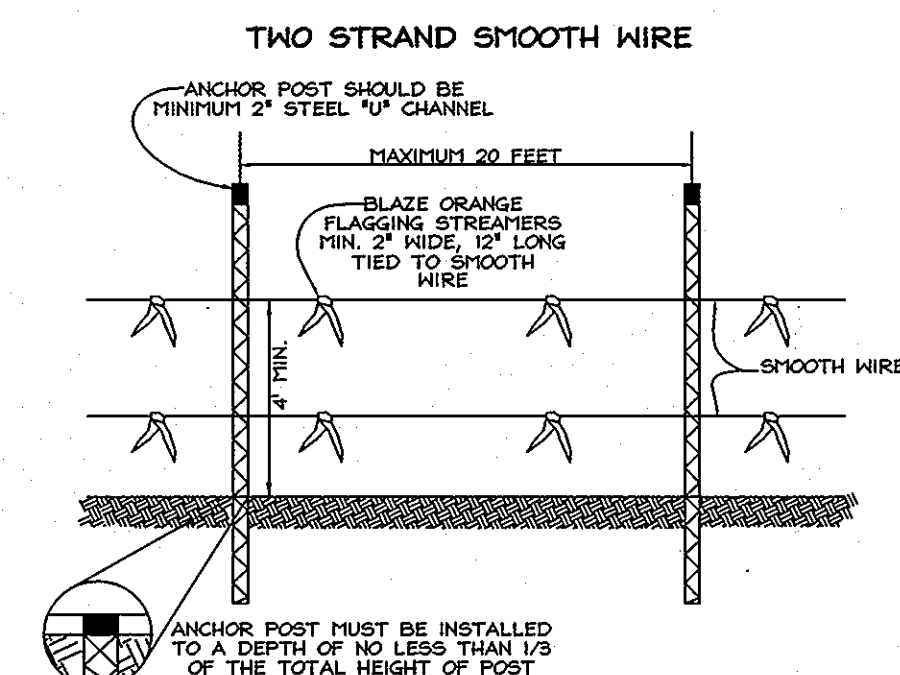
- PLANT AS PER CONTAINER PLANTING DETAIL EXCEPT PREP OF PLANTING AREA.
- A BASIN FOR PLANTING IS CUT INTO THE SLOPE WITH PLANT BEING PLACED NEAR THE DOWNHILL EDGE OF THE BASIN.
- BASIN SHOULD SLOPE TOWARD UPHILL SIDE TO ALLOW RAIN TO BE CAPTURED AND INFILTRATE.
- AN OVERFLOW CHANNEL SHALL BE CUT INTO UNDISTURBED SOIL AT THE REAR OF THE BASIN TO ALLOW EXCESS RUNOFF AND SEDIMENT TO ESCAPE WITHOUT DAMAGING THE BASIN.
- MULCH AROUND PLANT IN BASIN.



**CONTAINER PLANTING NOT TO SCALE**

**PLANTING PROCEDURE FOR CONTAINER GROWN PLANTS**

- REMOVE THE PLANT EITHER BY CUTTING OR INVERTING THE CONTAINER
- USE A KNIFE TO CUT THROUGH BOTTOM HALF OF THE ROOT BALL.
- PLANT SHRUBS ON FORMED UP MOUNDS 4" ABOVE THE EXISTING GRADE WHEN HIGH WATER TABLE CONDITIONS EXIST, OTHERWISE PLANT FLUSH WITH EXISTING GRADE.
- PLANTING HOLE TO BE 2-3 TIMES THE DIAMETER OF THE CONTAINER.
- INSERT FERTILIZER TABLET, BACKFILL 2/3 OF THE ROOT BALL AND WATER.
- AFTER WATER PERCOLATES, BACKFILL HOLE TO TOP OF ROOT BALL AND GENTLY TAMP SOIL TO FIRM CONTACT WITH PLANT.
- APPLY MULCH RING AROUND PLANT KEEPING A 6" IN CLEARANCE FROM STEM.



- NOTES:**
- FOREST PROTECTION DEVICE ONLY.
  - RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.
  - BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE TO BE AVOIDED.
  - PROTECTIVE SIGNAGE MAY ALSO BE USED.
  - DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION.
- TREE PROTECTION DETAIL NOT TO SCALE**

**EASEMENT #1 - REFORESTATION AREA : 3,396 Sq. ft. (0.08 Ac)**

350 TPA: 2'-3' Whip planting  
0.08 acre x 350 TPA = 28 trees required

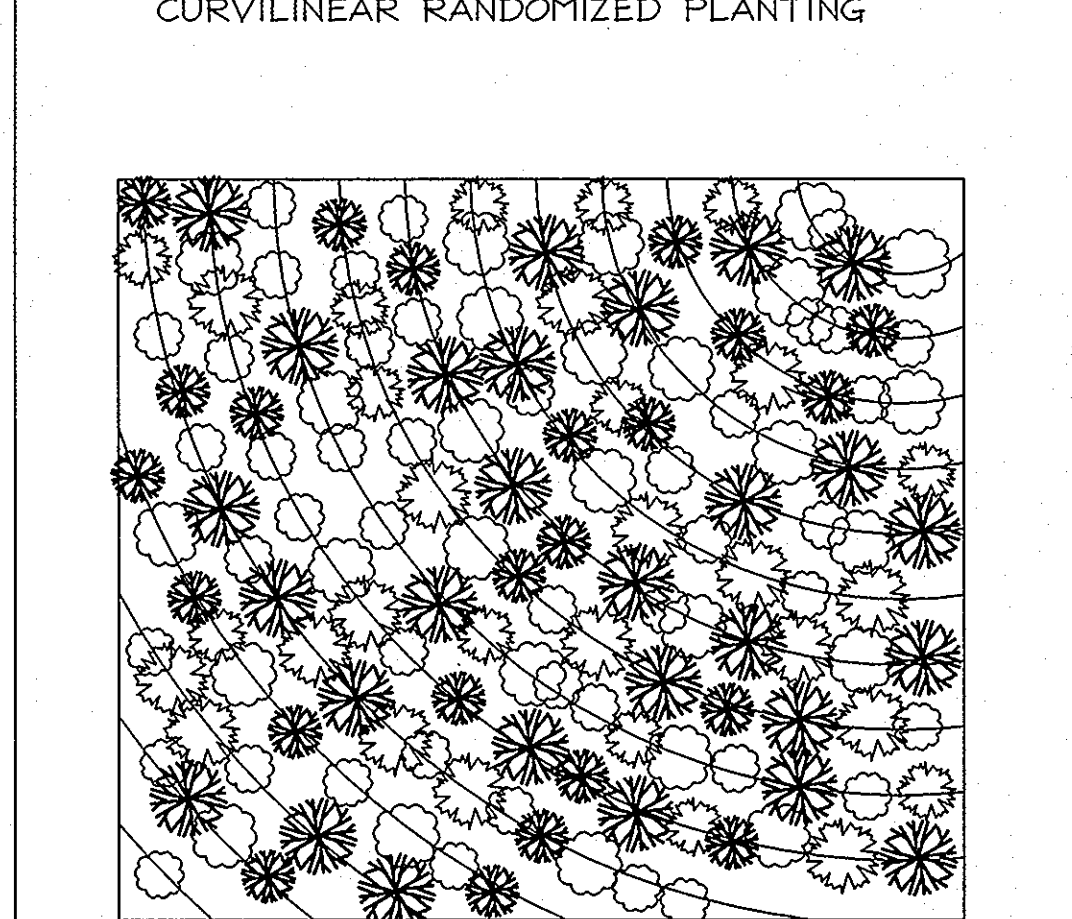
Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
5	Prunus serotina	Black Cherry	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with Tree Shelters
5	Nyssa sylvatica	Black Gum	WHIP 2-3'	11' o.c.	
6	Sassafras albidum	Sassafras	WHIP 2-3'	11' o.c.	
6	Robinia pseudoacacia	Black Locust	WHIP 2-3'	11' o.c.	
6	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	

**EASEMENT #2 - REFORESTATION : 8,300 Sq. ft. (0.19 Ac)**

350 TPA: 2'-3' Whip planting  
0.19 acre x 350 TPA = 67 trees required

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
13	Prunus serotina	Black Cherry	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with Tree Shelters
13	Nyssa sylvatica	Black Gum	WHIP 2-3'	11' o.c.	
13	Sassafras albidum	Sassafras	WHIP 2-3'	11' o.c.	
14	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	
14	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	

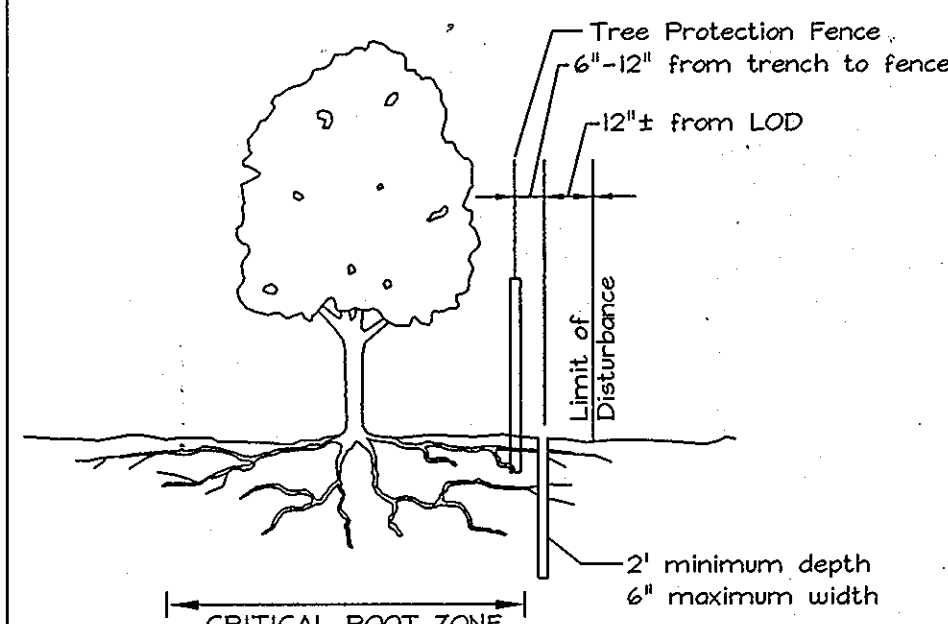
**CURVILINEAR RANDOMIZED PLANTING**



- MIX TREE AND SHRUB SPECIES IN THE STAGING AREA.
- SET THE GUIDE CURVILINEAR LINE AS CLOSE TO CONTOUR AS POSSIBLE

**ROOT PRUNING**

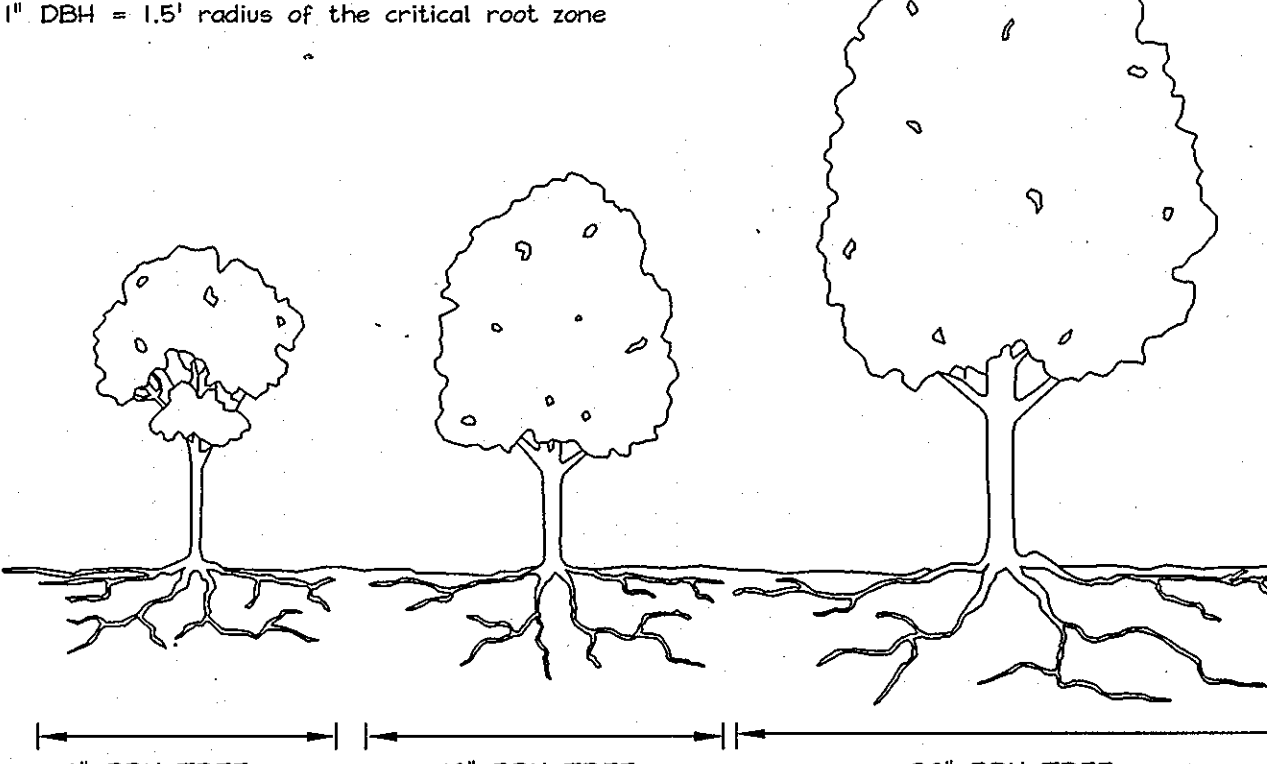
- Retention areas shall be set prior to construction
- Boundaries of retention areas shall be flagged, and location of trench shall be specified by ERI Qualified Professional.
- Roots shall be cut clearly with root pruning equipment. Where roots > 1" are found, trenching shall be done by air spade or hand tools. Roots > 1" shall be cut with a hand saw.
- Trench shall be immediately backfilled with soil removed or high organic content soil.
- Any other techniques shall be approved by the ERI Qualified Professional before implementation.



**CRITICAL ROOT ZONE**

For the edge of large areas, use the greater of the two choices below:  
1" DBH of the tree = 1' radius of the or 8 ft radius circle around the trunk of the tree  
critical root zone

For isolated specimen trees:  
1" DBH = 1.5' radius of the critical root zone



**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**  
**FOREST CONSERVATION PLAN**  
**HARWOOD INDUSTRIAL PARK**

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

PARCEL E-2  
HOWARD COUNTY, MARYLAND

**EXPLORATION RESEARCH, INC.**  
ENVIRONMENTAL CONSULTANTS  
LANDSCAPE ARCHITECTS  
6530 BOWMAN LANE  
BETHESDA, MARYLAND 20817  
TEL: (410) 667-6210 FAX: (410) 706-1662

DESIGN BY: **VOGEL ENG.** / **SMM**

DRAWN BY: **SLH**

CHECKED BY: **SLH**

DATE: **JULY 2008**

SCALE: **1"=30'**

W.O. NO.: **-**

**11** SHEET OF **12**

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

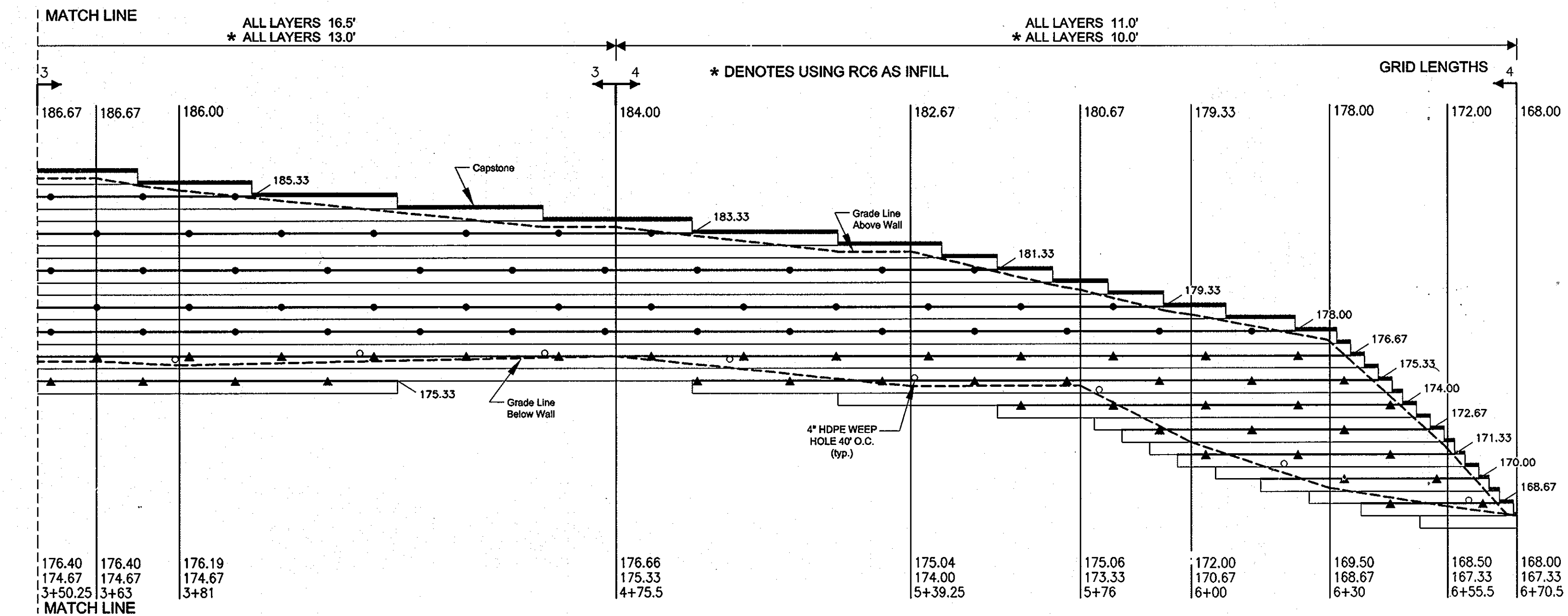
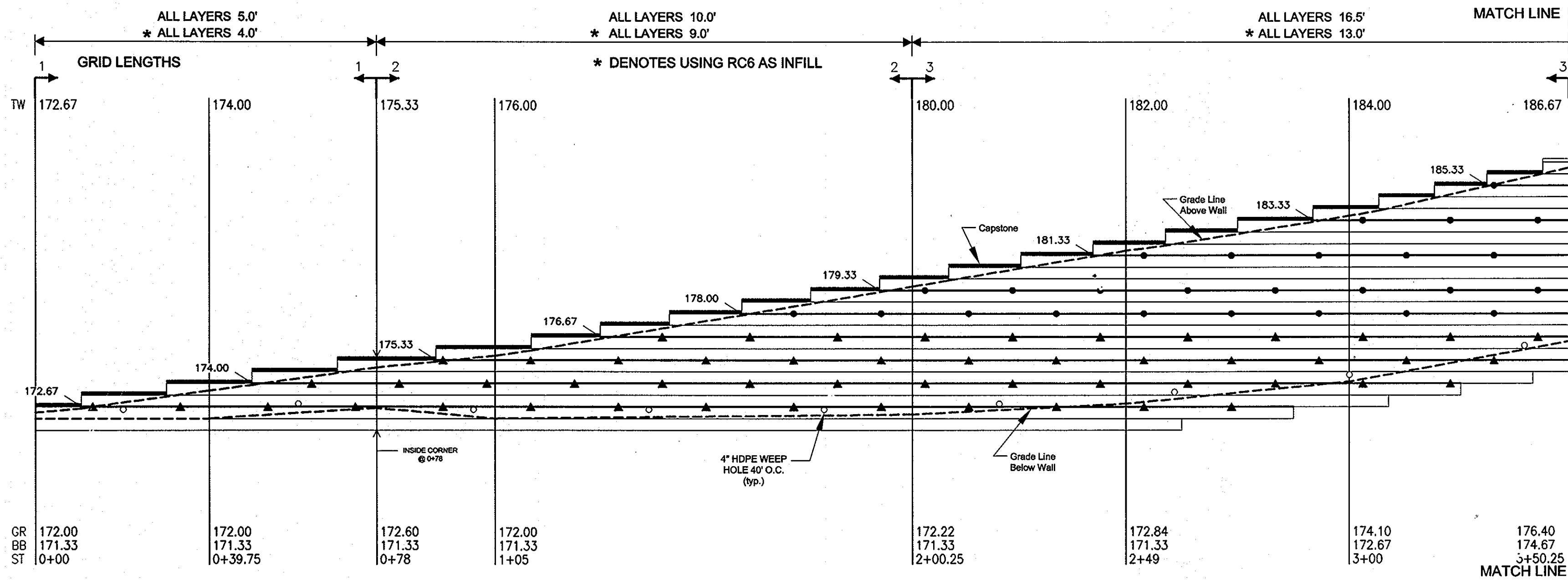
*[Signature]* **7/20/08**  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

*[Signature]* **8/5/08**  
CHIEF, DIVISION OF LAND DEVELOPMENT

*[Signature]* **8/3/08**  
DIRECTOR

\* FENCE AND OR RAILING TO BE INSTALLED ABOVE PROPOSED  
RETAINING WALL UNDER THIS SDP  
(SEE SHEET 14 OF 16 FOR ADDITIONAL DETAIL)

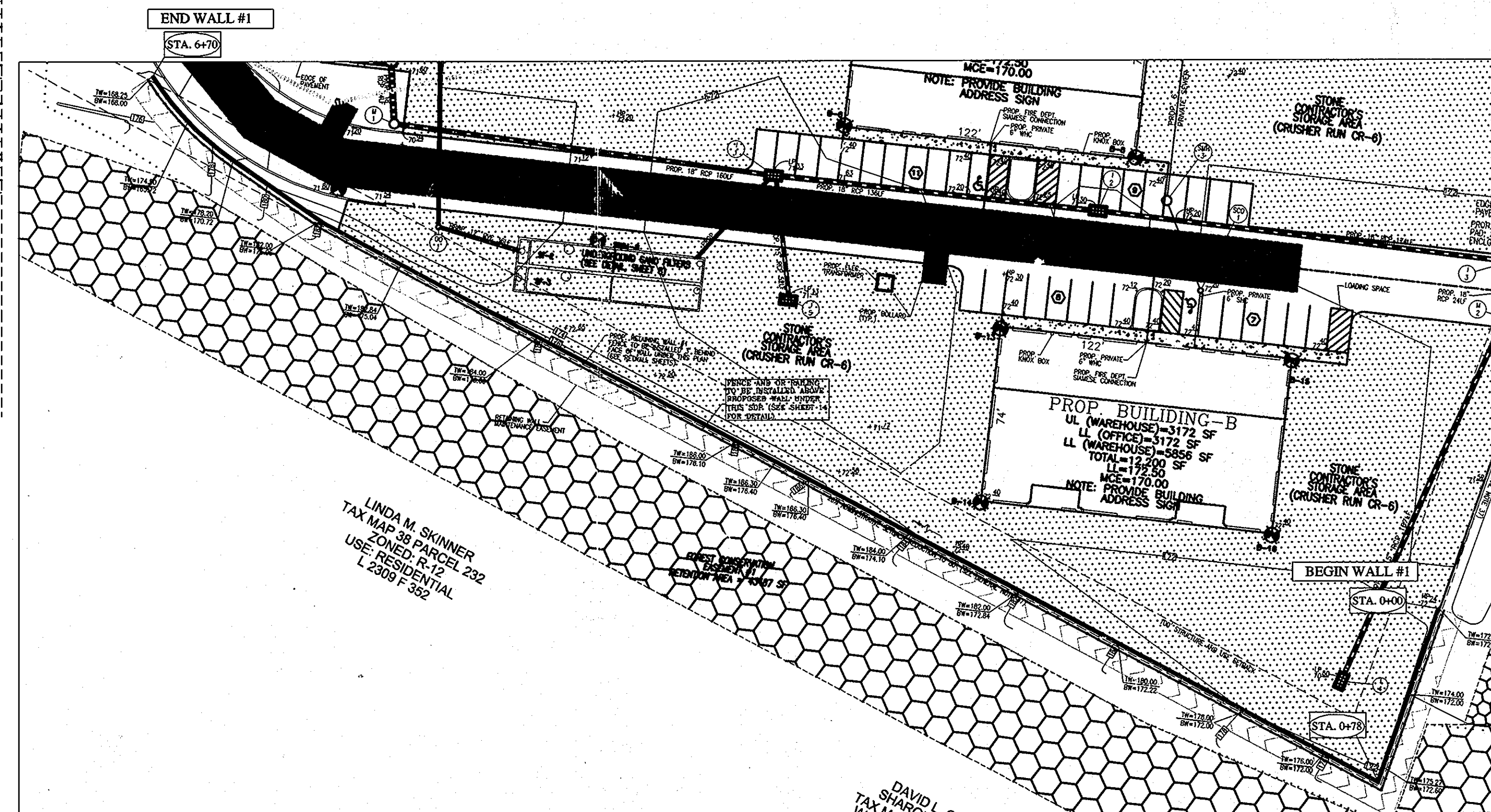
**WALL #1 PROFILE**



SCALE: HORIZONTAL SCALE 1" = 20'  
VERTICAL SCALE 1" = 5'

GRID KEY: MIRAFI 3XT ●  
MIRAFI 5XT ▲

TW = TOP OF WALL (NOT INCLUDING CAP)  
GR = PROPOSED FINISHED GRADE AT BASE OF WALL  
BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD  
ST = WALL STATION



**WALL PLAN**  
SCALE: 1" = 40'

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

WALL PLAN, SECTION & PROFILES

**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

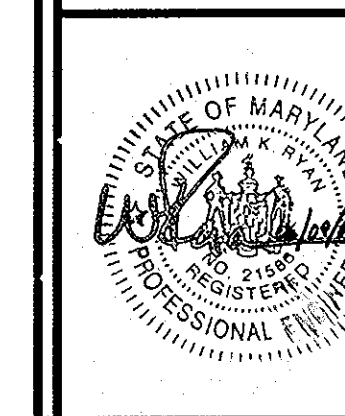
PARCEL E-2  
HOWARD COUNTY, MARYLAND

**PROFESSIONAL CERTIFICATION**  
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

William E. Ryan, P.E.  
License No. 21566  
Expiration Date: 05/09/2009

**Ryan & Associates**  
A Division of WKR Consulting Inc.  
Consulting & Design Engineers  
Structural - Retaining Walls  
Geo-technical

Email: info@ryanasociates.net  
922 North East Street, Frederick, MD 21701  
Tel: (301) 360-9534 Fax: (301) 360-9574



DESIGN BY: JO  
DRAWN BY: JO  
CHECKED BY: WKR  
DATE: JUNE 09, 2008  
SCALE: AS SHOWN  
W.O. NO.: 05-10

**CROSS SECTION DETAILS & FACTORS OF SAFETY:**

SECTION	STATION	TOTAL WALL HEIGHT (Including Embedment)	LOAD APPLIED	SLIDING minimum 1.50	OVERTURNING minimum 2.00	BEARING CAPACITY minimum 2.00	BEARING PRESSURE PSF
WALL #1		(Excluding Caps)					
1	0+00 TO 0+78	4.0'	120 PSF LIVE LOAD	3.12	9.74	11.72	620
2	0+78 TO 2+00.25	8.67'	3:1 BACKSLOPE/120 PSF LL	1.65	3.92	6.54	1,602
3	2+00.25 TO 4+75.5	12.0'	2.5:1 BACKSLOPE	1.85	5.14	9.15	2,025
4	4+75.5 TO 6+70.5	8.67'	2.5:1 BACKSLOPE	1.63	4.34	8.18	1,491

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

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

7/2/08  
5/1/08  
8/8/08

**STRUCTURAL NOTES**

**1. SOIL PARAMETERS:** Ryan & Associates (RA) has reviewed the Geotechnical Study Report dated 07/12/2006 for this project prepared by Herbst/Benson & Associates, Reisterstown, MD. The site soils (from the boreholes closest to the wall locations) are described as mainly silty sand. Therefore, RA has used an internal angle of friction of 28° (conservative) for the soils in the wall design. This value is for a worst case SM soil type. CH (fat/marine clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they must be removed and replaced with soils that meet or exceed the design friction angle of 28°. The site geotechnical engineer must monitor this closely during the construction process. All soils used for wall backfill must also meet the following additional requirements: maximum of 65% passing the #200 sieve (minimum of 35% retained on the #200 sieve), plastic limit 20, maximum optimum moisture of 20%, minimum dry unit weight of 100 PCF and maximum liquid limit of 40. Conservatively, an assumed unit weight (maximum wet density) of 125 PCF is used for the in-situ foundation and retained soils and an assumed unit weight (maximum wet density less 5% for 95% compaction) of 120 PCF is used for the compacted infill soils for wall #1. As requested by the client, an alternative design for wall #1 has been done using RC-6 (32° friction angle and 125 PCF unit weight) as backfill material, which reduces the grid length (as shown on the wall profile). The site geotechnical engineer will need to do a proctor test for the proposed wall infill to determine the actual density and moisture. Fluctuations in unit weight of 5 PCF higher or lower will not affect this design, however if the actual unit weights vary by more than 5 PCF RA shall be notified so that the cross sections analyses can be rerun to verify that all factors of safety are still met.

**3. SPECIFICATIONS:** Construction and materials must conform to the attached "Ryan & Associates segmental retaining wall specifications and installation guidelines for Verso-Lok".

**4. BEARING CAPACITY:** The sub-grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 2,500 PSF. The actual bearing pressure exerted by each specific wall section is shown on the Cross Section Details and Factors of Safety table so that the site geotechnical engineer may determine specifically how to handle any areas where low bearing capacity soils are encountered on an individual wall section basis. Areas of the sub-grades that do not meet these maximum pressures will require undercutting or geogrid reinforcing. The sub-grade must be virgin (natural undisturbed soil with blow counts ≤12) or suitable fill (≤28") compacted to 95% of a standard proctor maximum dry density.

**5. SLOPES & SURCHARGES:** A 120 PSF live load and a 2:1 to 3:1 backslope surcharge has been applied to wall #1.

**6. FACTORS OF SAFETY:** The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5 and Geogrid Pullout 1.5 (from the soil and from the block).

**7. GEOGRIDS:** These walls were designed with Mirafi 3XT and 5XT geogrids, which have a LTDS (Long Term Design Strength) of 1705 and 2234 ft/lbs. All other geogrid substitutions must have prior approval of RA.

**8. CONSTRUCTION OVERSIGHT:** The construction of these walls must be performed under the observation/review of a Maryland Registered Professional Engineer or their designated representative to ensure that they are built in accordance with the RA Structural Notes and Specifications. All wall construction must be certified by a registered professional geotechnical/structural engineer.

**9. WALL BATTER:** These walls were designed with the Verso-Lok blocks having 1.8" batter (1/4" setback). This may be used if desired and will allow for some construction tolerance. However, the 7.1" batter (rear pin position: 1" setback per block course) is strongly recommended by RA since it is more conservative (yields higher factors of safety) and allows for more construction tolerances. If the rear vertical batter is used the wall installer should lay the base course tilted back a minimum of 1/4" to compensate for movement during construction (from compaction equipment and the geogrid losing its slack) to ensure that the wall does not go beyond vertical (have a negative batter). If the 7.1" batter is used, it is important for the wall installer and the civil engineer/surveyor to predetermine the wall's batter during stake out. The base of the wall will need to be moved forward if there are critical dimensions that need to be met on the high side of the wall.

**10. BACK SLOPE:** Water management is especially critical since there is a back slope above this wall. Since water is being directed to the wall, the water must be directed over it (sheet flow - fill soils must come to top of cap) or a swale must be constructed behind the wall to divert the water around the end(s) of the wall. The surface water runoff must not be permitted to enter or pond above the reinforced geogrid zone or be introduced into the 12" gravel drainage layer (saturation of the reinforced geogrid zone will cause the reinforced backfill soils to lose their shear strength and may ultimately lead to wall failure). If a swale is done it must have a minimum depth of 8" and a minimum 1-2% slope laterally from the high point to the end(s) of the wall (see swale details for clarification). It shall be lined with asphalt, concrete, impermeable soils (clay: CL, GC or SC), low permeable soils (ML meeting the requirements in the RA Specifications) or an underlying geomembrane (see Section 3.16A of the RA Specifications for details on low permeable soils and the geomembrane). The soils in the back slope and the retained zone (within the wall's zone of influence: behind the reinforced geogrid zone and extending to a distance that is twice the wall's exposed height) must be virgin (natural undisturbed soil with blow counts ≤12) or suitable fill (≤28") compacted to 95% of a standard proctor maximum dry density. This must be verified by the site geotechnical engineer. The requirements for the impermeable layer/geomembrane may be waived if the infill soils are free-draining gravel or sand (classified by USCS as GP, GW, SP or SW).

**11. BLOCK SYSTEM:** This design is valid only for the Verso-Lok block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted without a partial or total redesign.

**12. EMBEDMENT:** Wall embedment varies from one to three blocks. The exact amount of buried blocks can be determined by subtracting the "BB" elevations from the "GR" elevations on the RA profile drawings.

**13. WALL PROFILE:** The elevation drawings were done to represent the grade changes necessary on the civil drawings and were done in even block course increments of 0.667' (8"). Minor field changes may be necessary by the wall installer. Lineal footage may be added or subtracted as needed if the wall's height is equal to or less than the design height. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the installer proceeds. The cap height of 0.302' (3.63") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

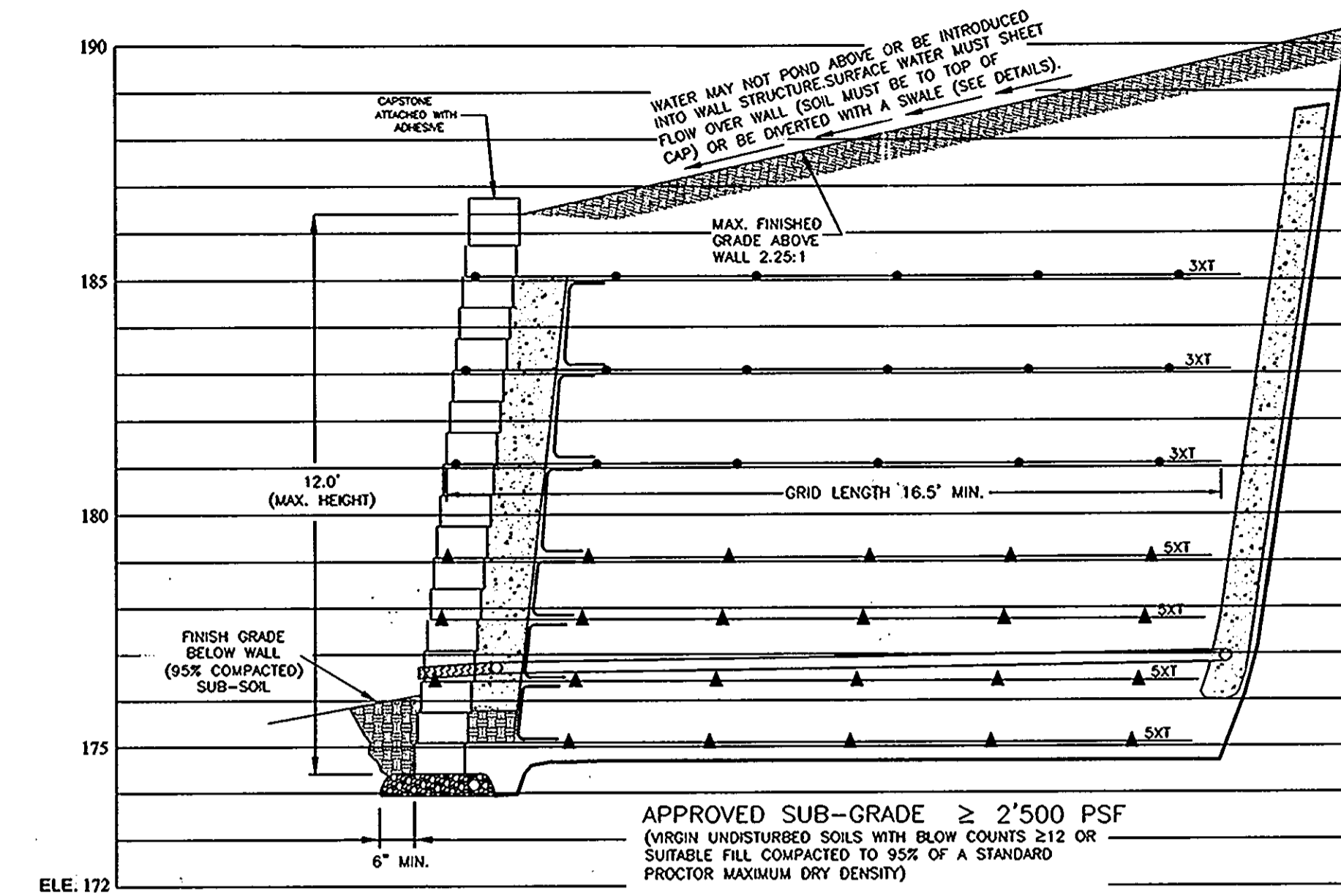
**14. DESIGN SOFTWARE:** Internal and external wall calculations were performed with SRWall (version 3.22). A load table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning and bearing capacity) and bearing pressure (the weight exerted by the wall structure - block and geogrid zone). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

**16. CIVIL PLANS:** This design package is based on the "Site Grading, Erosion and Sediment Control Plan", dated November, 2007 prepared by Robert H. Vogel Engineering, Inc. A partial copy of this plan has been included in this design to show the RA wall stationing.

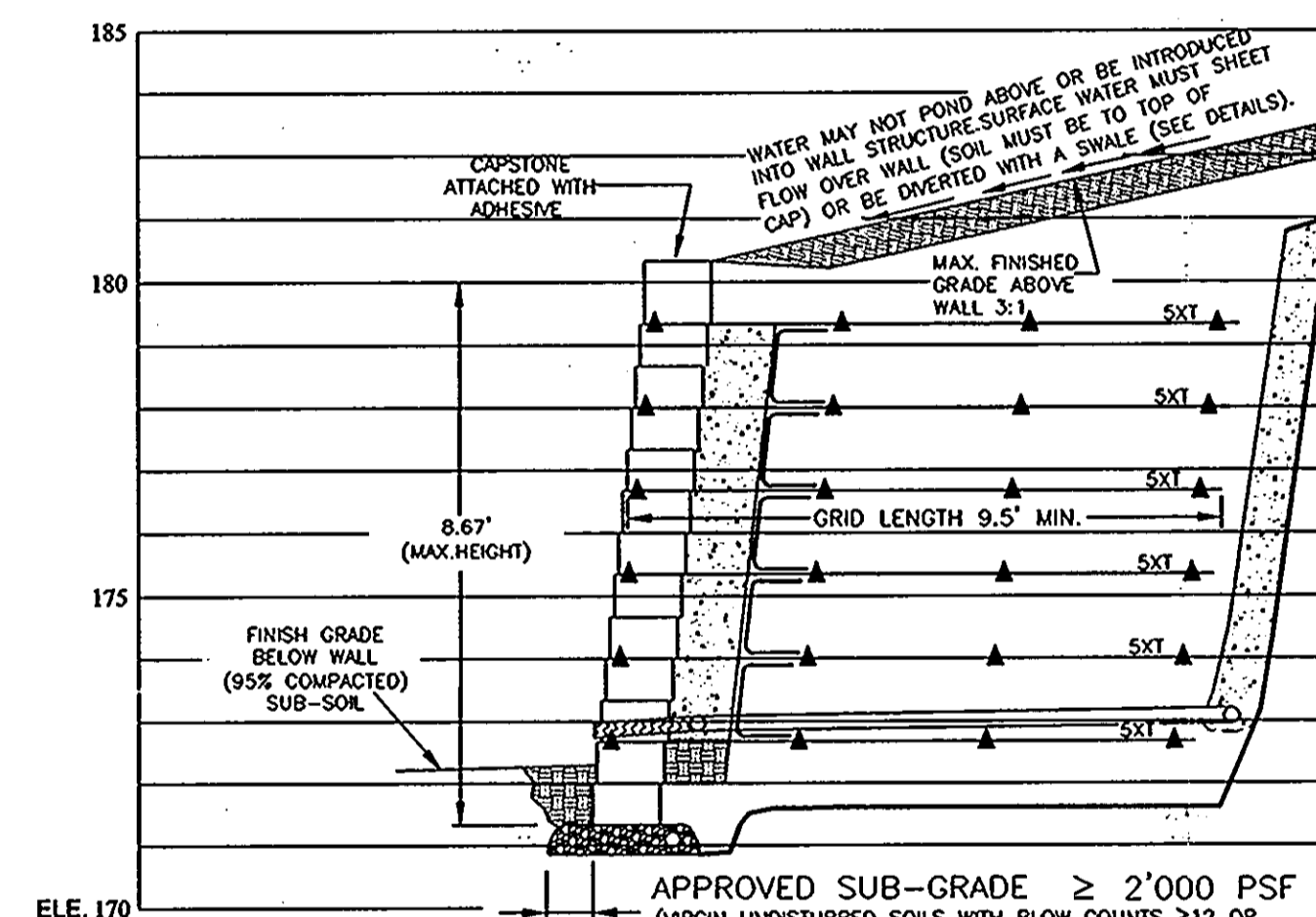
**17. FENCE/RAILING:** Fence/railling installation behind the wall(s) for a wall exposed height of 30 inches or taller (varies by local jurisdiction) is a must. Fence/railling post (non-wind/ non-load bearing) foundation details are shown on sheet 3.

**18. WEEP HOLES:** Weep hole(s) shown in wall profile(s) are for guidance purposes only, actual locations to be decided at site in consultation with site geotech engineer, but at a maximum spacing of 40'-0" on center.

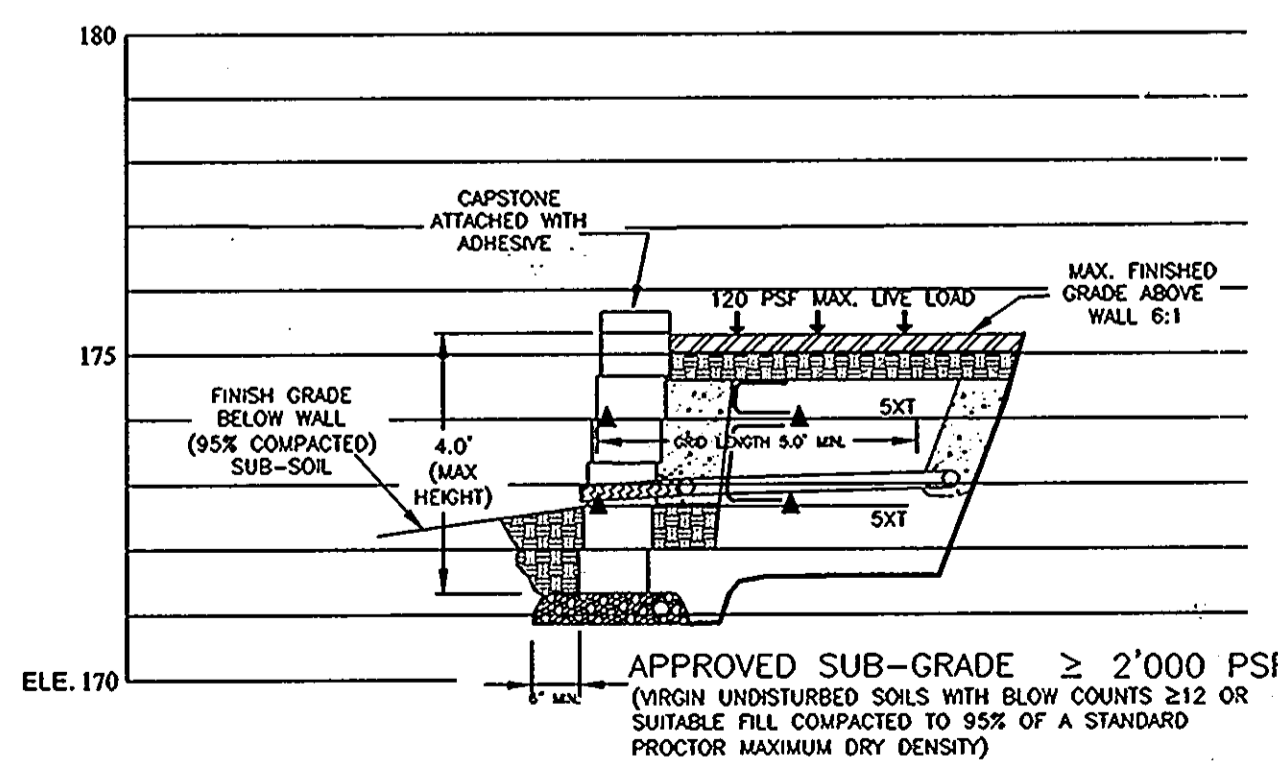
**19. SAFETY:** The contractor is responsible for the following: a) safety and protection within and adjacent to the site; b) Adhere to OSHA's health & safety laws; c) any special inspections required by the building codes; d) any temporary bracing or shoring; e) verification of all conditions, dimensions & elevations; f) erosion and sediment control of the site; g) notifying the design engineer (RA) of any conflicts or discrepancies between the design condition and site condition.



**WALL #1 SECTION #3 (STA. 2+00.25 TO 4+75.5)**  
(FOR CONSTRUCTION DETAILS SEE WALL TYPICAL SECTION ON SHEET 14)  
SCALE: 1"=3'



**WALL #1 SECTION #2 (STA. 0+78 TO 200.25)**  
(FOR CONSTRUCTION DETAILS SEE WALL TYPICAL SECTION ON SHEET 14)  
SCALE: 1"=3'



**WALL #1 SECTION #1 (STA. 0+00 TO 0+78)**  
(FOR CONSTRUCTION DETAILS SEE WALL TYPICAL SECTION ON SHEET 14)  
SCALE: 1"=3'

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

**STRUCTURAL NOTES & SECTIONS**

**HARWOOD INDUSTRIAL CENTER**  
PARCEL E-2

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

PROFESSIONAL CERTIFICATION  
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.



**Ryan & Associates**  
A Division of WKR Consulting Inc.  
Consulting & Design Engineers  
Structural - Retaining Walls  
Geo-technical

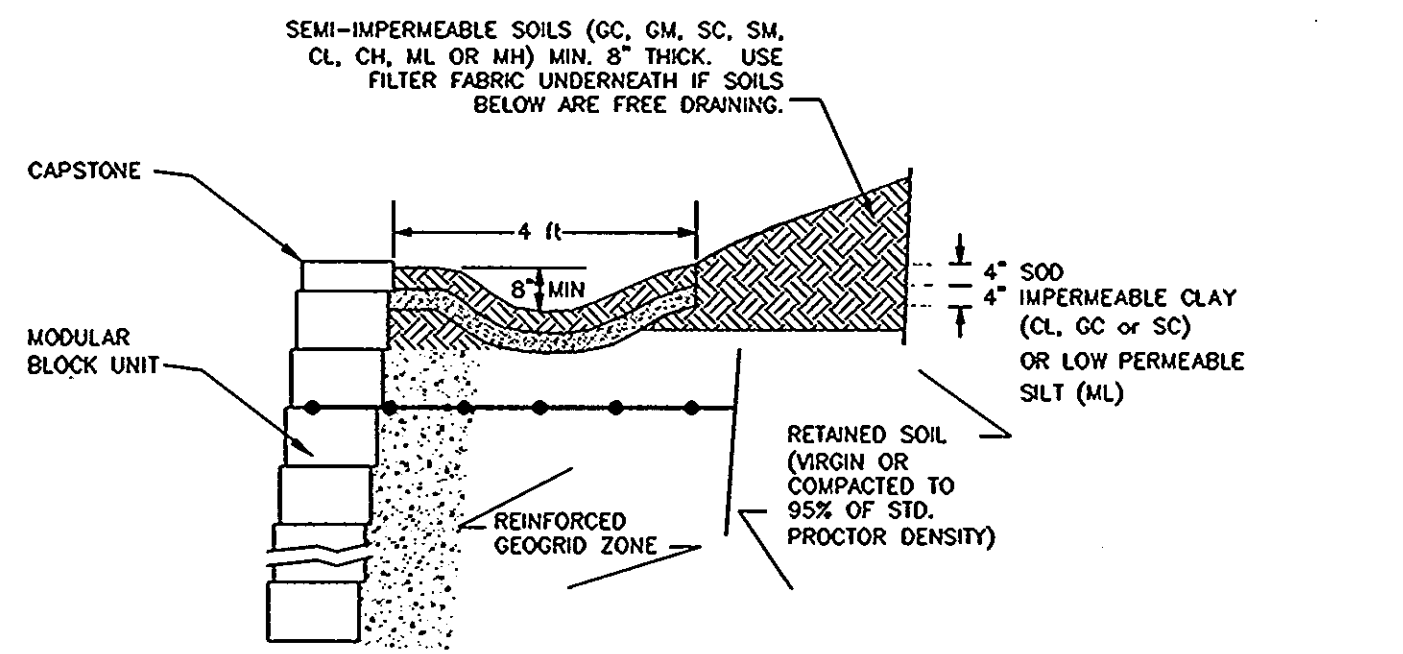
William K. Ryan, P.E.  
License No. 91566  
Expiration Date: 01/29/2009



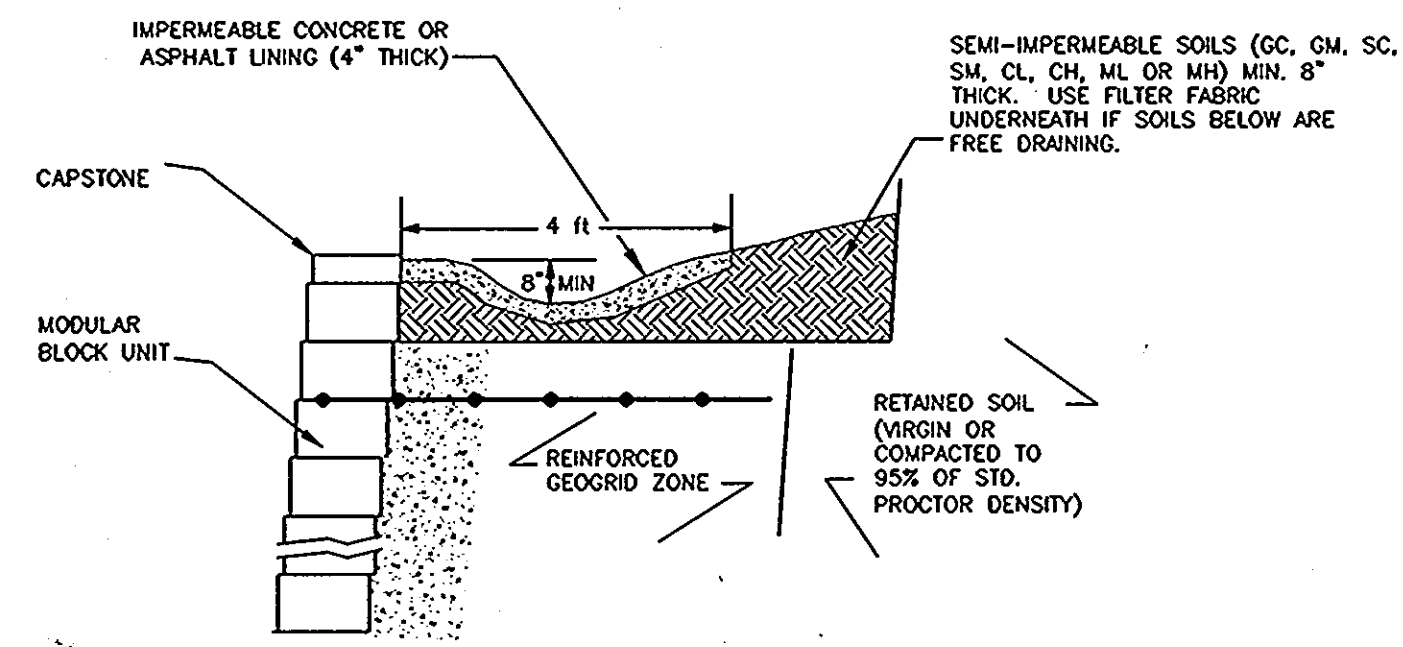
DESIGN BY: JO  
DRAWN BY: JO  
CHECKED BY: WKR  
DATE: JUNE 09, 2008  
SCALE: AS SHOWN  
W.O. NO.: 05-10

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

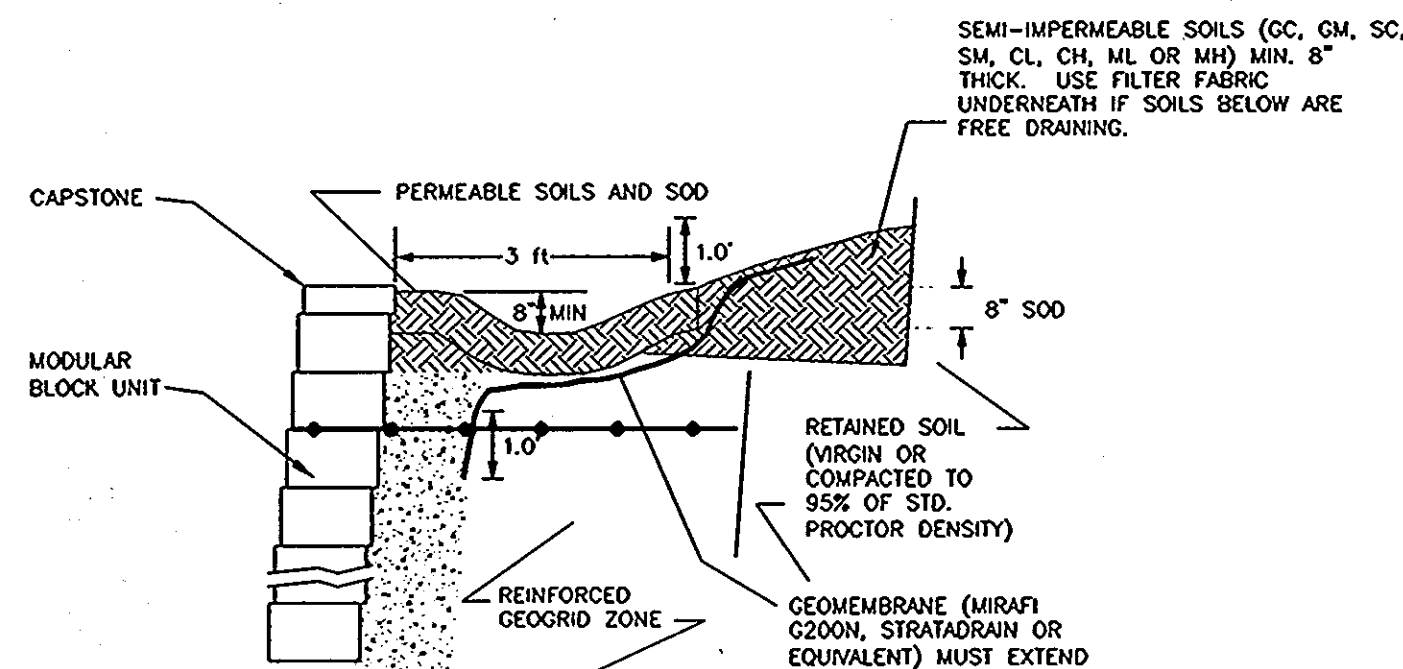
*[Signature]* 7/20/08  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
*[Signature]* 8/5/08  
CHIEF, DIVISION OF LAND DEVELOPMENT  
*[Signature]* 8/18/08  
DIRECTOR



CLAY LINED SWALE



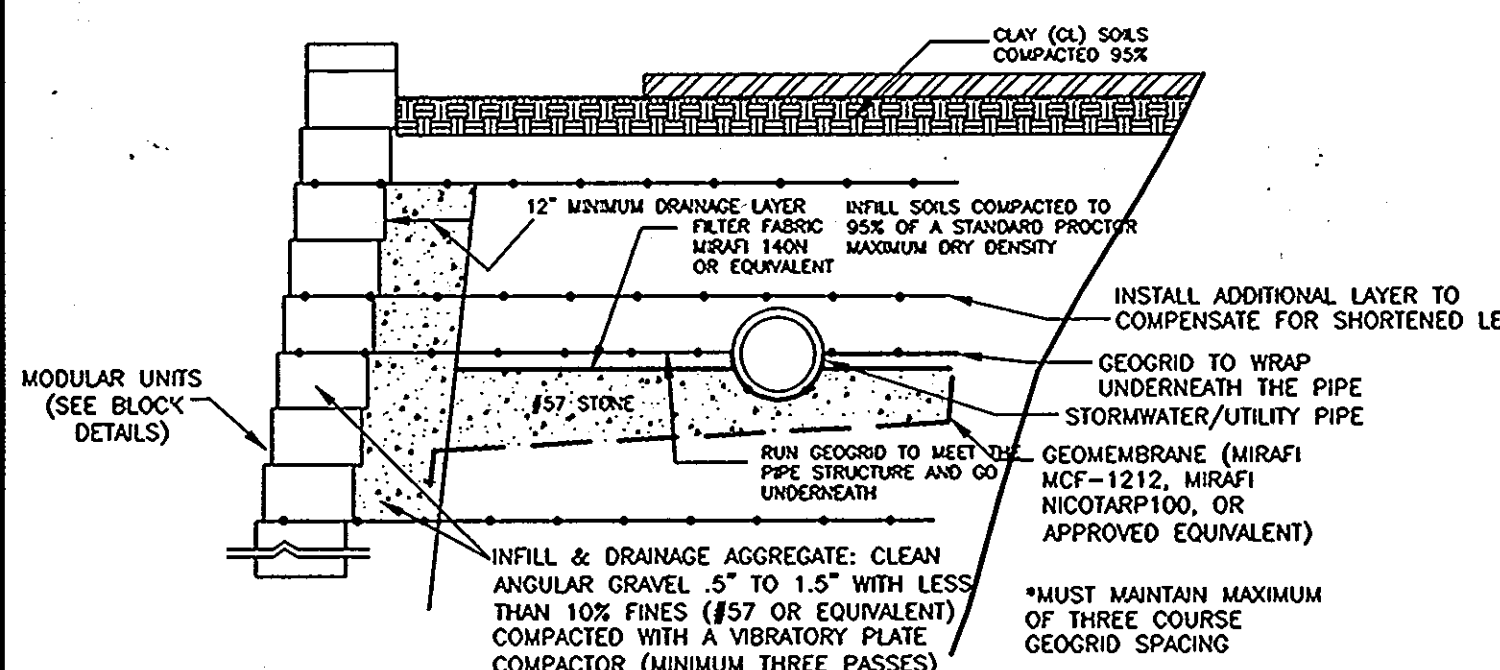
CONCRETE LINED SWALE



GEOMEMBRANE LINED SWALE

**SWALE DETAILS**

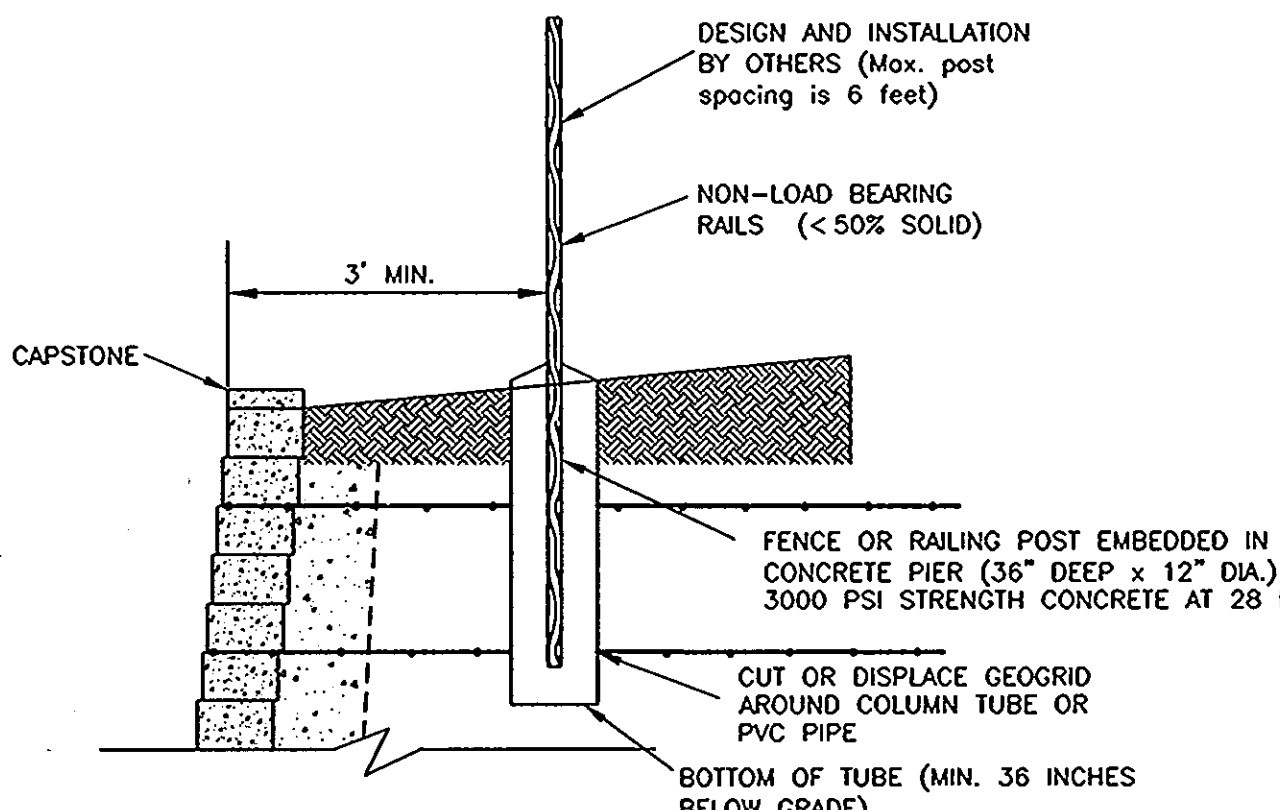
N.T.S.



**PLACEMENT OF GEOGRID AND DRAINAGE STONE AROUND STORMWATER/UTILITY PIPES, IF EXISTING, IN REINFORCED ZONE**

N.T.S.

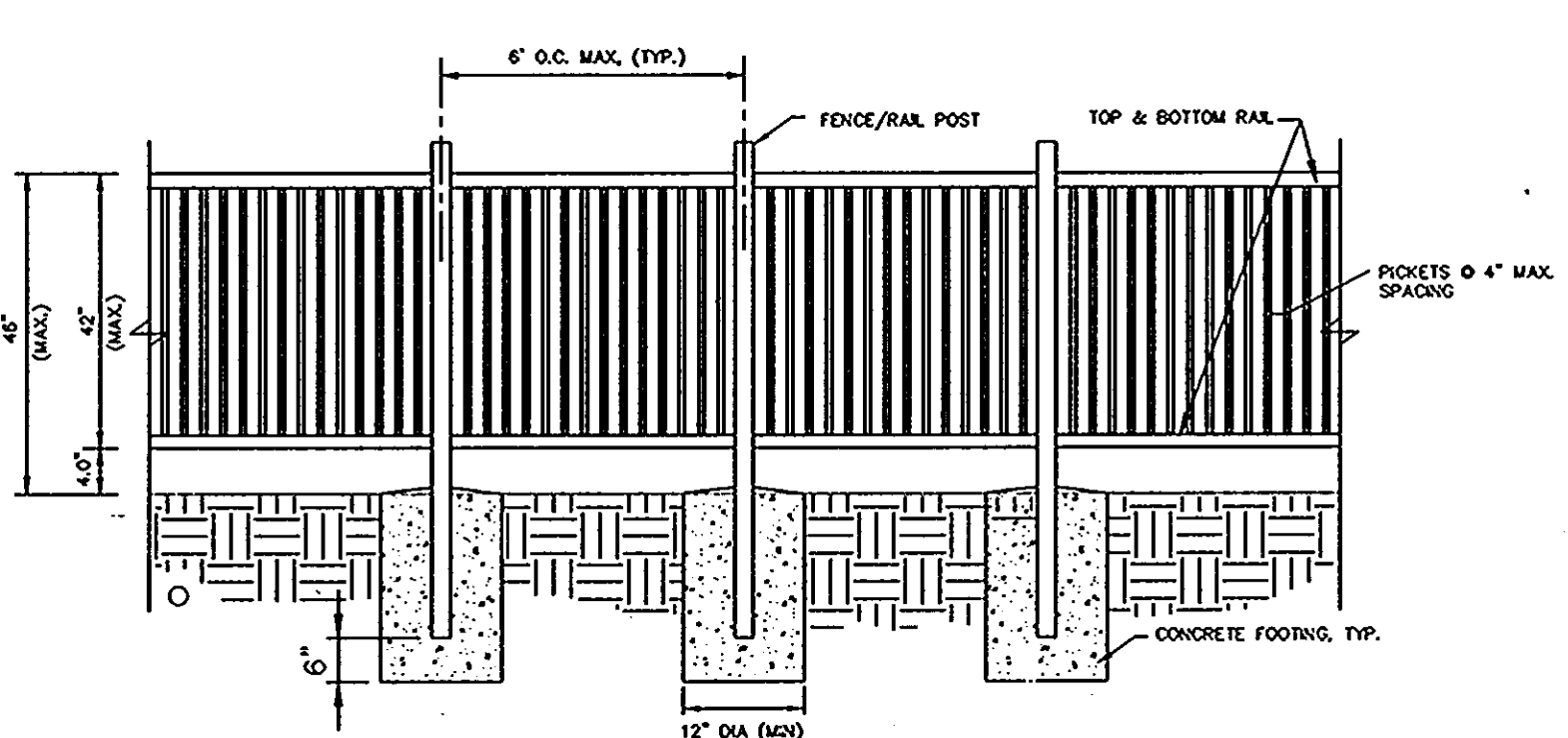
NOTE: THE WALL INSTALLER TO PLACE THE FENCE/RAIL POST SONOTUBES IN ACCORDANCE WITH THIS DETAIL FOR THE FENCE INSTALLER TO INSTALL FENCE/RAIL POSTS AT A LATER DATE. THE SONOTUBES MUST BE COVERED WITH A SECURED PLASTIC SHEET TO PREVENT RAINWATER OR WATER RUN-OFF TO ENTER THE POST HOLES. IT IS HIGHLY RECOMMENDED THAT THE SAFETY FENCE/RAIL BE INSTALLED WITHIN A FEW DAYS OF WALL CONSTRUCTION COMPLETION.



**NON-LOAD BEARING & NON-WIND BEARING FENCE**

N. T. S.

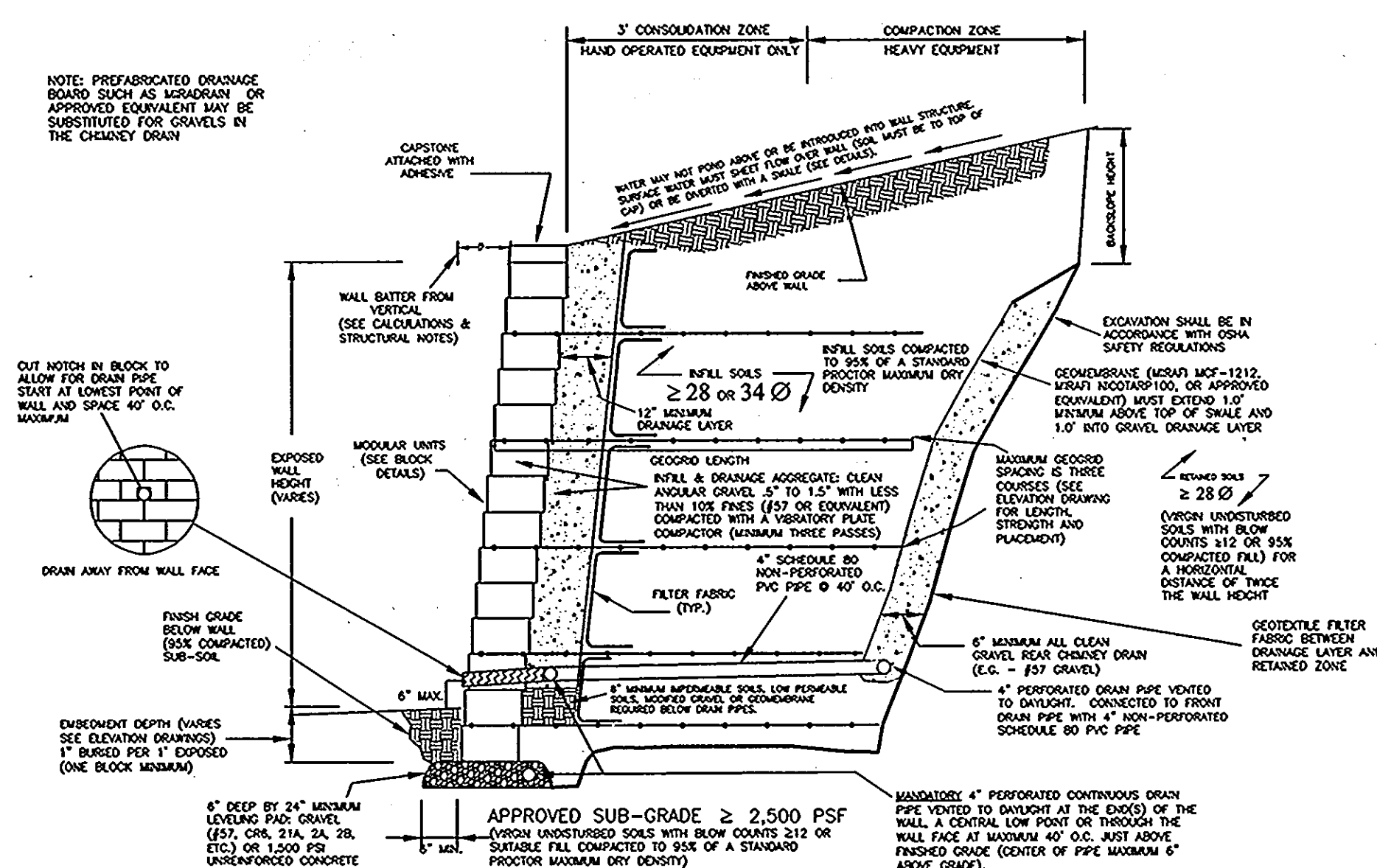
(FENCE AND OR RAILING TO BE INSTALLED ABOVE PROPOSED WALL UNDER THIS SDP)



**FENCE DETAIL AT RETAINING WALL**

N.T.S.

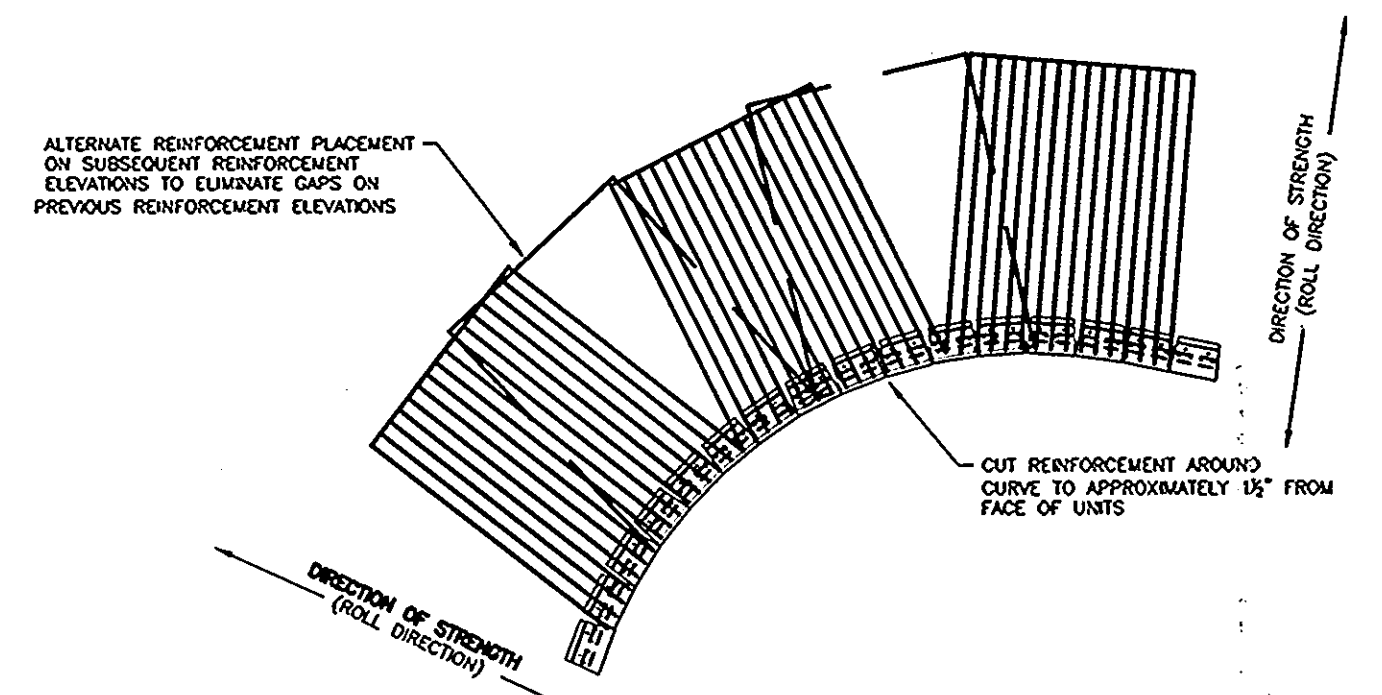
**VERSA-LOK**



**[BLOCK TYPE] WALL TYPICAL SECTION**

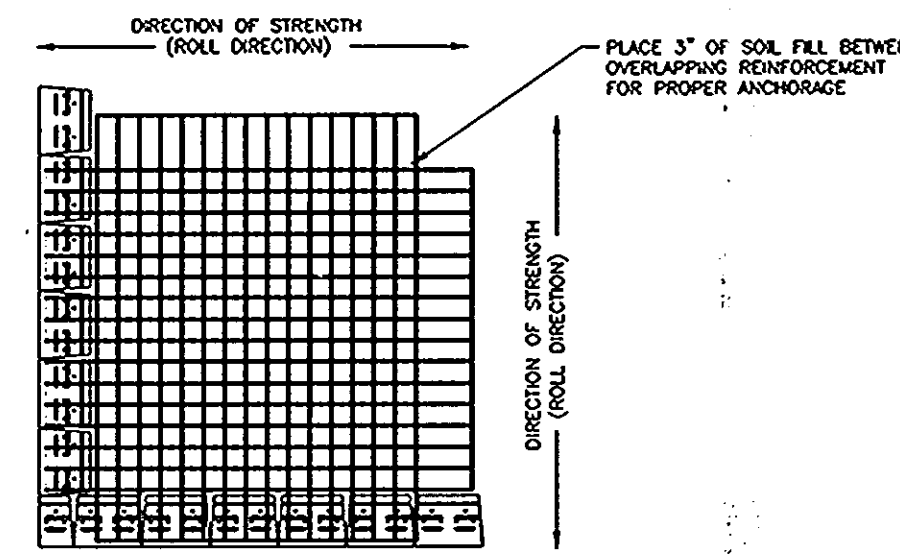
N. T. S.

(APPLIES TO WALL-1 & 2. FOR GEOGRID ELEVATIONS AND BLOCK COURSES SEE WALL PROFILE)



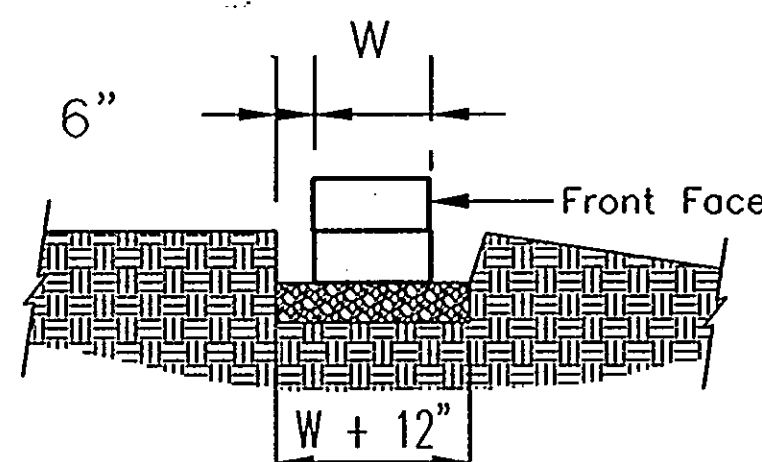
**GEOSYNTHETIC PLACEMENT-CONCAVE CURVE**

N.T.S.



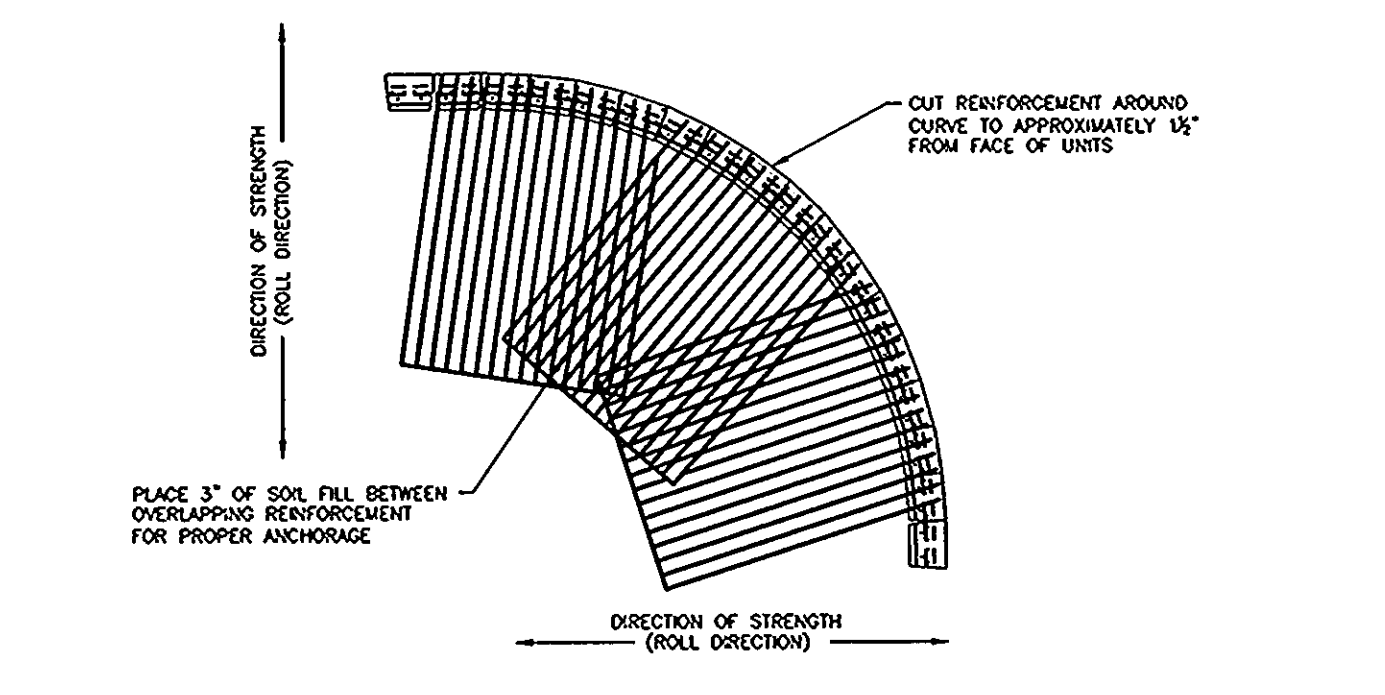
**GEOSYNTHETIC PLACEMENT-OUTSIDE CORNER**

N.T.S.



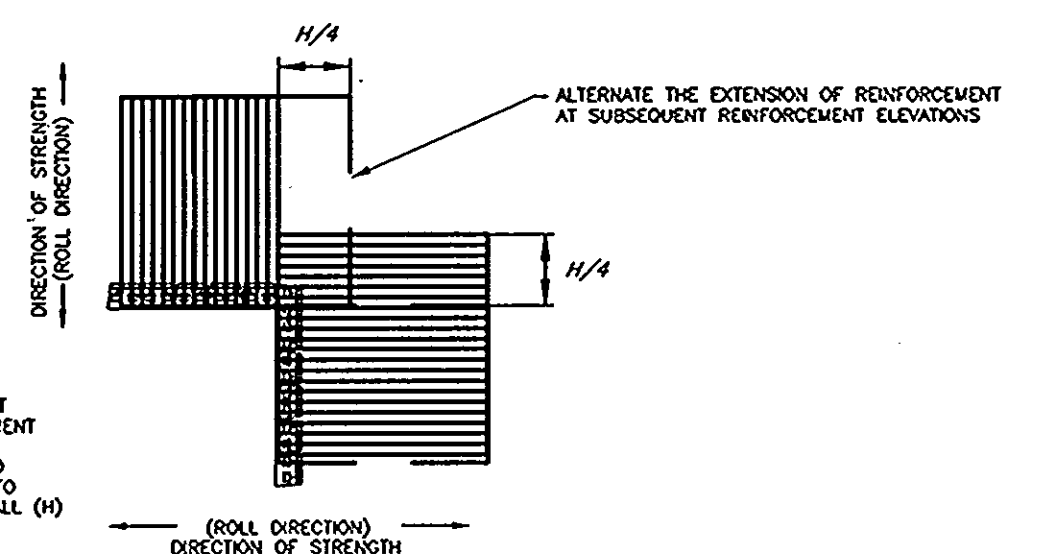
**LEVELING PAD DETAIL**

N.T.S.



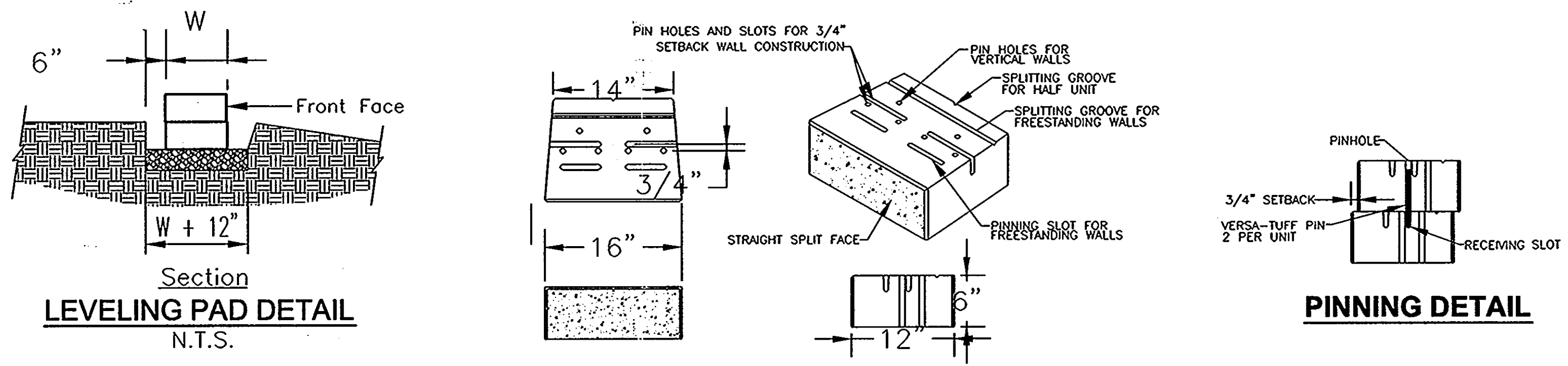
**GEOSYNTHETIC PLACEMENT-CONVEX CURVE**

N.T.S.

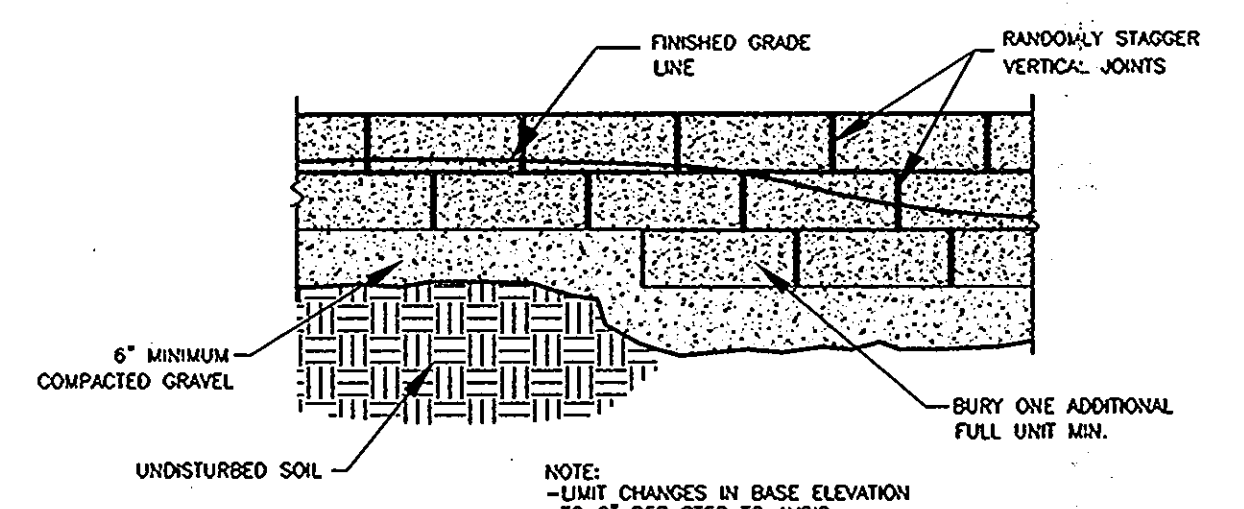


**GEOSYNTHETIC PLACEMENT-INSIDE CORNER**

N.T.S.

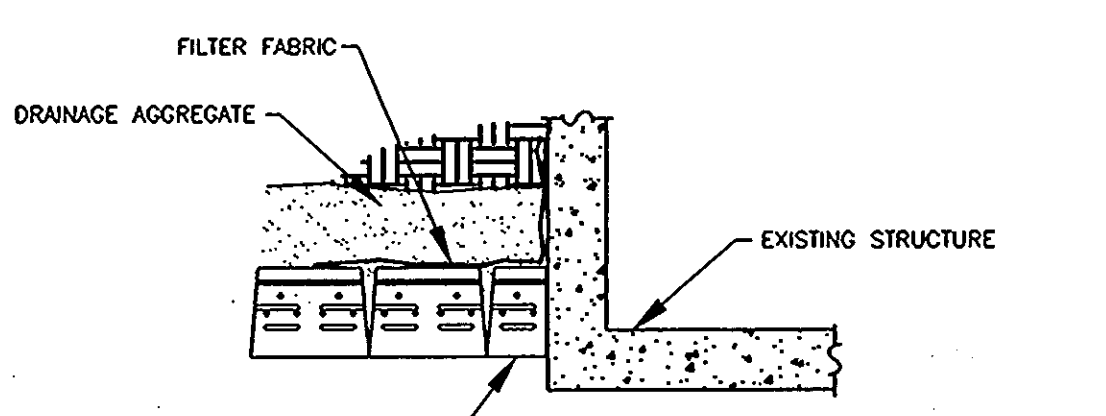


**VERSA-LOK UNIT**



**STEPPING BASE DETAIL**

N.T.S.



**WALL ABUTMENT DETAIL**

N.T.S.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 7/20/08 DATE  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 8/5/08 DATE  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 8/8/08 DATE  
 DIRECTOR

OWNER/PETITIONER  
 MIDDLE PATUXENT PROPERTIES, LLC.  
 12421 HOOPER COURT  
 FULTON, MARYLAND 20759-9645  
 240-372-9038

NO.	REVISION	DATE

**CONSTRUCTION DETAILS & SECTIONS**

**HARWOOD INDUSTRIAL CENTER**  
 PARCEL E-2  
 PARCEL E-2  
 HOWARD COUNTY, MARYLAND

TAX MAP 38 BLOCK 14  
 1ST ELECTION DISTRICT  
 PROFESSIONAL CERTIFICATION  
 I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed professional engineer under the laws of the State of Maryland.  
**Ryan & Associates**  
 A Division of WKR Consulting Inc.  
 Consulting & Design Engineers  
 Structural - Retaining Walls  
 Geo-technical  
 Email: info@ryanandassociates.com  
 922 North Elm Street, Frederick, MD 21701  
 Tel: (301) 360-9534 Fax: (301) 360-9574

DESIGN BY: JO  
 DRAWN BY: JO  
 CHECKED BY: WKR  
 DATE: JUNE 09, 2008  
 SCALE: AS SHOWN  
 W.O. NO.: 05-10  
 14 SHEET OF 16



**AASCD/MAA VEGETATIVE ESTABLISHMENT DETAILS AND SPECIFICATIONS FOR PROJECTS WITHIN 4 MILES OF THE BWI AIRPORT JULY 1, 2008**

References to ITEM #s noted below are found in Maryland Aviation Administration's manual entitled Specifications for Performing Landscaping Activities for the Maryland Aviation Administration dated May 2001

**SOIL TESTS**

- Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within seven calendar days for the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1) and fourteen days for all other disturbed or graded areas on the project site.
- Occurrence of acid sulfate soils (grayish black color) will require covering with a minimum of 12 inches of clean soil with 6 inches minimum capping of top soil. No stockpiling of material is allowed. If needed, soil tests shall be done before and after a 6-week incubation period to allow oxidation of sulfides.
- The minimum soil conditions required for permanent vegetative establishment are:
  - Soil pH shall be between 6.0 and 7.0.
  - Soluble salts shall be less than 500 parts per million (ppm).
  - The soil shall contain less than 40% clay but enough fine grained material (>30% fill plus clay) to provide the capacity to hold a moderate amount of moisture.
  - Soil shall contain 1.5% minimum organic matter by weight.
  - Soil must contain sufficient pore space to permit adequate root penetration.
  - If these conditions cannot be met by soils on site, adding topsoil is required in accordance ITEM 901 or amendments made as recommended by a certified agronomist.

**SEEDING**

**ITEM 903 SEEDING**

**DESCRIPTION**  
903-1.1 GENERAL. This item provides specifications for seeding of areas as designated on plans or as directed by the MAA Engineer. The species, mixtures, and methods of application provided in this item have been designed to reduce the attractiveness of airport grounds to wildlife. Only MAA-approved species, mixtures, and rates of application provided in this item may be used to establish vegetation. All activities associated with seeding including soil preparation, seed application, fertilization, and maintenance shall also conform to these approved standards.

**MATERIALS**

903-2.1 SEED. All seed shall comply with the Maryland Seed Law (Agricultural Article of the Code of Maryland). Only MAA-approved species, mixtures, and rates of application provided in this item may be used to establish vegetation. Seed will be sampled and tested by an inspector from the Turf and Seed Section, Maryland Department of Agriculture (MDA), Annapolis, Maryland. All laws and turf seed and mixtures shall be free from the following state-listed restricted noxious weeds:

Seed	Rate of Application (lbs of PLS/acre)
75% Hard Fescue	85
20% Chewings Fescue	23
5% Kentucky Bluegrass	7
Supplemental Seed Redtop	3

corn cockle (*Agrimonia eupatoria*), henbane (*Atropa belladonna*), wild onion (*Allium canadense*), wild garlic (*Allium vineale*), bindweed (*Convolvulus* spp.), dodder (*Cuscuta* spp.), Bermuda grass (*Cynodon dactylon*), scarlet runner (*Elymus glaucus*), tall fescue (*Festuca arvensis*), meadow fescue (*Festuca pratensis*), velvetgrass (*Holcus lanatus*), annual bluegrass (*Poa annua*), rough bluegrass (*Poa trivialis*), timothy (*Phleum pratense*), and Johnson grass (*Sorghum halepense*).

Restricted noxious-weed seed may not exceed 0.5 percent by weight of any seed mixture. In addition, all seeds sold in Maryland shall be free from the following listed prohibited seeds: corn cockle (*Agrimonia eupatoria*), henbane (*Atropa belladonna*), wild onion (*Allium canadense*), wild garlic (*Allium vineale*), bindweed (*Convolvulus* spp.), dodder (*Cuscuta* spp.), Bermuda grass (*Cynodon dactylon*), scarlet runner (*Elymus glaucus*), tall fescue (*Festuca arvensis*), meadow fescue (*Festuca pratensis*), velvetgrass (*Holcus lanatus*), annual bluegrass (*Poa annua*), rough bluegrass (*Poa trivialis*), timothy (*Phleum pratense*), and Johnson grass (*Sorghum halepense*).

903-2.1.3 MIXTURES AND APPLICATION RATES. Only seed mixtures and application rates described in this item may be used unless otherwise approved by the MAA Engineer. Seed mixtures shall meet criteria detailed in Paragraph 903-2.1.2. Seed mixtures have been formulated to minimize the attractiveness of areas to wildlife of common landscape scenarios. The appropriate seed mixture for application will be designated based on environmental conditions and may vary from site to site. All planting rates listed are in pounds of Pure Live Seed (PLS) per acre.

Seed mixtures, application scenarios, and rates for permanent cool-season grasses are as follows:

- Seed Mixture No. 1 - relatively flat areas (grade less than 4:1) subject to normal conditions and regular mowing (Application rate = 234 lbs PLS/acre);
- Seed Mixture No. 2 - sloped areas (grade greater than 4:1) not subject to regular mowing (Application rate = 115 lbs PLS/acre); and
- Seed Mixture No. 3 - wetlands and their associated buffer zones (Application rate = 131 lbs PLS/acre).

Seed Mixture No. 1: Relatively flat areas regularly mowed and exposed to normal conditions (Application rate = 234 lbs PLS/acre)

Seed	Rate of Application (lbs of PLS/acre)
85% Certified Turf-Type Tall Fescue	192
10% Certified Kentucky Bluegrass	28
5% Perennial Ryegrass	14
Supplemental Seed Annual Ryegrass	25

903-2.2 LIME. Lime shall consist of ground limestone and contain at least 85 percent total calcium. Lime shall be ground to a fineness so that at least 90 percent will pass through a No. 20 mesh sieve and 50 percent will pass through a No. 100 mesh sieve. Dolomitic lime or a high magnesium lime shall contain at least 10 percent magnesium oxide. Lime shall be applied by approved methods detailed in Section 903-3.3 of this item. The rate of application will be based on results of soil tests.

903-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizer (supplied separately or in mixtures) and meet the requirements of applicable state and federal laws (CFR 241) as well as standards of the Association of Official Agricultural Chemists. Nitrogen-Phosphorus-Potassium (N-P-K) concentrations shall be determined from analysis of soil samples (Approved Fertilizer rate: 21 pounds of 10-10-10 per 1,000 square feet). Methods of fertilizer application shall conform to standards described in Section 903-3.3 of this item. Fertilizer shall be furnished in standard containers that are clearly labeled with name, weight, and guaranteed analysis of the contents (percentage of total nitrogen, available phosphoric acid, and water-soluble potash). Mixed fertilizers shall not contain any hydrated lime or cyanamide compounds. Fertilizers failing to meet the specified analysis may be approved by the MAA Engineer, providing sufficient materials are applied to conform with the specified nutrients per unit of measure without additional cost to MAA.

The fertilizers may be supplied in the following forms:

- A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- A finely ground fertilizer soluble in water, suitable for application by power sprayer; or

noxious weeds: hallooivine (*Cardioperman halicacabum*), quackgrass (*Elytrigia repens*), sicklepod (*Senna obtusifolia*), sorghum (*Sorghum spp.*), Canada thistle (*Cirsium arvense*), phloxes (pink) (*Carduus spp.*), includes much thick and curled daisy, and sorrel tussock (*Nastella trichotoma*).

903-2.1.1 APPROVED SPECIES. The following table contains species that are approved by MAA for use in seed mixtures. Purity requirements and germination requirements are also provided.

MAA SEED MIXTURES	APPROVED PLANT SPECIES		
	Purity Not Less than %	Minimum % Germination	Pure Live Seed Factor
Certified Turf-Type Tall Fescue ( <i>Festuca arvensis</i> )	90	90	1.13
Certified Kentucky Bluegrass ( <i>Poa pratensis</i> )	90	80	1.39
Hard Fescue ( <i>Festuca ovina</i> )	98	90	1.13
Chewings Fescue ( <i>Festuca ovina</i> )	98	90	1.13
Annual Ryegrass ( <i>Lolium multiflorum</i> )	95	85	1.24
Perennial Ryegrass ( <i>Lolium perenne</i> )	90	80	1.39
Fowl Meadow Grass ( <i>Poa puberula</i> )	90	80	1.39
Lime Bluegrass ( <i>Lolium perenne</i> )	62	94	1.71

903-2.1.2 PURITY. All seed shall be free of all state-designated noxious weeds listed in Paragraph 2.1.1 and conform to MAA specifications. To ensure compliance, MAA requires sampling and testing of seed by the Turf and Seed Section, Maryland Department of Agriculture (MDA). The Contractor shall furnish the MAA Engineer with duplicate signed copies of a statement by the Turf and Seed Section certifying that each lot of seed has been laboratory tested within six months of date of delivery. This statement shall include the following information:

- name and address of laboratory;
- date of test;
- lot number;
- the results of tests as to name, percentages of purity and of germination;
- percentage of weed content of the seed furnished;

Seed Mixture No. 2: Sloped areas not subject to regular mowing (Application rate = 115 lbs PLS/acre)

Seed	Rate of Application (lbs of PLS/acre)
75% Hard Fescue	85
20% Chewings Fescue	23
5% Kentucky Bluegrass	7
Supplemental Seed Redtop	3

Seed Mixture No. 3 - Wetland areas and their associated buffer zones (Application rate = 131 lbs PLS/acre)

Seed	Rate of Application (lbs of PLS/acre)
60% Fowl Meadow Grass	83
30% Chewings Fescue	34
10% Perennial Ryegrass	14
Supplemental Seed Redtop	3

903-2.1.4 SEEDING SEASONS. Application of seed and seed mixture shall occur within a specified seeding season unless otherwise approved by the MAA Engineer. No seed or seed mixtures are to be applied on frozen ground or when the temperature is at or below 35 degrees Fahrenheit (7.2 degrees Centigrade). Under these conditions, a layer of mulch should be applied in accordance with Item 905. Mulching, to stabilize the site, and permanent seeding should occur in the subsequent seeding season. Seed application may occur during the seeding season dates listed below. Seeding performed after October 20 should be a temporary cover of annual ryegrass and followed by overseeding of the appropriate seed mixture during the spring seeding season.

SEEDING SEASONS	Rate of Application (lbs of PLS/acre)
Permanent Cool-Season Grasses	March 1 to April 30 and August 1 to October 30, inclusive
Temporary Cover of Annual Ryegrass	March 1 to April 30 and August 1 to November 30, inclusive
Temporary Cover of Warm-Season Grasses (Lime Bluegrass only)	May 1 to July 31, inclusive. Rate of application should be 13.6 lbs PLS per acre.

Seeding seasons are based on typical years and can be subject to variation, which may be modified by the MAA Engineer based on seasonal trends.

If the time required to complete any of the operations necessary under this item, within the specified planting season or any authorized extension thereof, extends beyond the Contract period, then such time will be charged against the Contract time, and liquidated damages will be enforced with respect to this portion of work.

903-2.2 LIME. Lime shall consist of ground limestone and contain at least 85 percent total calcium. Lime shall be ground to a fineness so that at least 90 percent will pass through a No. 20 mesh sieve and 50 percent will pass through a No. 100 mesh sieve. Dolomitic lime or a high magnesium lime shall contain at least 10 percent magnesium oxide. Lime shall be applied by approved methods detailed in Section 903-3.3 of this item. The rate of application will be based on results of soil tests.

903-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizer (supplied separately or in mixtures) and meet the requirements of applicable state and federal laws (CFR 241) as well as standards of the Association of Official Agricultural Chemists. Nitrogen-Phosphorus-Potassium (N-P-K) concentrations shall be determined from analysis of soil samples (Approved Fertilizer rate: 21 pounds of 10-10-10 per 1,000 square feet). Methods of fertilizer application shall conform to standards described in Section 903-3.3 of this item. Fertilizer shall be furnished in standard containers that are clearly labeled with name, weight, and guaranteed analysis of the contents (percentage of total nitrogen, available phosphoric acid, and water-soluble potash). Mixed fertilizers shall not contain any hydrated lime or cyanamide compounds. Fertilizers failing to meet the specified analysis may be approved by the MAA Engineer, providing sufficient materials are applied to conform with the specified nutrients per unit of measure without additional cost to MAA.

The fertilizers may be supplied in the following forms:

- A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- A finely ground fertilizer soluble in water, suitable for application by power sprayer; or

c. A granular or pellet form suitable for application by blower equipment.

The rate of application will be based on results of soil tests performed by the University of Maryland Soil Testing Laboratory. By law, persons applying fertilizer to State-owned land shall follow the recommendations of the University of Maryland as set forth in the "Plant Nutrient Recommendations Based on Soil Tests for Turf Maintenance" and the "Plant Nutrient Recommendations Based on Soil Tests for Soil Production" (see Appendix B). Application of the fertilizer shall be in a manner that is consistent with the recommendations of the University of Maryland Cooperative Extension.

**CONSTRUCTION METHODS AND EQUIPMENT**

903-3.1 GENERAL. This section provides approved methods for the application of and includes standards for seedbed preparation, methods of application, and equipment to be used during the process. Lime and fertilizer shall be applied to seeded areas before the seed is spread. The mixture of seed will be determined for sites based on environmental conditions as described in Paragraph 903-2.1.3.

903-3.2 ADVANCE PREPARATION. Areas designated for seeding shall be properly prepared in advance of seed application. The area shall be tilled and graded prior to application of lime and fertilizer, and the surface area shall be cleared of any stones larger than 1 inch in diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. Damage caused by erosion or other forces that occur after the completion of grading shall be repaired prior to the application of fertilizer and lime. The Contractor will repair such damage, which may include filling gullies, smoothing irregularities, and repairing other incidental damage before beginning the application of fertilizer and ground limestone.

If an area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, all grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory condition by discing or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

An area to be seeded shall be considered a satisfactory seedbed (without requiring additional treatment) if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches; the top 3 inches of soil is loose, friable, and is reasonably free from large clods, rocks, large roots, or other undesirable matter; appropriate amounts of fertilizer and lime have been applied, if it has been shaped to the required grade immediately prior to seeding. For slope areas steeper than 3:1 (three horizontal to one vertical), the subsoil shall be loose to a depth of 1 inch.

After completion of tilling and grading, lime and fertilizer shall be applied within 48 hours according to the specified rate (Paragraphs 903-2.2 and 2.3) and methods (Paragraphs 903-2.3.1 and 903-3.2.2) approved by MAA. The seeding mixture shall be applied within 48 hours after application of lime and fertilizer. To firm the seeded areas, outpacking shall occur immediately after seeding.

903-3.3 METHODS OF APPLICATION. Lime, fertilizer, and seed mixtures shall be applied by either the dry or wet application methods that have been approved by MAA and are detailed below.

**903-3.3.1 DRY APPLICATION METHOD**

a. Liming. If soil test results indicate that lime is needed, the following procedures will be used: following advance preparation of the seedbed, lime shall be applied prior to the application of any fertilizer or seed and only on seedbeds that have been prepared as described in Paragraph 903-3.2. The lime shall be uniformly spread and worked into the top 2 inches of soil, after which the seedbed shall be properly graded again.

b. Fertilizing. Following advance preparations (and liming if necessary), fertilizer shall be spread uniformly at the specified rate to provide no less than the minimum quantity stated in Paragraph 903-2.3.

c. Seeding. Seed mixtures shall be sown immediately after fertilization of the seedbed. The fertilizer and seed shall be lightly raked to a depth of 1 inch for newly graded and disturbed areas.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted using a cultipacker or an approved lawnmower.

**903-3.3.2 WET APPLICATION METHOD/HYDROSEEDING**

a. General. The Contractor may elect to apply seed and fertilizer as per Paragraph c and d of this section in the form of an aqueous mixture by spraying over the previously prepared seedbed using methods and equipment approved by MAA. The rates of application shall be as specified in Paragraphs 903-2.1 through 903-2.3.

b. Spraying Equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge capable of reading increments of 50 gallons or less over the entire range of the tank capacity. The liquid level gauge shall be mounted so as to be visible to the nozzle operator at all times. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The spraying equipment shall also include a pressure pump capable of delivering 100 gallons per minute at a pressure of 100 pounds per square inch. The pressure pump assembly shall be configured to allow the mixture to flow through the tank when not being sprayed from the nozzle. All pump passages and pipelines shall be capable of providing clearance for 5/8-inch solids. The power units for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. A pressure gauge shall be connected to and mounted immediately behind the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture to be supplied so that mixtures may be properly sprayed over a distance varying from 20 feet to 100 feet. One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For ease of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings. In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

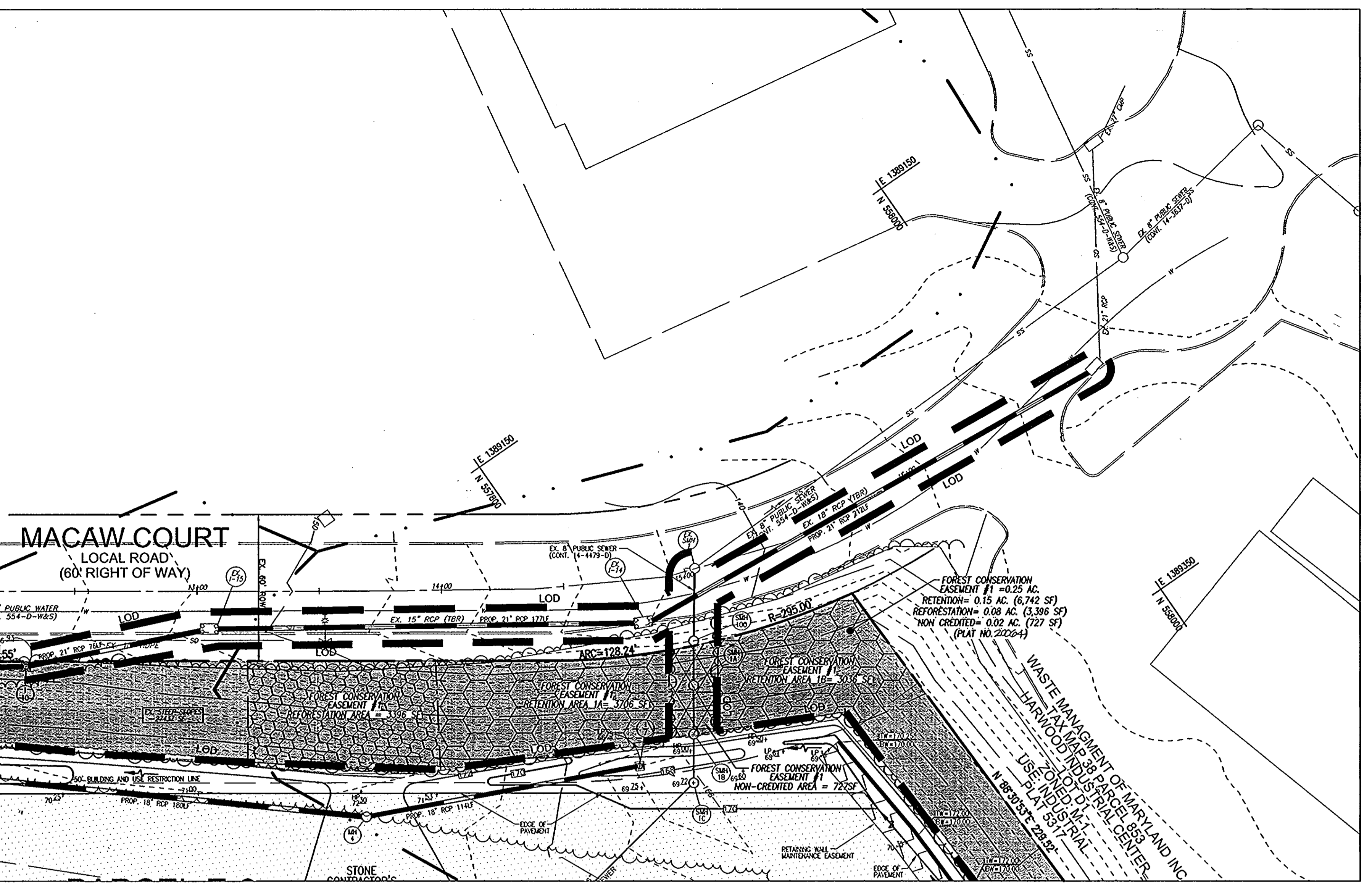
c. Mixtures. Lime shall be applied separately in the quantity specified, prior to the fertilizing and seeding operations. Lime should be added to and mixed with water at a concentration not to exceed 220 pounds of lime for every 100 gallons of water. After lime has been applied, the tank should be emptied and rinsed with fresh water. Seed and fertilizer shall be mixed together in the relative proportions specified, but the resulting concentration should not exceed 220 pounds of mixture per 100 gallons of water and should be applied within 30 minutes to prevent fertilizer burn of the seeds.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Fresh water shall not be used at any time. The Contractor shall identify all sources of water to the MAA Engineer at least two weeks prior to use. The Engineer may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 30 minutes from the time they were mixed or they shall be wasted and disposed of at a location acceptable to the Engineer.

**MINING OPERATIONS**

Sediment control plans for mining operations must include the following seeding dates and mixtures:  
For seeding dates of February 1 through April 30 and August 15 through October 31, use seed mixture of tall fescue at the rate of 2 pounds per 1,000 square feet and red top at the minimum rate of 0.5 pounds per 1,000 square feet.  
NOTE: Use of this information does not preclude meeting all of the requirements of the current Maryland Standards and Specifications for Soil Erosion and Sediment Control.



SCALE: 1"=30'

shall be applied using a high-pressure spray which shall always be directed upward into the air so that the mixtures will fall to the ground in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner that might produce erosion or runoff. Particular care shall be exercised to ensure that the application is made uniformly, at the prescribed rate, and to guard against misses and overlapped areas. Predetermined quantities of the mixture shall be used in accordance with specifications to cover specified sections of known areas. To check the rate and uniformity of application, the applicator will observe the degree of wetting of the ground or distribute test sheets of paper or pans over the area at intervals and observe the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the MAA Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is to be used, the raking and rolling operations will be required after the soil has dried.

903-3.4 MAINTENANCE OF SEEDED AREAS. The contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeded as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work performed out of season, the Contractor will be required to establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

**MULCHING**

Mulch shall be applied to all seeded areas immediately after seeding. During the time period when seeding is not permitted, mulch shall be applied immediately after grading.

Mulch shall be applied as per ITEM 905.

d. Spraying. Lime shall be sprayed upon previously prepared seedbeds on which the lime, if required, shall have been worked in already. The mixtures

**TEMPORARY SEEDING**

Lime: 100 pounds of dolomitic limestone per 1,000 square feet.

Fertilizer: 15 pounds of 10-10-10 per 1,000 square feet.

Seed: Per ITEM 903

Mulch: Mulch shall be applied as per ITEM 905.

**FILL**

No fills may be placed on frozen ground. All fill to be placed in approximately horizontal layers, each layer having a loose thickness of not more than 8 inches. All fill in roadways and parking areas is to be classified Type 2 as per Anne Arundel County Code - Article 21, Section 2-308, and compacted to 90% density; compaction to be determined by ASTM D-1557-60T (Modified Proctor). Any fill within the building areas is to be compacted to a minimum of 95% density as determined by methods previously mentioned. Fills for pond embankments shall be compacted as per MD-378 Construction Specifications. All other fills shall be compacted sufficiently so as to be stable and prevent erosion and slippage.

**SODDING**

Installation of sod should follow permanent seeding dates. Seedbed preparation for sod shall be as noted above. Lime and fertilizer per permanent seeding specifications and lightly irrigate soil prior to laying sod. Sod is to be laid on the contour with all ends tightly abutting. Joints are to be staggered between rows. Water and roll or tamp sod to insure positive root contact with the soil. All slopes steeper than 3:1, as shown, are to be permanently sodded or protected with an approved erosion control netting. Additional watering for establishment may be required. Sod is not to be installed on frozen ground. Sod shall not be transplanted when moisture content (dry or wet) and/or temperature may adversely affect its survival. In the absence of adequate rainfall, irrigation should be performed to ensure establishment of sod.

Install sod as per ITEM 904.

**OWNER/PETITIONER**  
MIDDLE PATUXENT PROPERTIES, LLC.  
12421 HOOPER COURT  
FULTON, MARYLAND 20759-9645  
240-372-9038

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**

AASCD/MAA NOTES & DETAILS;  
MACAW COURT STORM DRAIN CONSTRUCTION

HARWOOD INDUSTRIAL CENTER  
PARCEL E-2

TAX MAP 38 BLOCK 14  
1ST ELECTION DISTRICT

PARCEL E-2  
HOWARD COUNTY, MARYLAND

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

DESIGN BY: _____	DATE: _____
DRAWN BY: _____	DATE: _____
CHECKED BY: _____	DATE: _____
SCALE: _____	AS SHOWN
W.O. NO.: _____	05-10

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 7/20/08

CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 8/5/08

DIRECTOR  
DATE: 8/8/08