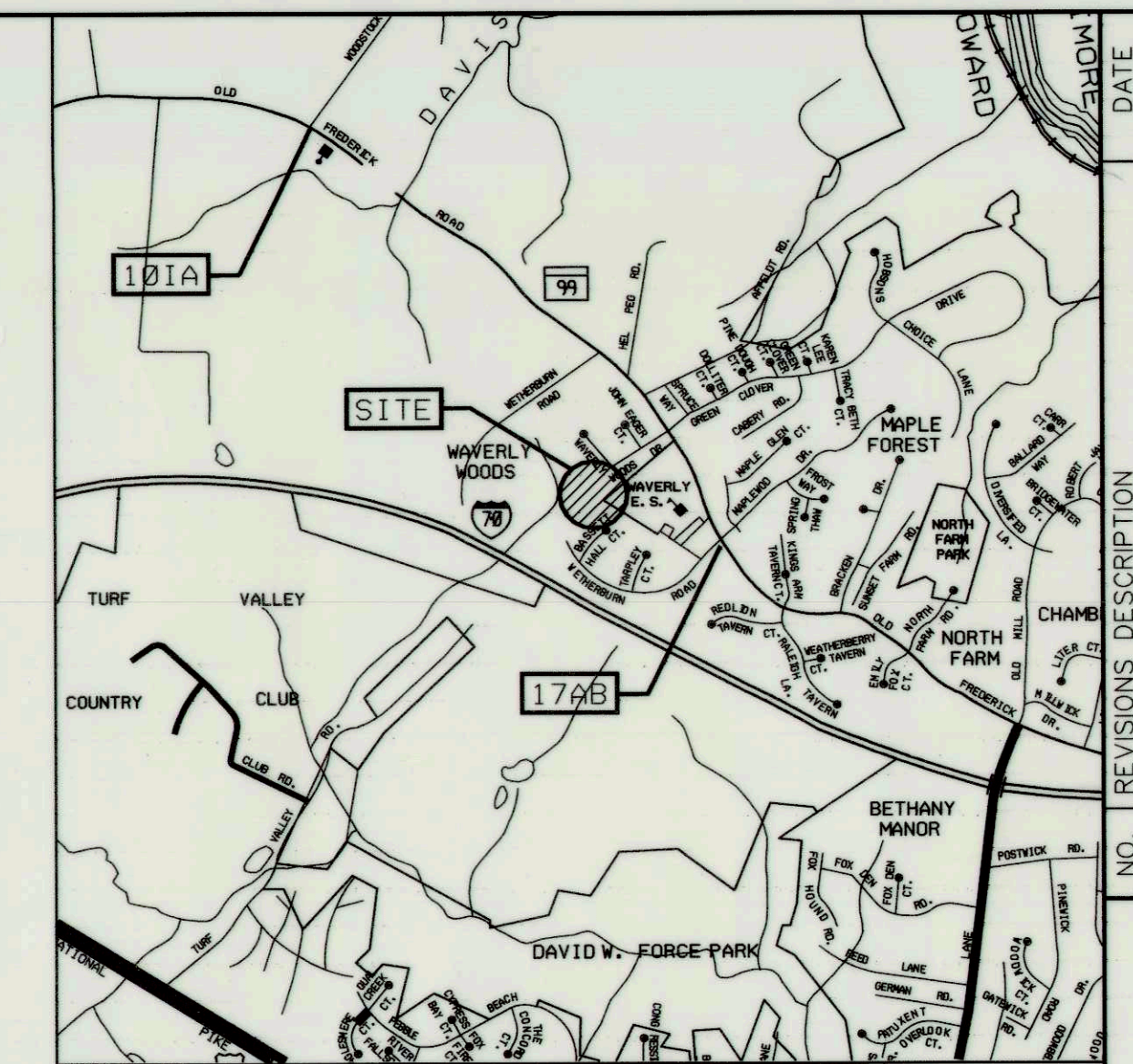


# WAVERLY WOODS, SECTION 1, AREA 1

## STORMWATER MANAGEMENT RETROFIT

### HOWARD COUNTY, MARYLAND

HOWARD COUNTY SURVEY CONTROL			
DESIGNATION	NORTHING	EASTING	ELEVATION
10IA	600995.1136	1345340.330	441.969
17AB	598435.249	1348615.248	508.469



VICINITY MAP  
1"=2000'

NO.	REVISIONS DESCRIPTION	DATE

10 NORTH PARK DRIVE  
HUNT VALLEY, MD 21030  
PHONE: (410) 316-7800  
FAX: (410) 316-7817  
www.kci.com



WAVERLY WOODS  
SECTION 1, AREA 1  
STORMWATER MANAGEMENT RETROFIT  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MARYLAND 21046  
PLAT #7269, TAX MAP 16 & 17, GRID 7, PARCEL 667,  
LOT 46, ELECTION DISTRICT 2

TITLE SHEET

SCALE:	AS SHOWN
DATE:	FEBRUARY 2008
KCI JOB NO.:	01-043223.28
CAPITAL PROJECT NO.:	
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
SHEET NO.:	1 OF 5

LEGEND

	EX. TREES
	EXIST. MAJOR CONTOUR
	EXIST. MINOR CONTOUR
	PROP. CONTOURS
	EXIST. PROPERTY LINE
	WETLANDS
	LIMIT OF DISTURBANCE
	SILT FENCE
	REMOVABLE PUMPING STATION
	SUMP PIT
	ORANGE SAFETY FENCE
	PROPOSED STORM DRAIN
	PERIMETER DIKE/SWALE
	EXISTING FENCE
	EXISTING EDGE OF ROADWAY
	EDGE OF ROADWAY
	EPHEMERAL DRAINAGEWAY (NON-JURISDICTIONAL)
	FILTER BAG
	PUMP
	SANDBAG DIVERSION
	PROPOSED GABION
	EX. EMBANKMENT REPLACEMENT
	EX. RIPRAP
	PROP. RIPRAP

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GRADING PLAN
3	PROFILES AND DETAILS
4	EROSION AND SEDIMENT CONTROL PLAN
5	EROSION AND SEDIMENT CONTROL NOTES & DETAILS

SITE ANALYSIS DATA CHART

- TOTAL PROJECT AREA: 3.56 ACRES.
- LIMIT OF DISTURBED AREA: 1.57 ACRES (68,435 SF).
- PRESENT ZONING DESIGNATION: R-20.
- PROPOSED USE FOR THE SITE: RETROFIT EXISTING STORMWATER FACILITY.
- OPEN SPACE ON SITE: 148,754.3 SF (96% OF GROSS AREA).

HAZARD CLASSIFICATION STATEMENT

THE BREACH HEIGHT UNDER PROPOSED CONDITIONS IS 6.0 FEET. THE RESULTING BREACH DISCHARGE IS 282.2 CFS. THE CHANNEL RUNS NEARLY 1700 FEET BEFORE PASSING UNDER WETHERBURN ROAD. NO OBSTRUCTIONS EXIST UPSTREAM OF WETHERBURN ROAD.

A CROSS SECTION WAS ANALYZED 400' DOWNSTREAM OF THE EMBANKMENT. THE DEPTH AT THIS LOCATION WAS 1.03 FEET WITH A VELOCITY OF 3.66 FEET PER SECOND. THIS WAS DETERMINED TO BE NON-HAZARDOUS CONDITIONS.

THEREFORE, SINCE NO STRUCTURES WILL BE IMPACTED AS A RESULT OF A DAM FAILURE, THIS POND IS A CLASS "A" HAZARD.

ADDRESS CHART

LOT/PARCEL NO. 46/697	STREET NO. S WAVERLY WOODS DRIVE ELLCOTT CITY, MD 21042
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PERMIT INFORMATION CHART

SUBDIVISION NAME	SECTION/AREA	LOT/PARCEL NO.
WAVERLY WOODS	1/1	46/697
PLAT * GRID *	ZONING	TAX MAP
7269 7	R20	16 & 17
WATER CODE	SEWER CODE	ELEC. DIST.
N/A	N/A	2
		CENSUS TRACT
		6021



ENGINEER'S CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

*James A. Tomkinson*  
SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE)  
**JAMES TOMKINSON, P.E.**  
DATE: 2/8/08

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS AND THAT ANY 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 THE BEGINNING OF THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT"

*Howard E. Saltzman*  
SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE)  
**Howard E Saltzman**  
DATE: 2/7/08

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

*Howard SCD*  
HOWARD SCD  
DATE: 3/5/08

AS-BUILT CERTIFICATION

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

*James A. Tomkinson*  
SIGNATURE OF ENGINEER  
LICENSE NO. 31201  
DATE: AUGUST 25, 2011

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, LICENSE NO. 31201 EXPIRATION DATE: JANUARY 24, 2009



THESE SPECIFICATIONS ARE APPROPRIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

**SITE PREPARATION**  
 AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

**EARTH FILL**  
 MATERIAL - THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION CC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER. MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

**PLACEMENT** - AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL MATERIAL. FILL SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

**COMPACTION** - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF SHEEPSFOOT, RUBBER TIERED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/- 2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

**CUT OFF TRENCH** - THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GROUND OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

**EMBANKMENT CORE** - THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

**STRUCTURE BACKFILL**  
 BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE, UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE WHEN USING FLOWABLE FILL. ALL METAL PIPE SHALL BE BITUMINOUS COATED, ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT

TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET MEASURED HORIZONTALLY TO ANY PART OF A STRUCTURE UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURE BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

**PIPE CONDUITS**  
 ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.  
 CORRUGATED METAL PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR CORRUGATED METAL PIPE:

1. MATERIALS - (POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL BE INSULATED FROM DISSIMILAR MATERIALS WITH PER REQUIREMENTS OF AASHTO SPECIFICATION M-245 & M-246 WITH WATER TIGHT COUPLING BANDS OR FLANGES.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. ALL COUPLING BANDS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATER TIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE RIGIDLY SECURED TO THE RISER. METAL ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATER TIGHT. Dimple BANDS ARE NOT CONSIDERED TO BE WATER TIGHT.

4. JOINTS - ALL JOINTS SHALL BE RIGIDLY SECURED TO THE PIPE. ALL JOINTS SHALL BE RIGIDLY SECURED TO THE PIPE. ALL JOINTS SHALL BE RIGIDLY SECURED TO THE PIPE. ALL JOINTS SHALL BE RIGIDLY SECURED TO THE PIPE.

5. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH, WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

**REINFORCED CONCRETE PIPE** - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR REINFORCED CONCRETE PIPE:

1. MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361.

2. BEDDING - REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING / CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING / CRADLE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE. AT LEAST 60% OF ITS OUT-SIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".  
 THROUGHOUT ITS ENTIRE LENGTH WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.  
 PLASTIC PIPE - THE FOLLOWING CRITERIA SHALL APPLY FOR PLASTIC PIPE:

1. MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLERS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4" - 10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATER TIGHT.  
 3. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".  
 5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

**CONCRETE**  
 CONCRETE SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 414, MIX NO. 3.  
**ROCK RIPRAP**  
 ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 414, MIX NO. 3.

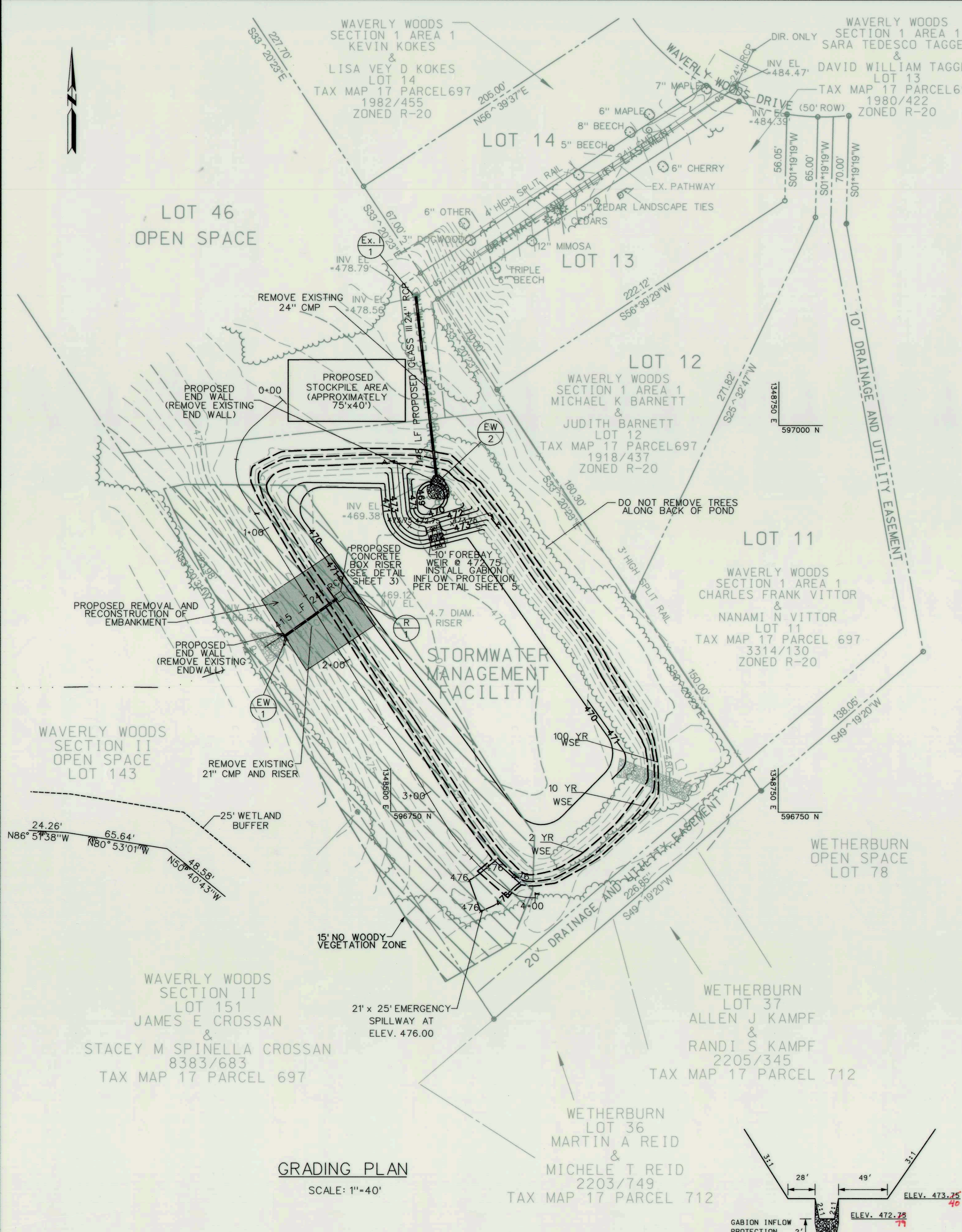
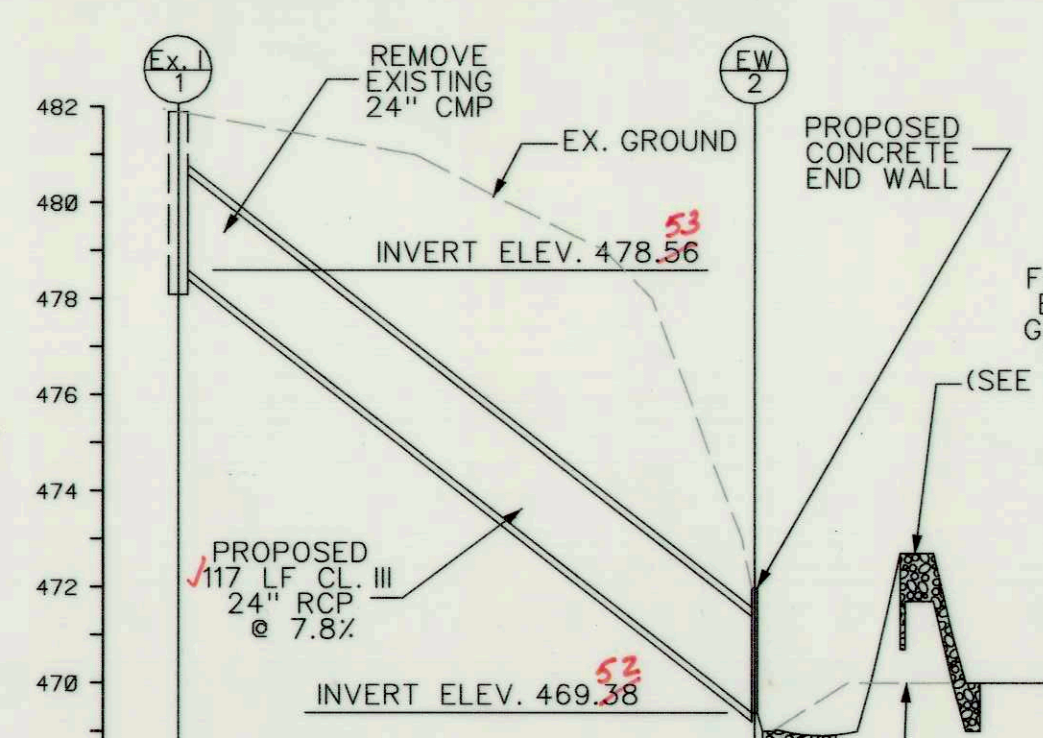
**CARE OF WATER DURING CONSTRUCTION**  
 ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED. EXCAVATION SAND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

**STABILIZATION**  
 ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SIGHTLY CONDITION. ALL EXPOSED SURFACE OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

**EROSION AND SEDIMENT CONTROL**  
 CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

**HYDROLOGIC SUMMARY (DRAINAGE AREA - 29.81 AC)**

	EXISTING				PROPOSED			
	2-YR (EX)	10-YR (EX)	10-YR (ULT)	100-YR (ULT)	2-YR (EX)	10-YR (EX)	10-YR (ULT)	100-YR (ULT)
ORIGINAL APPROVED DISCHARGES	4.3	19.2	77.0	N/A	N/A	N/A	N/A	N/A
COMPUTED INFLOW (CFS)	26.3	70.5	87.5	146.2	26.3	70.5	87.5	146.2
WATER SURFACE ELEV. (FT)	474.26	475.68	476.12	476.95	473.93	475.51	476.00	476.99
DISCHARGE (CFS)	3.9	22.1	41.8	114.0	3.84	21.4	33.2	103.1
STORAGE (AC-FT)	1.276	1.999	2.400	3.094	0.850	2.097	2.514	3.407



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

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

DATE: 1/15/00

**KCI TECHNOLOGIES**  
 10 NORTH PARK DRIVE  
 HUNT VALLEY, MD 21030  
 PHONE: (410) 316-7800  
 FAX: (410) 316-7817  
 WWW.KCI.COM

**WAVELY WOODS SECTION 1, AREA 1**  
 STORMWATER MANAGEMENT RETROFIT  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MARYLAND 21046  
 PLAT #2989, TAX MAP 16 & 17, GRID 7, PARCEL 697,  
 LOT 46, ELECTION DISTRICT 2

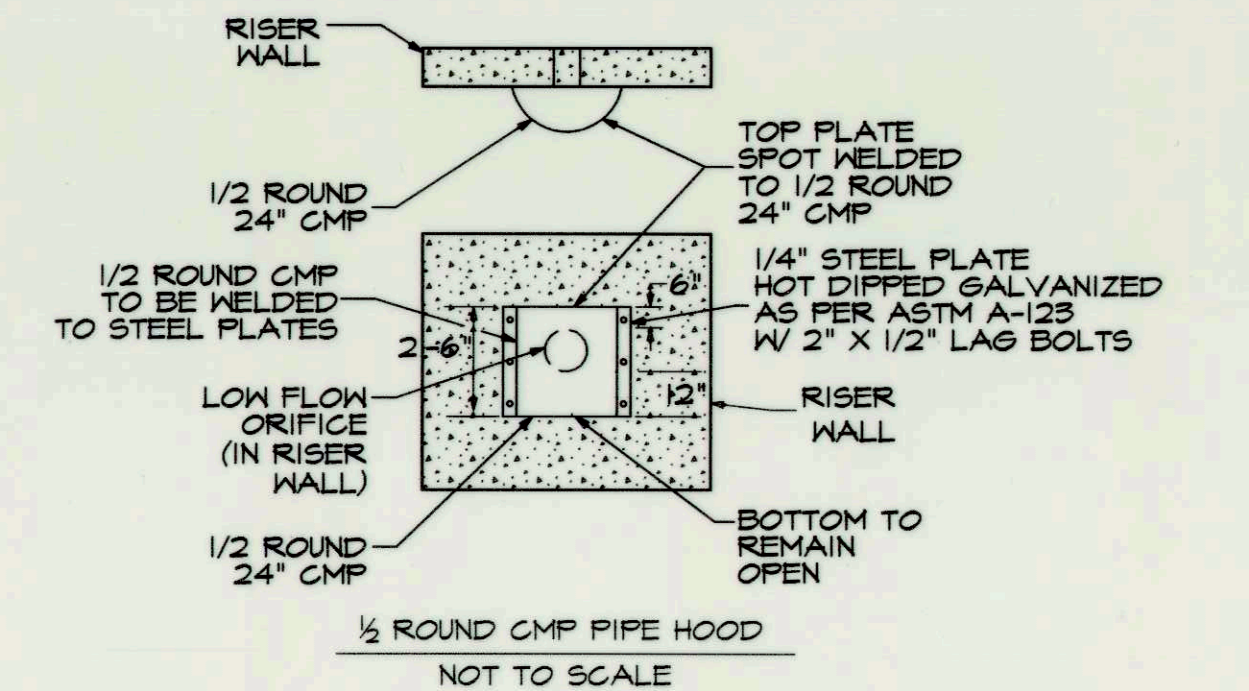
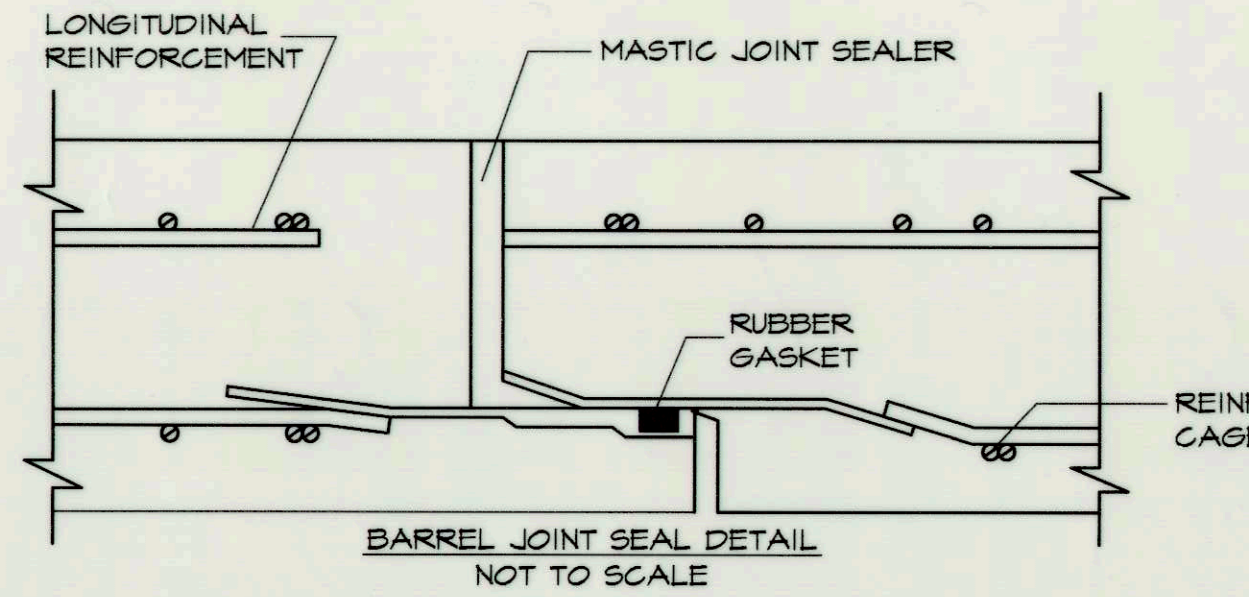
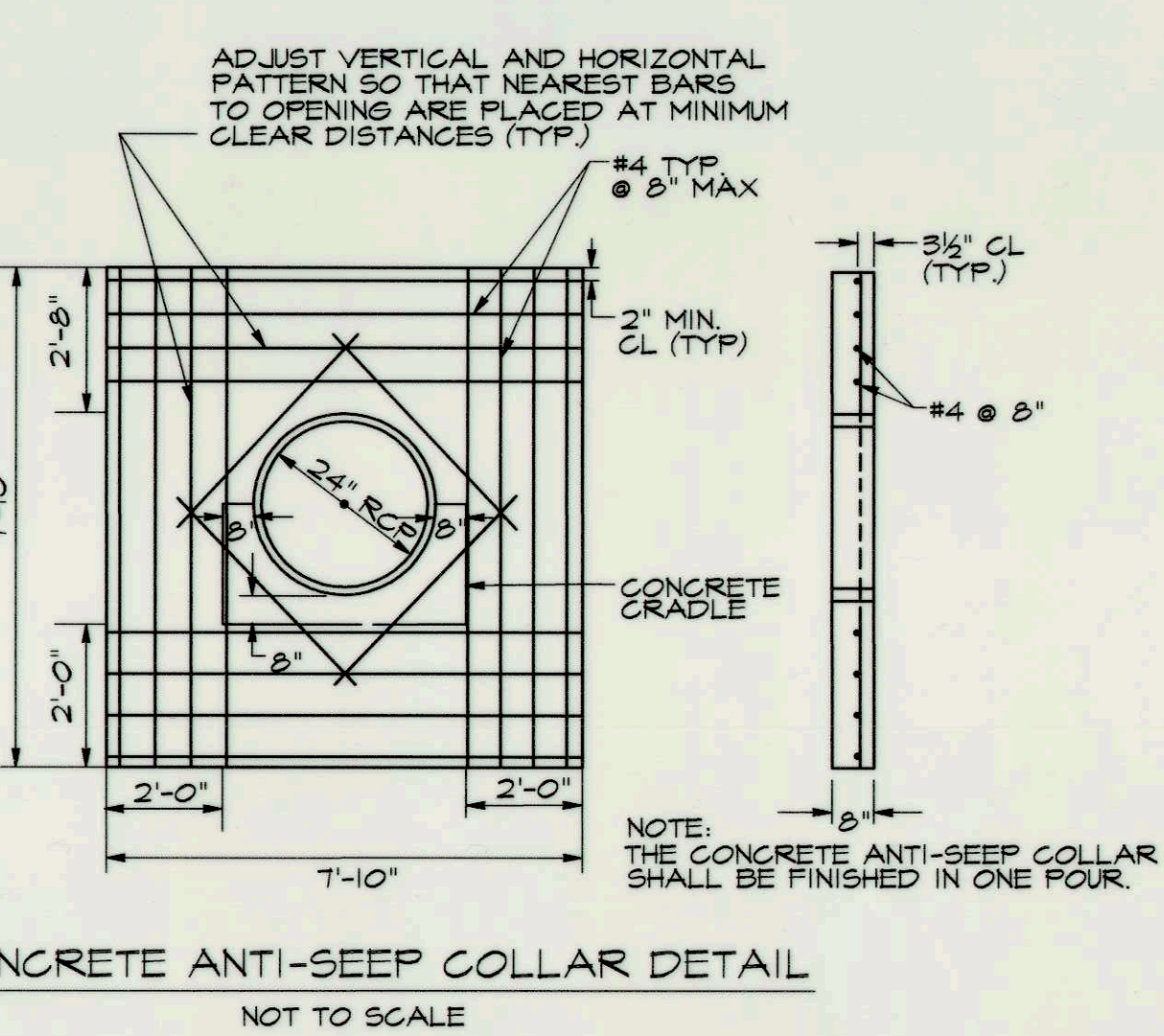
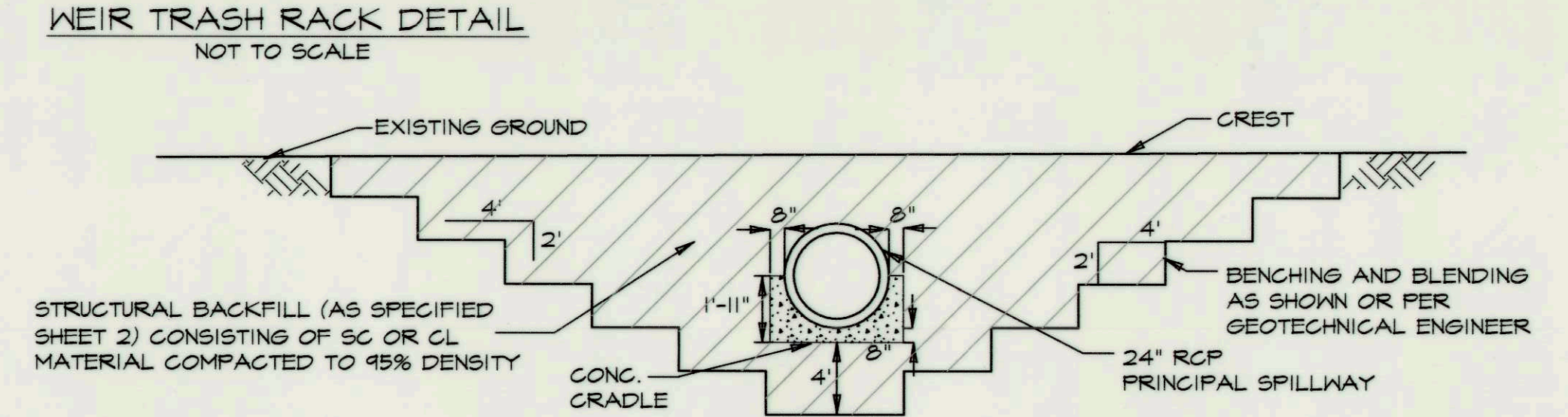
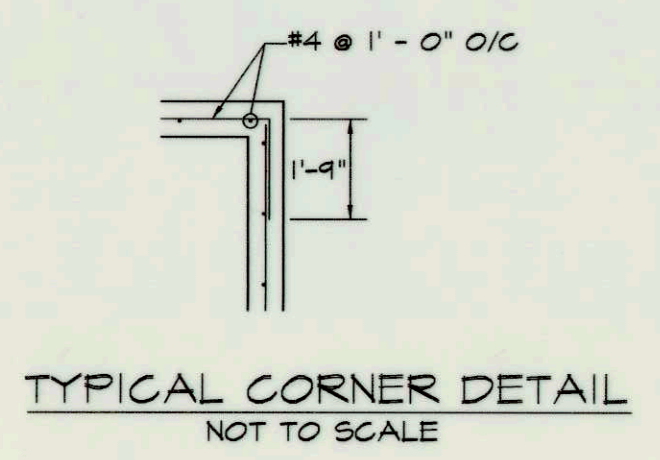
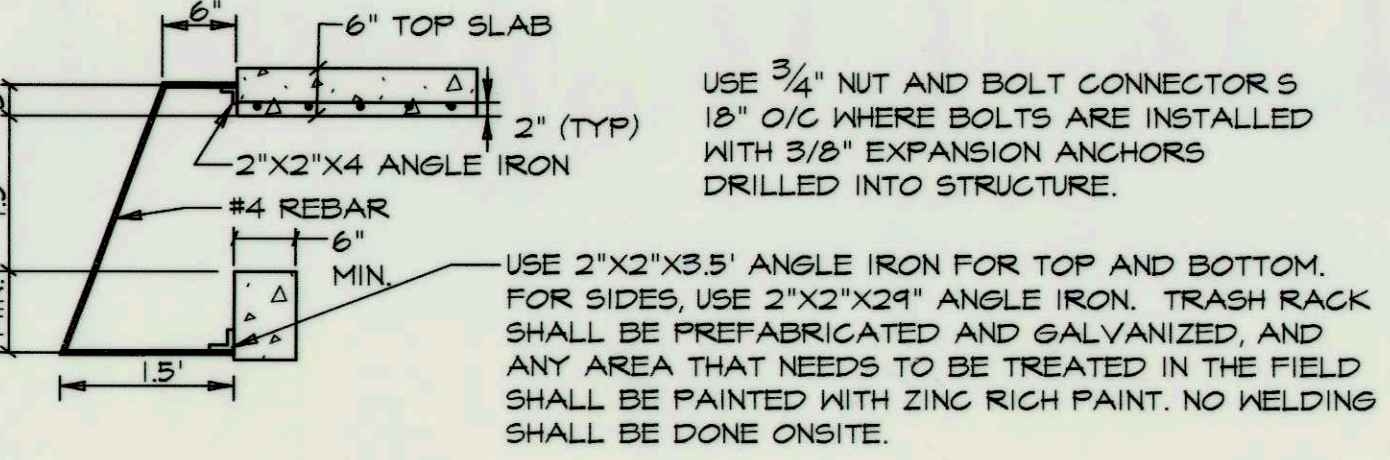
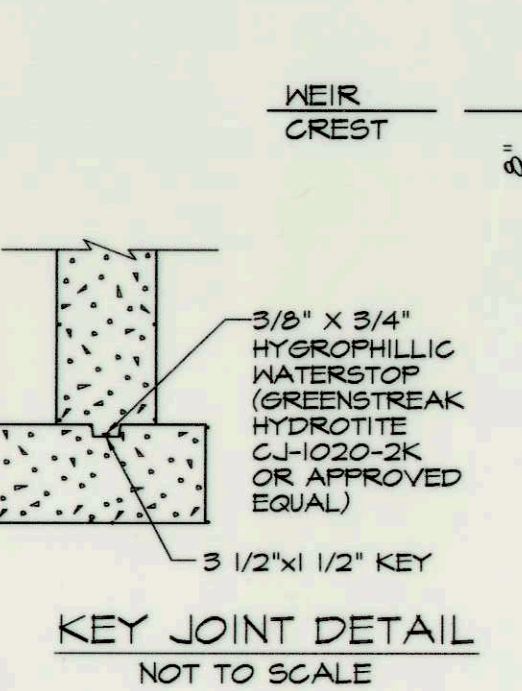
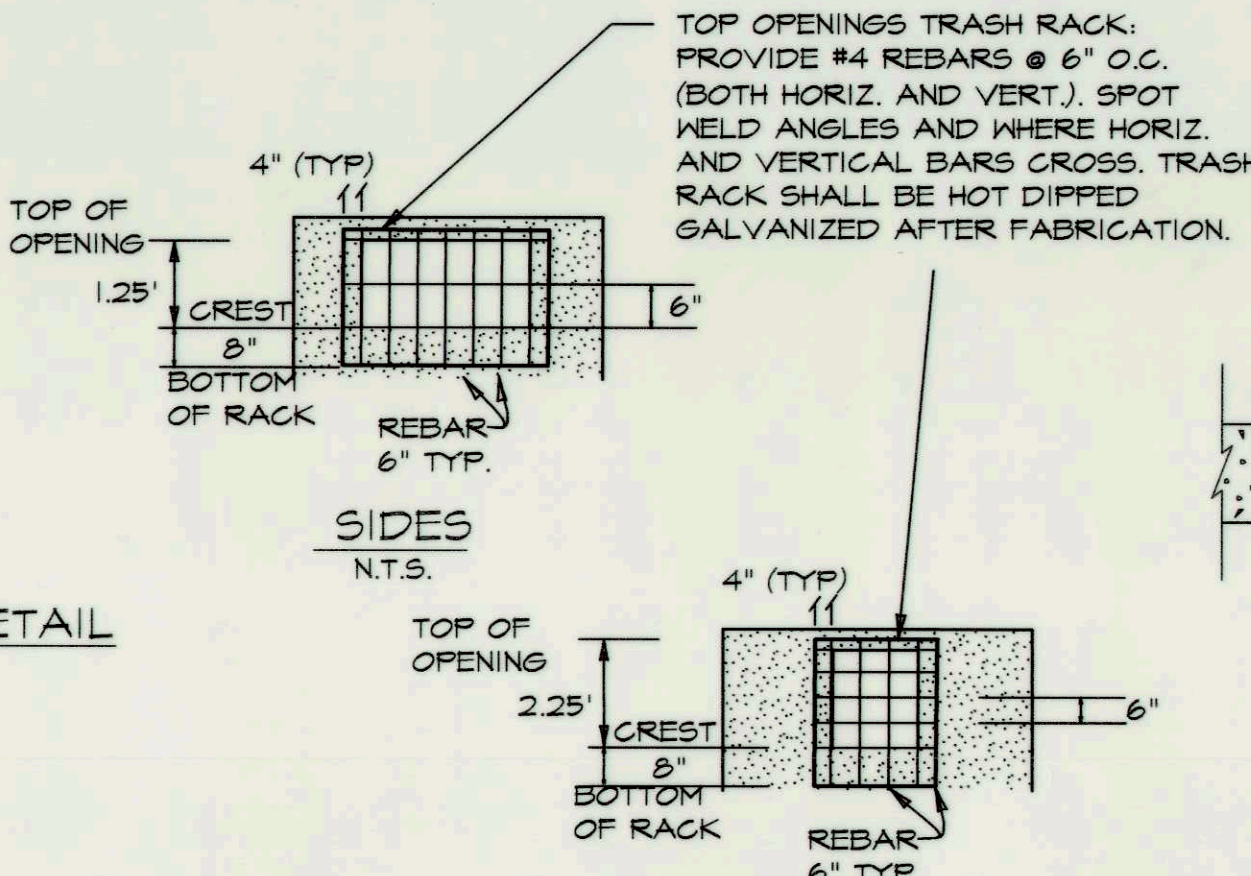
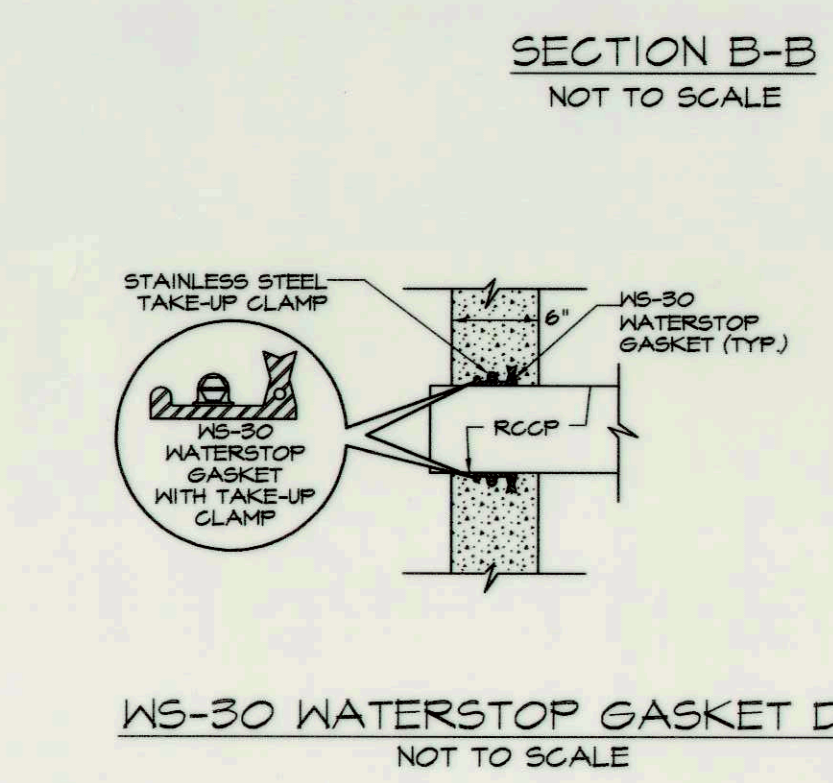
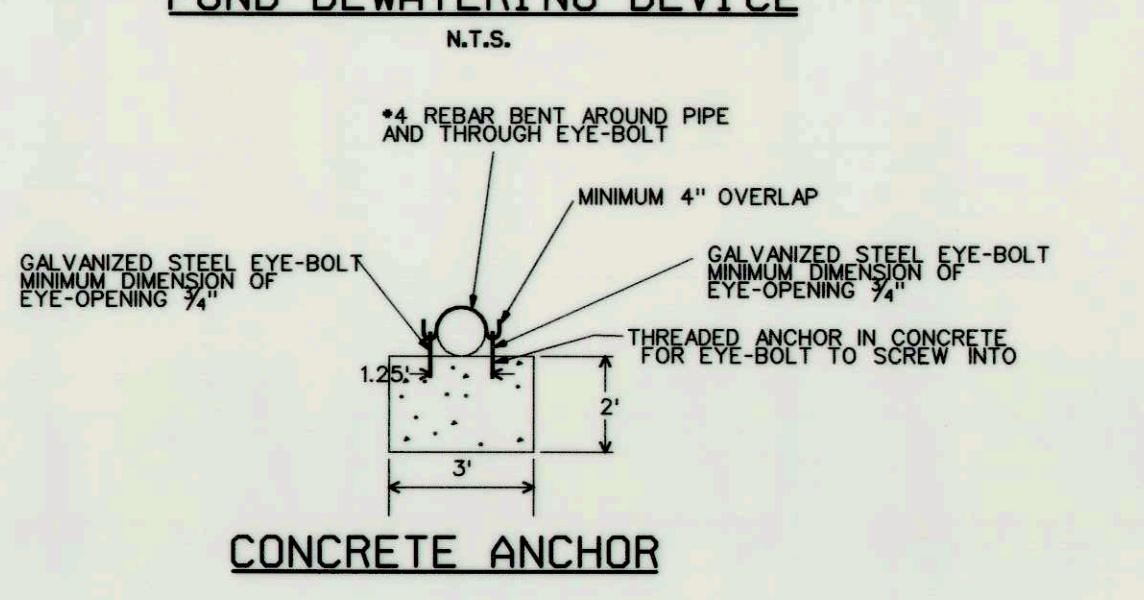
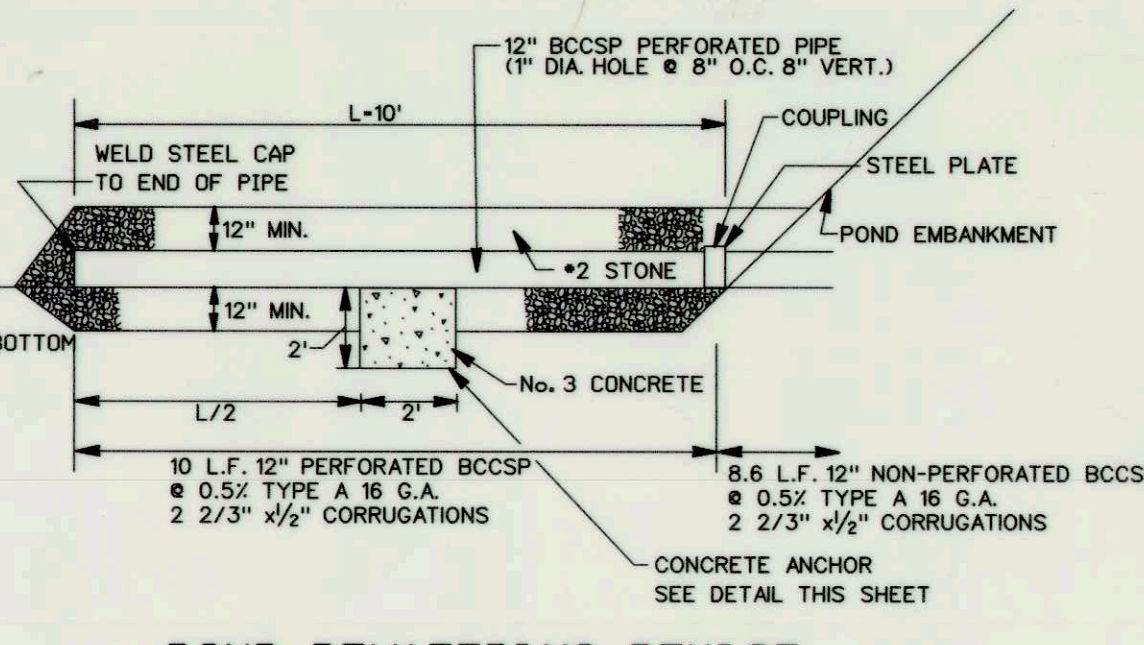
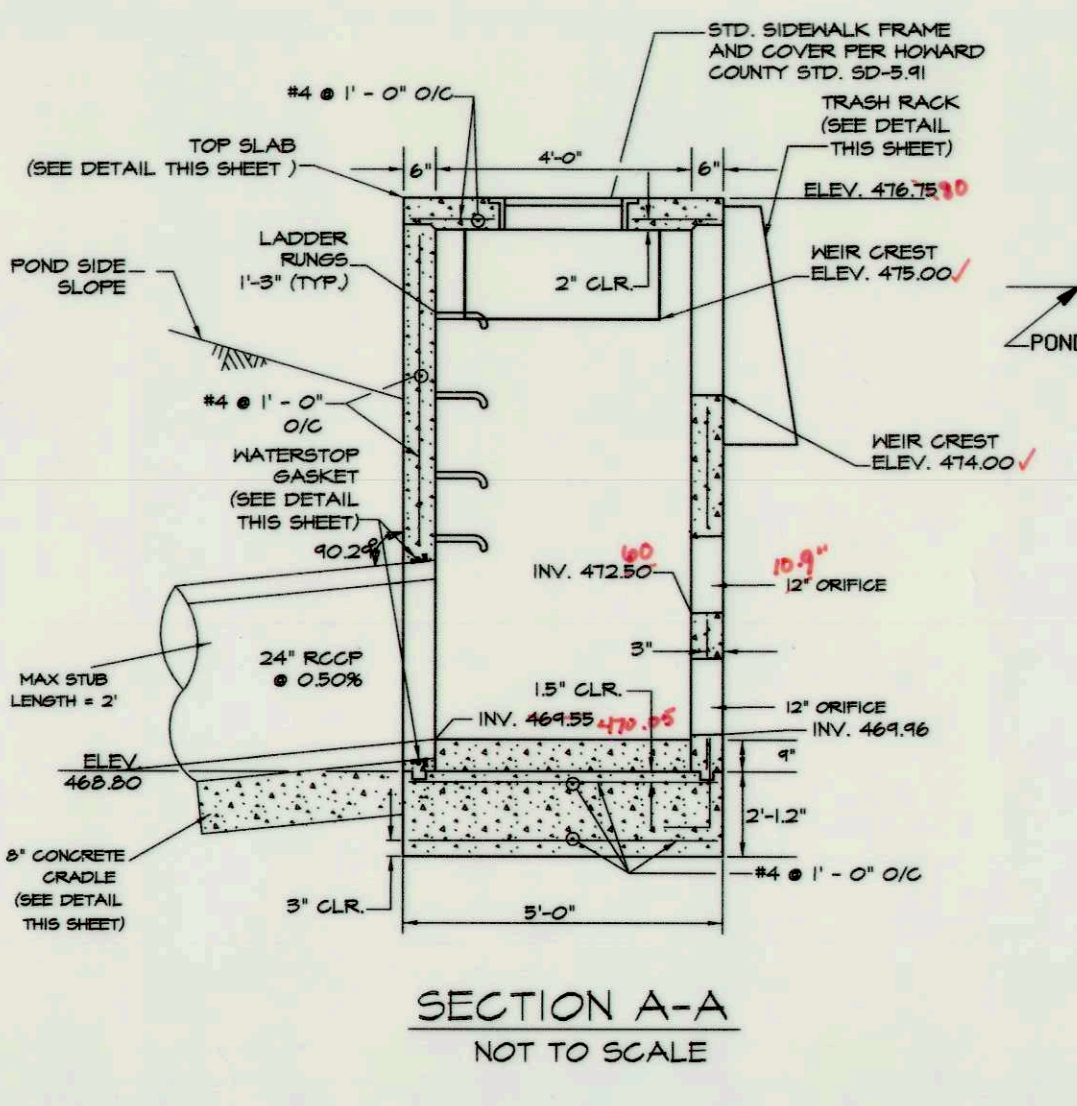
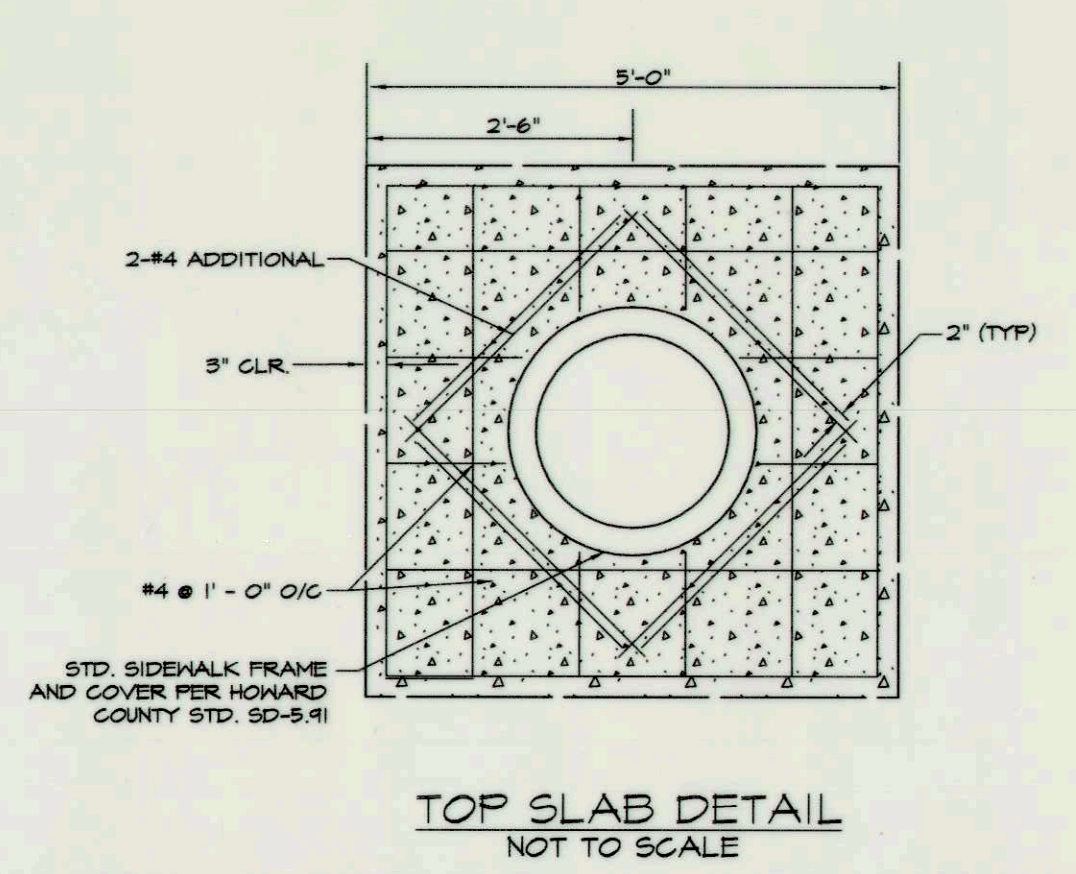
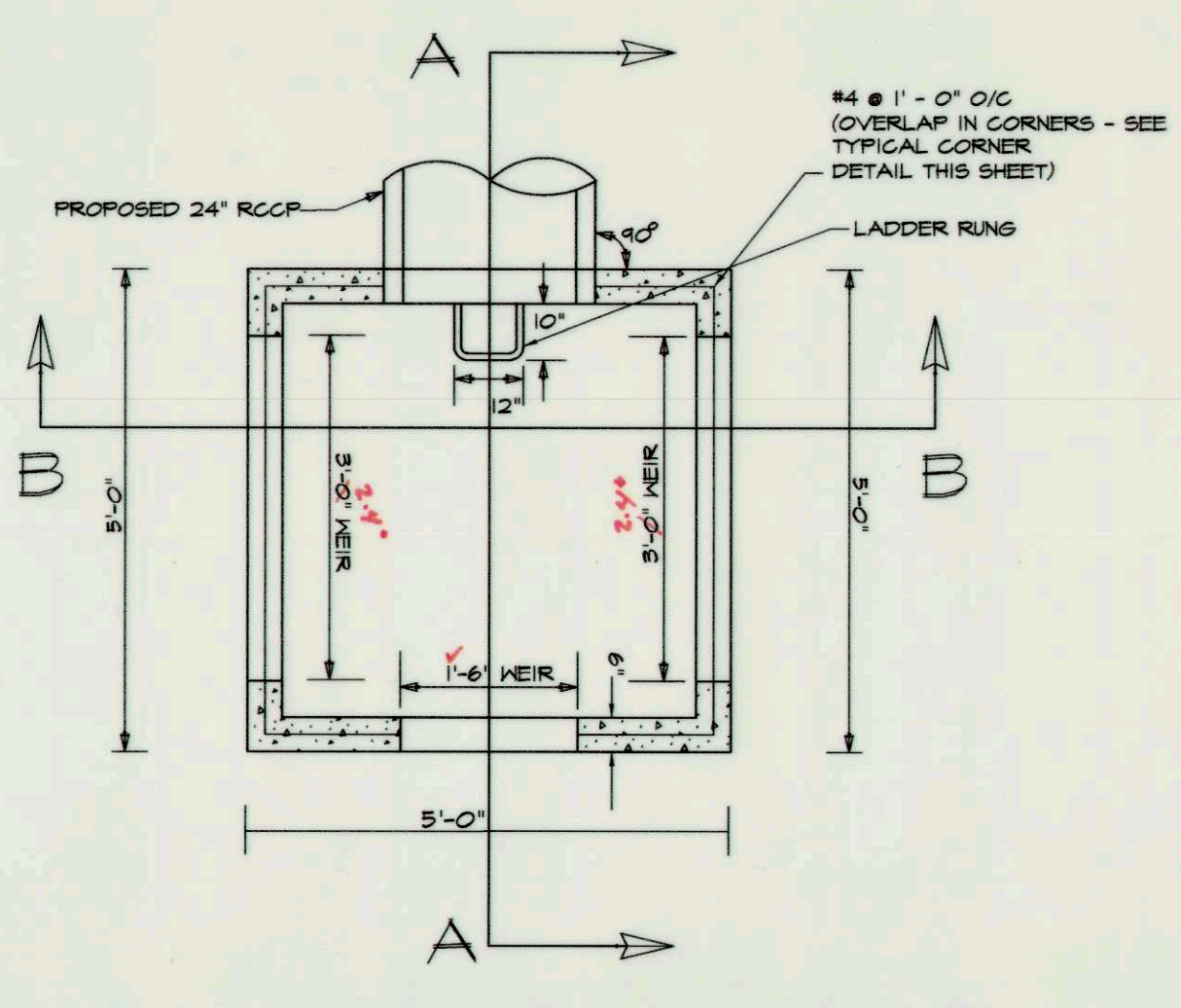
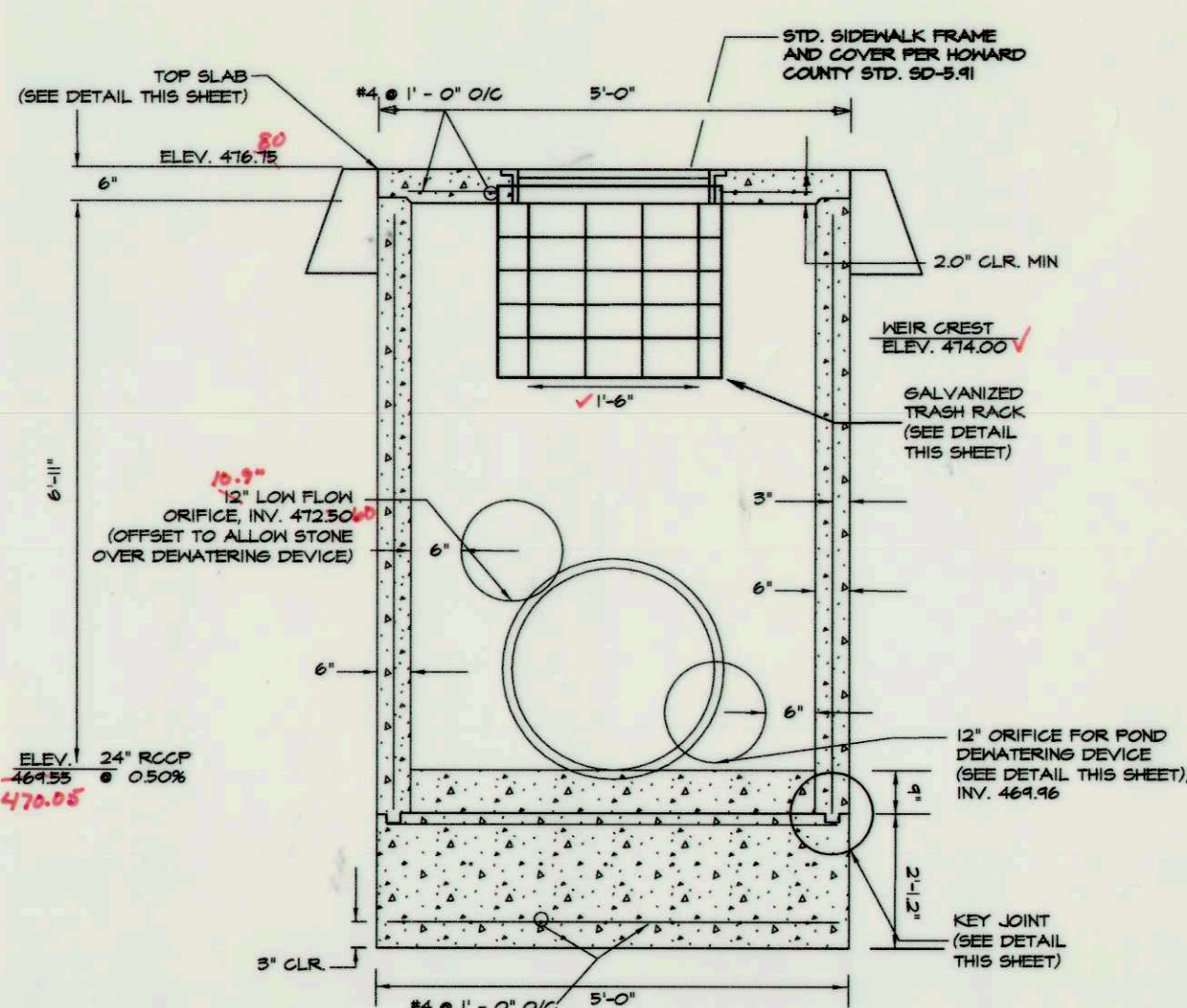
**GRADING PLAN**

SCALE: 1"=40'  
 DATE: FEBRUARY 2008  
 KCIJOB NO.: 01-043223.28  
 CAPITAL PROJECT NO.:  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

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, LICENSE NO. 31201 EXPIRATION DATE: JANUARY 24, 2009

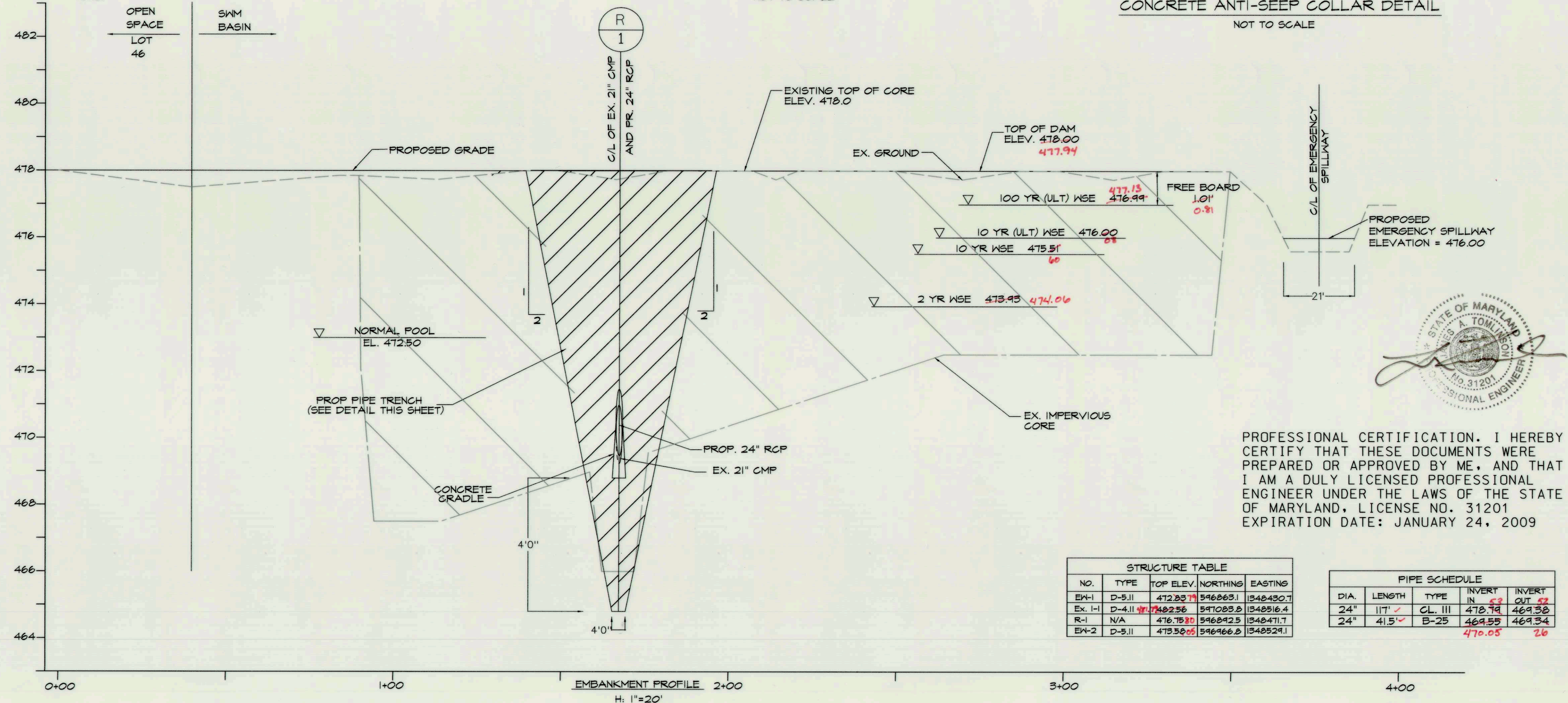
SHEET NO.: 2 OF 5





**OPERATION, MAINTENANCE, AND INSPECTION**

INSPECTION OF THE POND SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USDA, NRCS "STANDARDS AND SPECIFICATIONS FOR PONDS" (MD-579). THE POND OWNER(S) AND ANY HEIRS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATIONS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.



THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD COUNTY DISTRICT.

HOWARD SCD *[Signature]* DATE 3/5/08

NO.	REVISIONS DESCRIPTION	DATE

10 NORTH PARK DRIVE  
HUNT VALLEY, MD 21030  
PHONE: (410) 316-7800  
FAX: (410) 316-7817  
WWW.KCI.COM

**WAVERLY WOODS SECTION 1, AREA 1**

STORMWATER MANAGEMENT RETROFIT

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MARYLAND 21046

PLAT #7289, T&M 145, 15, & 17, CSD# 7, PARCEL 687, LOT 48, ELECTION DISTRICT 2

**PROFILES & DETAILS**

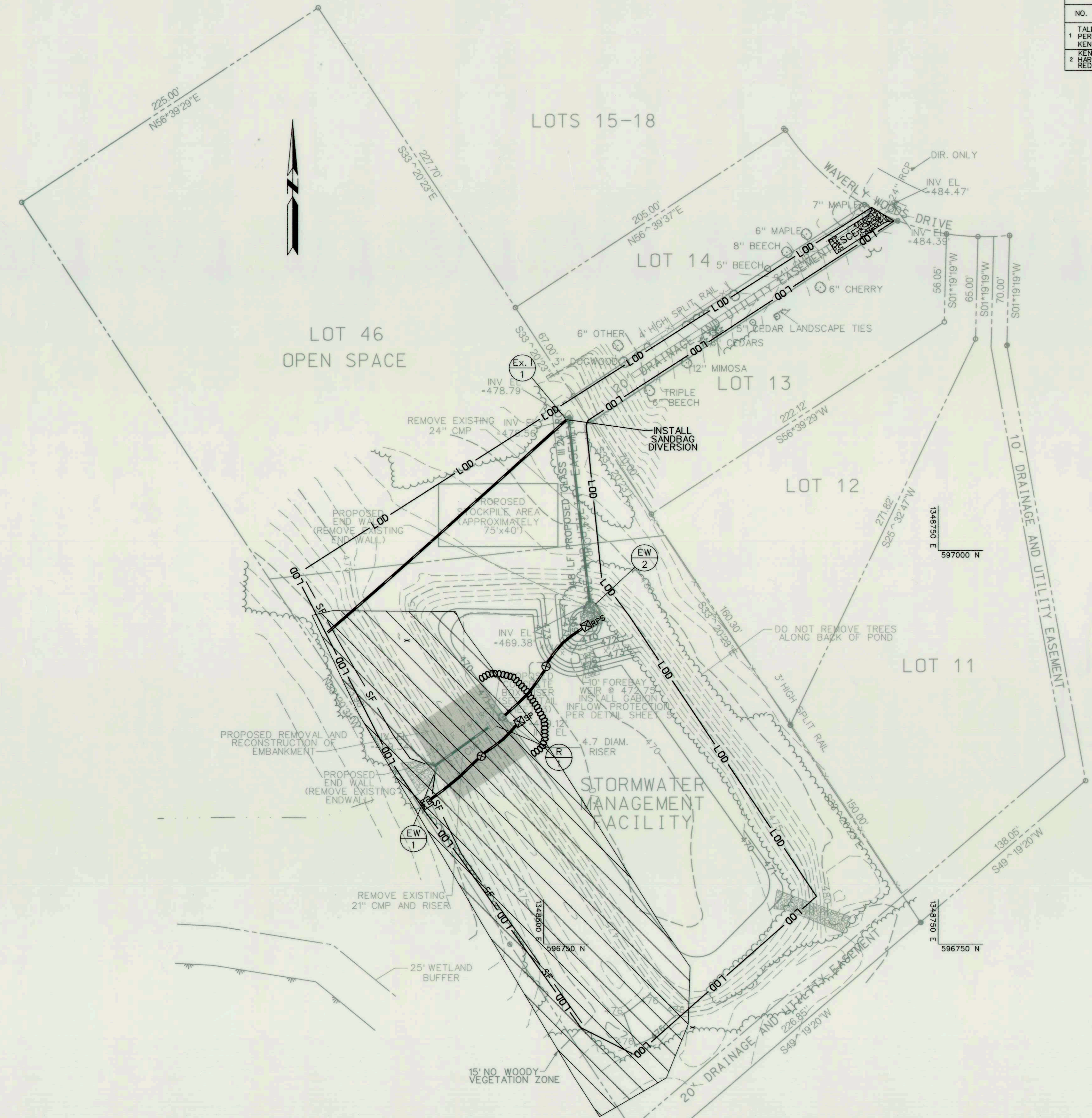
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DATE: FEBRUARY 2008  
KCI JOB NO.: 01-043223.28  
CAPITAL PROJECT NO.:  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

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, LICENSE NO. 31201 EXPIRATION DATE: JANUARY 24, 2009

STATE OF MARYLAND PROFESSIONAL ENGINEER

SHEET NO. 3 OF 5





TEMPORARY SEEDING SUMMARY

SEED MIXTURE (HARDNESS ZONE 6B)				FERTILIZER RATE (10-10-10)		LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS		
1	RYE	140	3/1-4/30 8/15-11/15	1-2 INCH	600 LB/AC (15 LB/1000 SF)	2 tons/ac (100 LB/1000 SF)
2	RYE PLUS FOXTAIL MILLET	150	3/1-4/30 8/15-11/15	1 INCH		

PERMANENT SEEDING SUMMARY

SEED MIXTURE (HARDNESS ZONE 6B)				FERTILIZER RATE (10-20-20)			LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS	N	P205	K20
1	TALL FESCUE (85%) PERENNIAL RYEGRASS (10%) KENTUCKY BLUEGRASS (5%)	125 15 10	3/1-5/15 8/15-10/15	1-2 INCH	90 LB/AC (2.0 LB/1000 SF)	175 lb/ac (4.0 LB/1000 SF)	175 lb/ac (4.0 LB/1000 SF)
2	KENTUCKY BLUEGRASS (50%) HARD FESCUE (40%) RED TOP (10%)	150	3/1-5/15 8/15-10/15	1-2 INCH	1000 SF	1000 SF	1000 SF

\* PLANT SPATTERDOCK (Nuphar luteum) BELOW PERMANENT WATER SURFACE ELEVATION

- SEQUENCE OF CONSTRUCTION
- OBTAIN THE NECESSARY GRADING PERMIT AND MDE PERMIT PRIOR TO CONSTRUCTION. (1 DAY)
  - THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AND THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS/ BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION (410-313-1880) AT LEAST 5 DAYS PRIOR TO BEGINNING ANY WORK. (5 DAYS)
  - CONTRACTOR SHALL COORDINATE AN ON-SITE PRE-CONSTRUCTION MEETING WHICH SHALL INCLUDE, BUT NOT BE LIMITED TO, THE COUNTY PROJECT MANAGER, THE ENGINEER, AND A REPRESENTATIVE FROM HOWARD COUNTY CONSTRUCTION INSPECTION. (1 DAY)
  - INSTALL THE PERIMETER SEDIMENT CONTROL MEASURES INCLUDING SILT FENCE, SUMP PIT NEAR RISER, FILTER BAG, AND STABILIZED CONSTRUCTION ENTRANCE AS SHOWN ON GRADING PLAN. INSTALL THE TEMPORARY PIPE FROM THE SUMP PIT TO THE FILTER BAG. (5 DAYS)
  - INSTALL SANDBAG DIVERSION FROM EX. I-1 TO DOWNSTREAM TOE OF EMBANKMENT. (1 DAY)
  - WITH A 5-DAY CLEAR FORECAST FROM THE NATIONAL WEATHER SERVICE, EXCAVATE THE EMBANKMENT AS SHOWN ON THE DETAIL. REMOVE THE EXISTING RISER AND BARREL PIPE. (5 DAYS)
  - INSTALL THE PROPOSED CONCRETE BOX RISER, 24" RCP BARREL PIPE, ANTI-SEEP COLLARS, AND CONCRETE CRADLE IN THE EMBANKMENT TRENCH. (5 DAYS)
  - REPLACE THE EMBANKMENT GRADE THE SIDE SLOPES TO MATCH THE UNDISTURBED EMBANKMENT SLOPES. (3 DAYS)
  - WITH A 5-DAY CLEAR FORECAST FROM THE NATIONAL WEATHER SERVICE, REPLACE EXISTING 24" CMP PIPE FROM EX. I-1 TO EW-2 WITH THE 24" RCP AS SHOWN. (5 DAYS)
  - GRADE THE BOTTOM OF THE POND AS SHOWN, INSTALL THE FOREBAY REMOVABLE PUMPING STATION DOWNSTREAM OF EW-2 AND CONNECT TO NEW RISER. INSTALL FOREBAY AS SHOWN ON GRADING PLANS. (5 DAYS)
  - INSTALL PLANTINGS, MULCH, AND SEED ALL DISTURBED AREAS EXCEPT FOR THE PERIMETER SEDIMENT CONTROL MEASURES. (3 DAYS)
  - WHEN THE SITE IS STABILIZED AND WITH THE PERMISSION OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL DEVICES AND STABILIZE ANY AREAS DISTURBED BY THIS ACTIVITY. (5 DAYS)

PERMANENT VEGETATIVE STABILIZATION

ALL DISTURBED AREAS, WHICH ARE NOT TO BE PAVED, SHALL BE PERMANENTLY STABILIZED AS FOLLOWS:

A) SEEDBED PREPARATION:  
LOOSEN UPPER THREE INCHES BY RAKING, DISCING, OR OTHER ACCEPTABLE MEANS AFTER SPREADING FOUR INCHES OF TOPSOIL.

B) SOIL AMENDMENTS:  
APPLY 500 LBS PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

C) SEEDING:  
FOR PERIODS OF MARCH 1 TO MAY 15 AND AUGUST 15 TO OCTOBER 15, SEED WITH 125 LBS PER ACRE OF TALL FESCUE, 15 LBS PER ACRE OF PERENNIAL RYEGRASS, AND 10 LBS OF KENTUCKY BLUEGRASS.  
FOR PERIOD OF MAY 16 TO AUGUST 14, SEED WITH 110 LBS PER ACRE OF TALL FESCUE AND 3 LBS PER ACRE OF WEEPING LOVEGRASS.

FOR PERIOD OF OCTOBER 16 TO FEBRUARY 28, PROTECT SITE BY: OPTIONS -  
1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING; 2) USE SOD; OR 3) SEED WITH 60 LBS PER ACRE OF TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.  
NOTE: FOR QUICK COVER WITH TALL FESCUE, ADD 2 LBS OF SMALL GRAIN PER 1,000 SQ. FT.

D) MULCHING SPECIFICATIONS:  
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING. APPLY 2 TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED TO 2.5 TONS PER ACRES. \*\* MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE TYPE OF MULCH ANCHORING USED MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS.

\* IF OTHER SEED MIXES ARE TO BE SUBSTITUTED, THEY MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS, CHAPTER 20, TABLE 25.  
\*\* IF A DIFFERENT TYPE OF MULCH IS TO BE USED, IT MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATION, CHAPTER 20.

TEMPORARY VEGETATIVE STABILIZATION

A) SEEDBED PREPARATION:  
LOOSEN UPPER THREE INCHES BY DISCING, RAKING OR OTHER ACCEPTABLE MEANS.

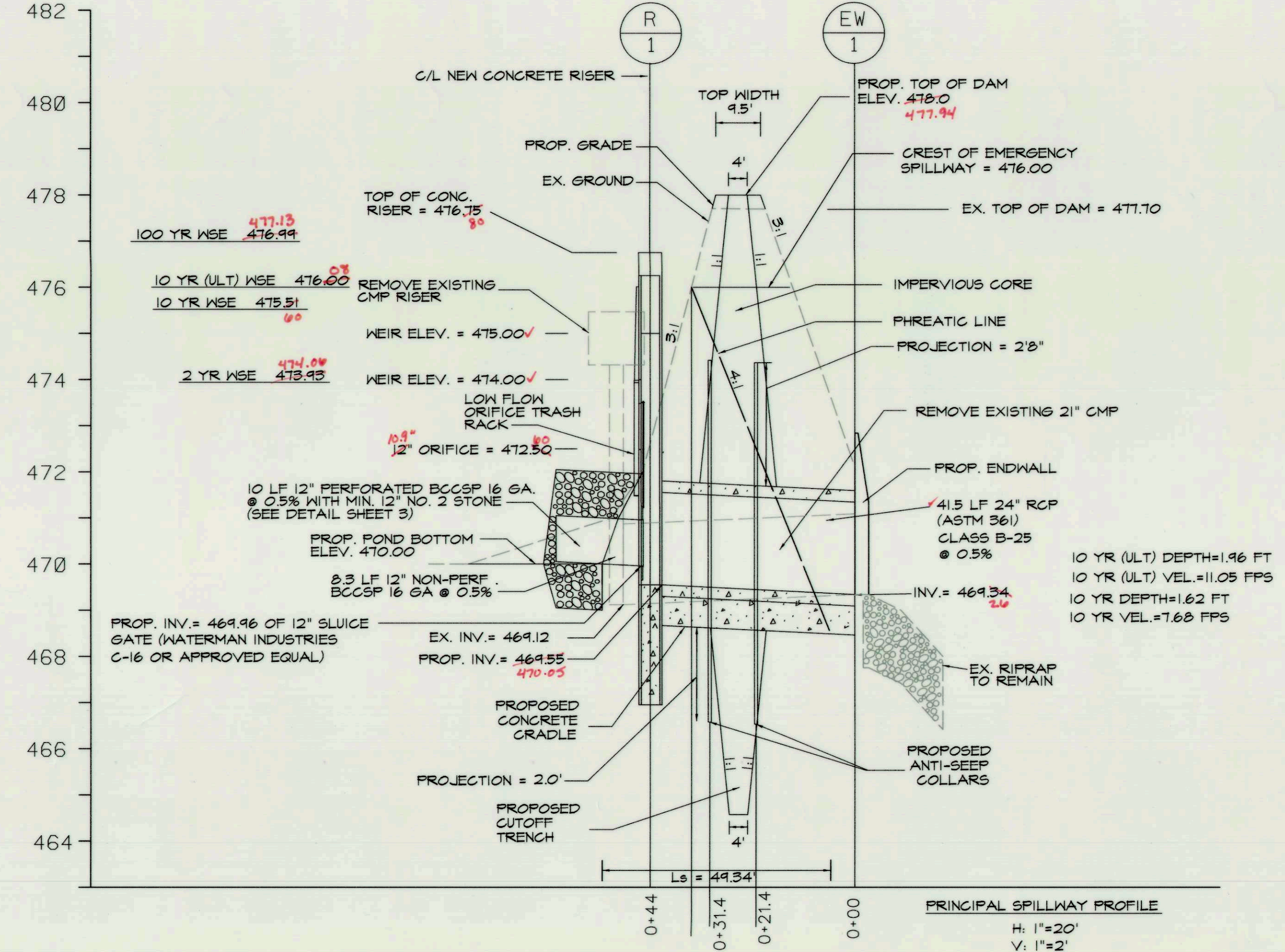
B) SOIL AMENDMENTS:  
APPLY 600 LBS PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

C) SEEDING: \*  
FOR PERIODS OF MARCH 1 TO APRIL 30 AND AUGUST 15 TO NOVEMBER 15, SEED WITH 2.5 TONS PER ACRE OF CEREAL RYE PLUS 30 LBS PER ACRE OF TALL FESCUE OR 5 LBS PER ACRE OF REDTOP OR 20 LBS PER ACRE OF PERENNIAL RYEGRASS. FOR PERIOD OF MAY 1 TO AUGUST 14, SEED WITH 3 LBS PER ACRE OF WEEPING LOVEGRASS OR 40 LBS PER ACRE OF JAPANESE OR FOXTAIL MILLET.

FOR PERIOD OF NOVEMBER 16 TO FEBRUARY 28, PROTECT THE SITE BY APPLYING TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING OR USE SOD.

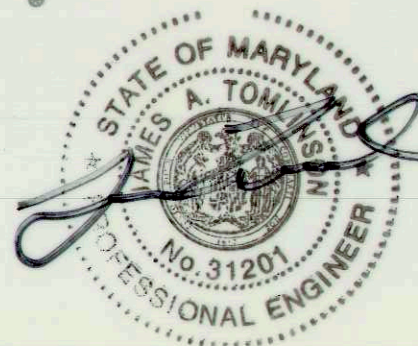
D) MULCHING SPECIFICATIONS:  
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING. APPLY 2 TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED TO 2.5 TONS PER ACRES. \*\* MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE TYPE OF MULCH ANCHORING USED MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS.

\* IF OTHER SEED MIXES ARE TO BE SUBSTITUTED, THEY MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS, CHAPTER 20, TABLE 25.  
\*\* IF A DIFFERENT TYPE OF MULCH IS TO BE USED, IT MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATION, CHAPTER 20.



PLAN  
SCALE: 1"=40'

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, LICENSE NO. 31201 EXPIRATION DATE: JANUARY 24, 2009



THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

DATE: 3/5/08

DATE: \_\_\_\_\_

NO. REVISIONS DESCRIPTION: \_\_\_\_\_

10 NORTH PARK DRIVE  
HUNT VALLEY, MD 21030  
PHONE: (410) 316-7800  
FAX: (410) 316-7817  
WWW.KCI.COM

KCI TECHNOLOGIES

WAVELY WOODS SECTION 1, AREA 1  
STORMWATER MANAGEMENT RETROFIT  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MARYLAND 21046  
PLAT #7268, TAX MAP 15 & 17, GRID 7, PARCEL 687, LOT 46, ELECTION DISTRICT 2

EROSION & SEDIMENT CONTROL PLAN

SCALE: AS SHOWN  
DATE: FEBRUARY 2008  
KCI JOB NO.: 01-043223.28  
CAPITAL PROJECT NO.:  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

SHEET NO.: 4 OF 5



21.0 STANDARD AND SPECIFICATIONS FOR TOP SOIL

Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.

To provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

Conditions Where Practice Applies

- This practice is limited to areas having 2:1 or flatter slopes where:
  - The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
  - The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
  - The original soil to be vegetated contains material toxic to plant growth.
  - The soil is so acidic that treatment with limestone is not feasible.

For the purpose of these Standards and Specifications, areas having slopes steeper than 2:1 require special consideration and design for adequate stabilization. Areas having slopes steeper than 2:1 shall have the appropriate stabilization shown on the plans.

Construction and Material Specifications

- Topsoil salvaged from the existing site may be used provided that it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-SCS in cooperation with Maryland Agricultural Experiment Station.
- Topsoil Specifications - Soil to be used as topsoil must meet the following:
  - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, roots, trash, or other materials larger than 1 1/2" in diameter.
  - Topsoil must be free of plants or plant parts such as Bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.
  - Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

- For sites having disturbed areas under 5 acres:
  - Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section # - Vegetative Stabilization Methods and Materials.
- For sites having disturbed areas over 5 acres:
  - On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
    - pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.
    - Organic content of topsoil shall be not less than 1.5 percent by weight.
    - Topsoil having soluble salt content greater than 500 parts per million shall not be used.
    - No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phytotoxic materials.

Note: Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

ii. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section # - Vegetative Stabilization Methods and Materials.

V. Topsoil Application

- When topsoiling, maintain needed erosion and sediment control practices such as diversions, Grade Stabilization Structures, Earth Dikes, Slope Silt Fence and Sediment Traps and Basins.
- Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.
- Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that seeding or sodding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets.
- Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seeded preparation.
- See Sheet 3 for Permanent and Temporary seeding rates and mixes.

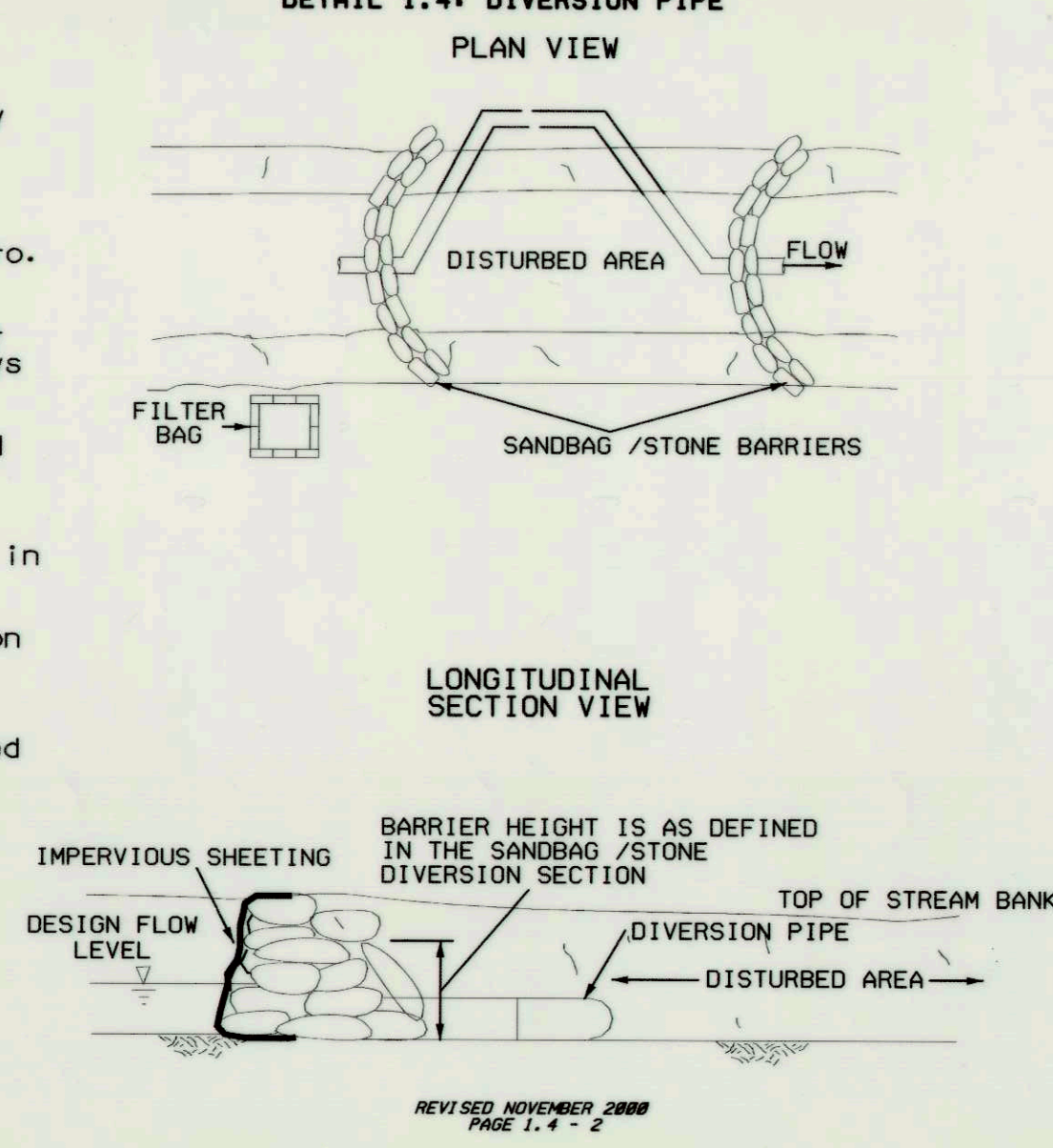
HOWARD COUNTY CONSERVATION DISTRICT  
STANDARD SEDIMENT CONTROL NOTES

- A minimum of 48 hours notice must be given to the Howard County Department of Inspections, Licenses and Permits, Sediment Control Division prior to the start of any construction (313-1855).
- All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the most current MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL and revisions thereto.
- Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1; b) 14 days as to all other disturbed or graded areas on the project site.
- All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol 1, Chapter 12 of the HOWARD COUNTY DESIGN MANUAL, Storm Drainage.
- All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seeding (Sec. 51), sod (Sec. 54), temporary seeding (Sec. 50) and mulching (Sec. 52). Temporary stabilization with mulch alone can only be done when recommended seeding dates do not allow for proper germination and establishment of grasses.
- All sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector.
- Site Analysis:
 

Total Area of Site	3.56 Acres (155,098.3 SF)
Area Disturbed	1.57 Acres (68,435 SF)
Area to be roofed or paved	0.0 Acres
Area to be vegetatively stabilized	1.57 Acres
Total Cut	700 Cu. Yds.
Total Fill	400 Cu. Yds.
Offsite waste/borrow area location	To Be Determined*
- Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
- Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.
- On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
- Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized by the end of each work day, whichever is shorter.

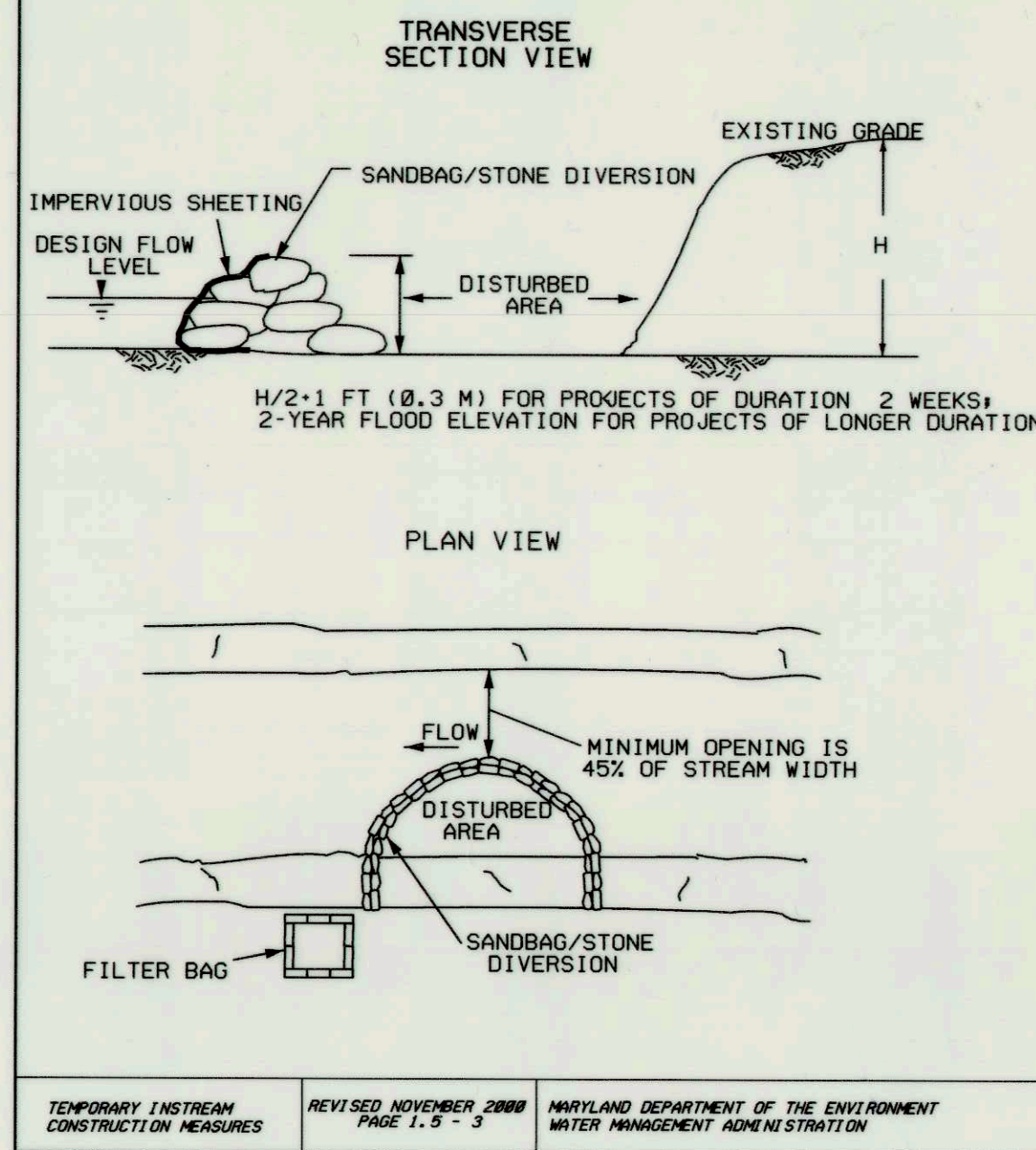
\*Offsite waste/borrow site shall have an approved sediment control plan and permit.

MARYLAND GUIDELINES TO WATERWAY CONSTRUCTION  
DETAIL 1.4: DIVERSION PIPE



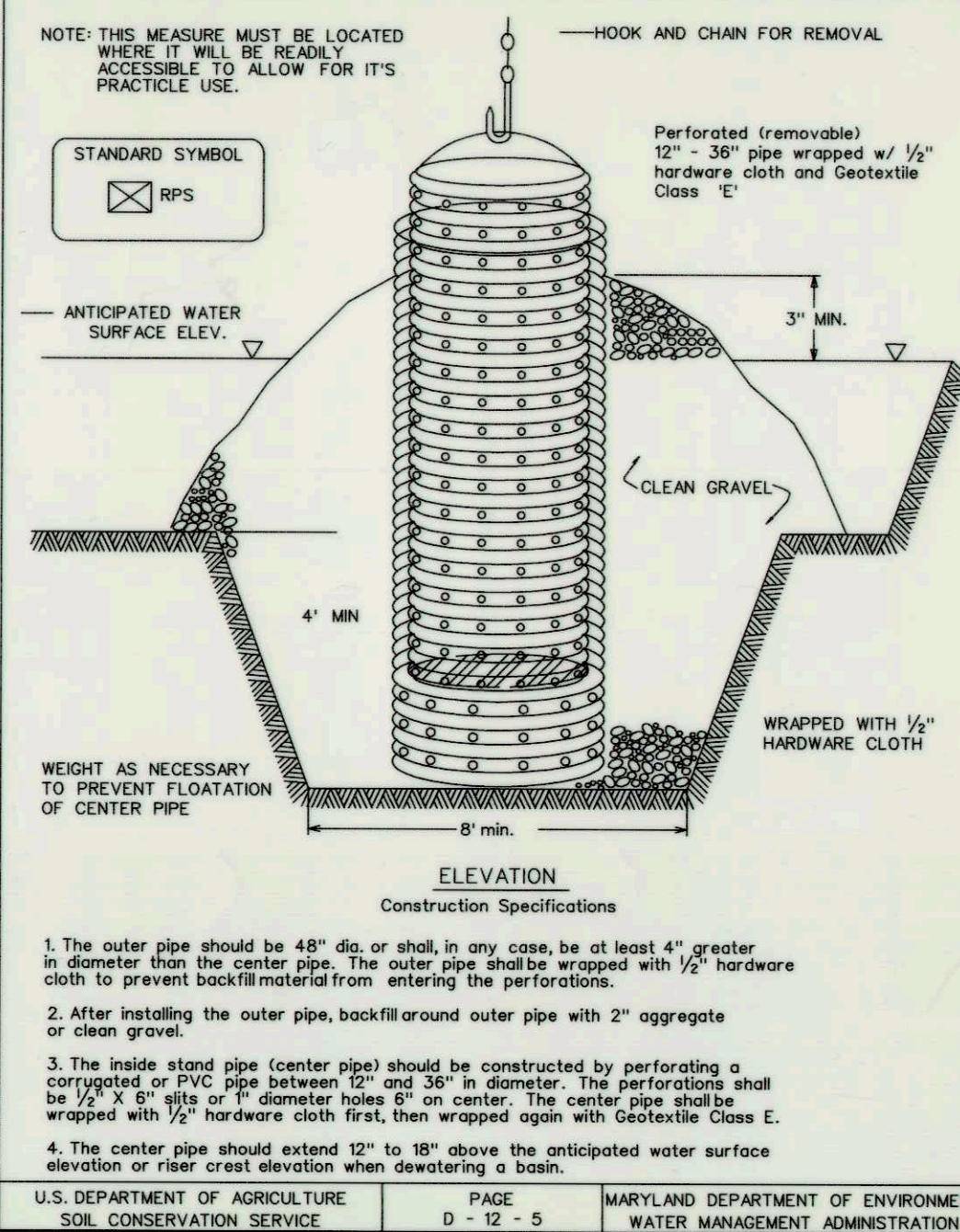
REVISED NOVEMBER 2000  
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DETAIL 1.5: SANDBAG/STONE DIVERSION



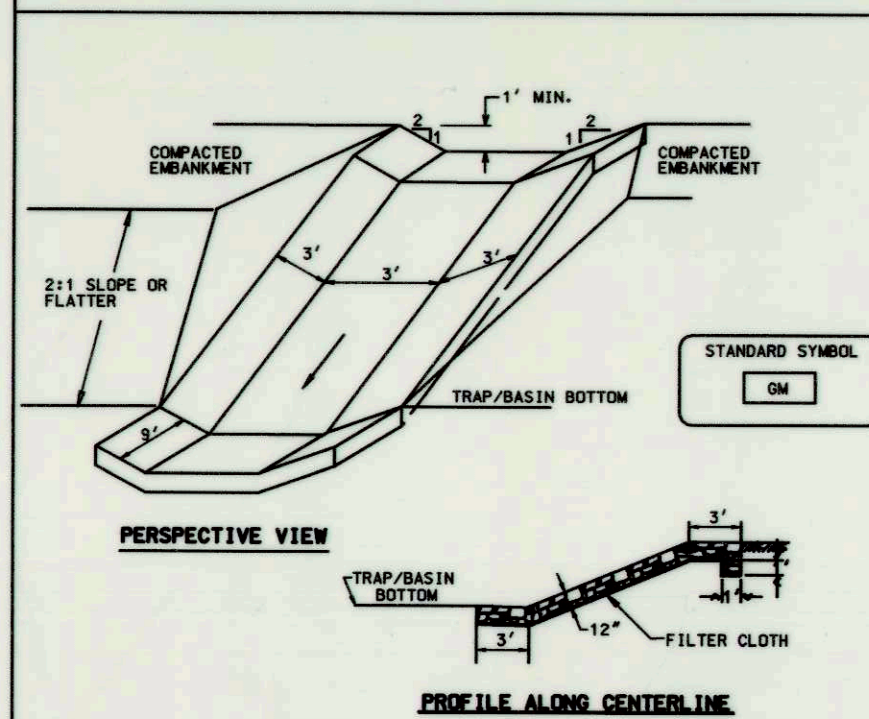
TEMPORARY INSTREAM CONSTRUCTION MEASURES  
REVISED NOVEMBER 2000  
PAGE 1.5 - 3  
MARYLAND DEPARTMENT OF THE ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION

DETAIL 20A - REMOVABLE PUMPING STATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
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MARYLAND DEPARTMENT OF ENVIRONMENT  
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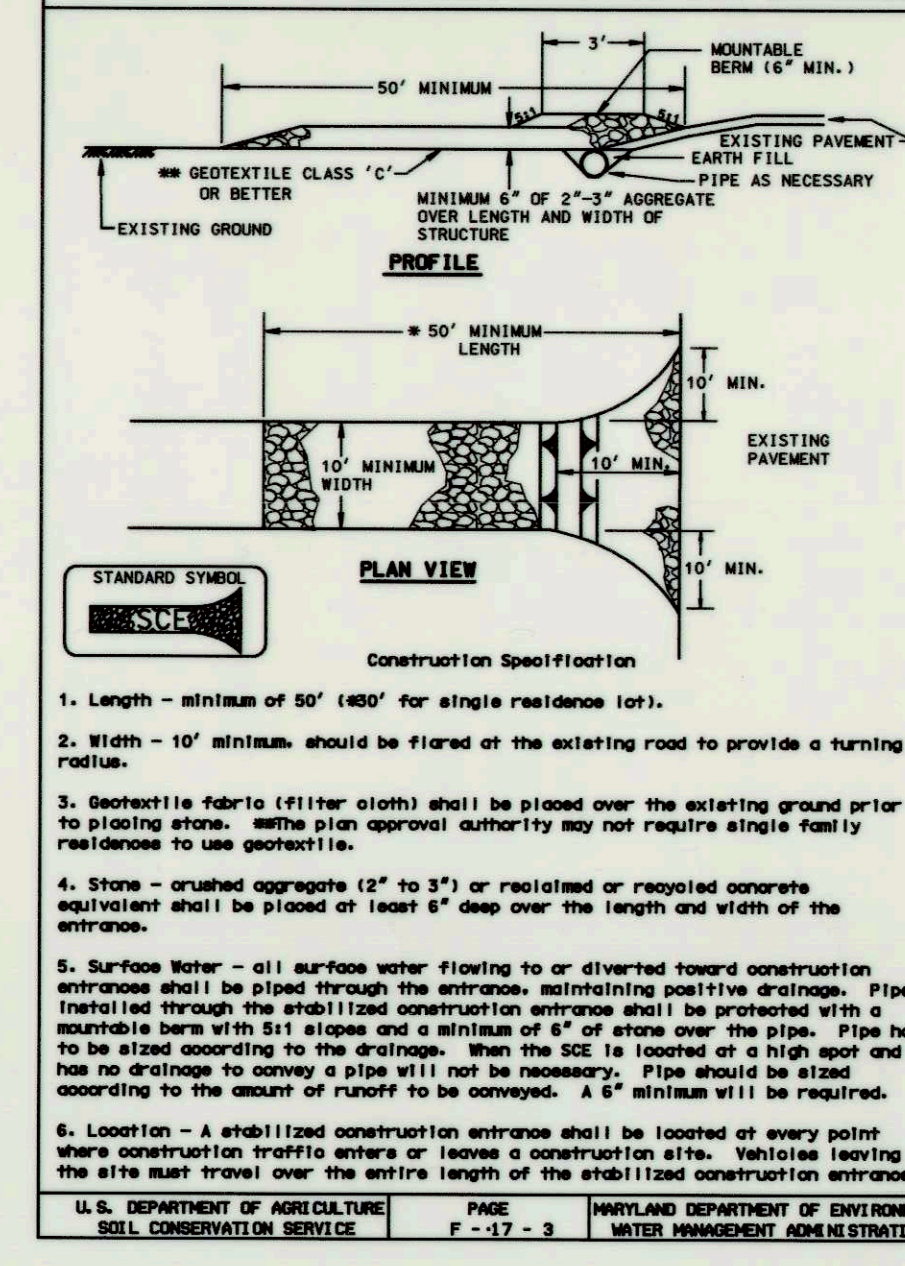
DETAIL 6 - GABION INFLOW PROTECTION



- Construction Specifications
- Gabion inflow protection shall be constructed of 9' x 3' x 3' gabion baskets forming a trapezoidal cross section 1' deep, with 2:1 side slopes, and a 3' bottom width.
  - Geotextile Class C shall be installed under all gabion baskets.
  - The stone used to fill the gabion baskets shall be 4" - 7".
  - Gabions shall be installed in accordance with manufacturer's recommendations.
  - Gabion Inflow Protection shall be used where concentrated flow is present on a slope steeper than 4:1.

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
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MARYLAND DEPARTMENT OF ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION

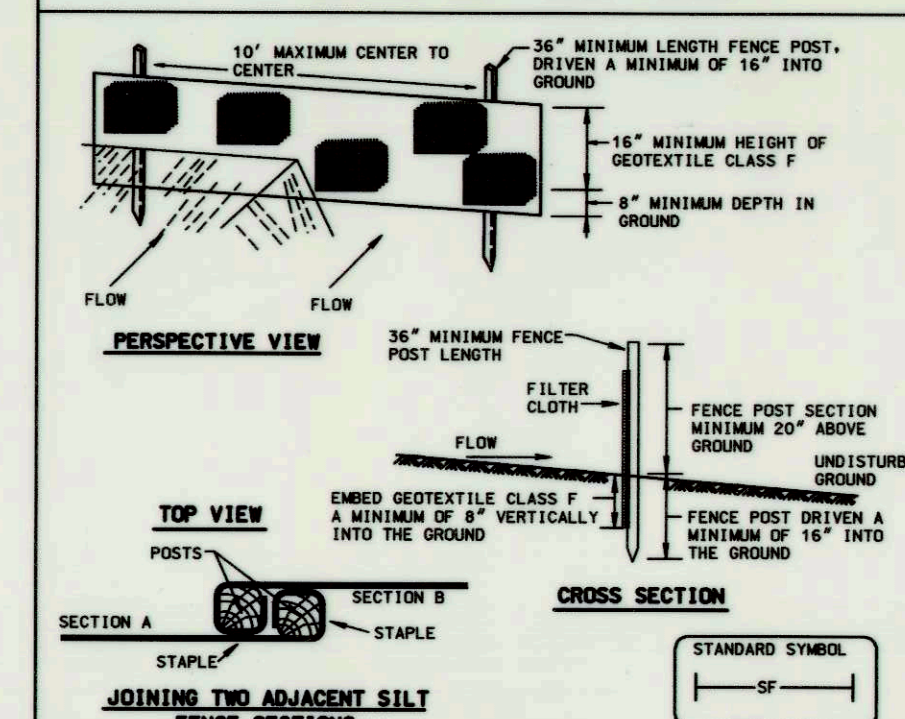
DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



- Construction Specifications
- Length - minimum of 50' (40' for single residence lots).
  - Width - 10' minimum, should be flared at the existing road to provide a turning radius.
  - Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. After approval authority may not require stone family resistance to use geotextile.
  - Stone - crushed aggregate (2" to 3") or recycled or recycled concrete equivalent shall be placed at least 4" deep over the length and width of the entrance.
  - Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a manhole with 18" diameter and a minimum of 6" of stone over the pipe. Pipe has manhole to be sized according to the drainage. When the site is located on a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
  - Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site, whether leaving the site or traveling over the entire length of the stabilized construction entrance.

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
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MARYLAND DEPARTMENT OF ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION

DETAIL 22 - SILT FENCE



- Construction Specifications
- Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum cut, or 1 1/2" diameter (minimum round) and shall be of sound quality hardwood. Steel posts will be standard 1" or 1 1/2" section weighting not less than 1.00 pound per linear foot.
  - Geotextile shall be fastened securely to each fence post with wire ties or staples of top and side-section and shall meet the following requirements for Geotextile Class F:
 

Tensile Strength	50 lbf/in (min.)	Tear Weight	509
Tensile Modulus	20 lbf/in (min.)	Tear Weight	509
Flow Rate	0.3 gal 4 1/2" minute (max.)	Tear Weight	322
Filtering Efficiency	75% (min.)		
  - Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
  - Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

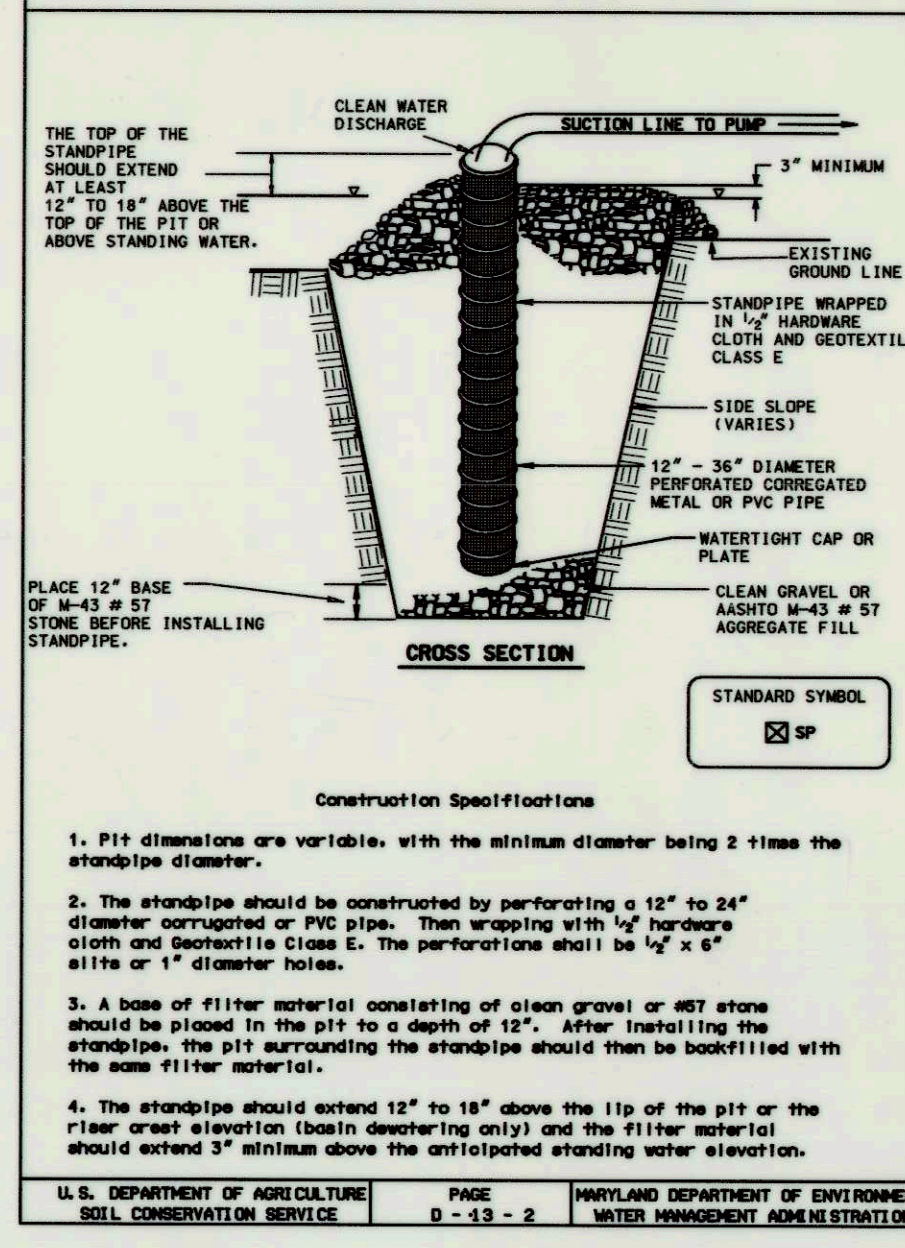
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- FILTER BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE.
- ALL STRUCTURAL SEAMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE WITH HIGH STRENGTH THREAD. SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD.
- FILTER BAG SHALL HAVE A NOZZLE LARGE ENOUGH TO ACCOMMODATE A FOUR (4) INCH DIAMETER PUMP DISCHARGE HOSE.
- NOZZLE SHALL BE SEALED TIGHTLY AROUND THE PUMP DISCHARGE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNFILTERED WATER FROM ESCAPING.
- FILTER BAG SHALL BE PLACED ON A LEVEL OR GENTLY SLOPING (5% MAXIMUM) AREA.
- FILTER BAG SHALL BE PLACED UPON A BASE OF STRAW BALES OR THREE (3) INCHES OF CLEAN STONE TO PROMOTE DEWATERING THROUGH BOTTOM SURFACE OF THE FILTER BAG.
- PUMPING RATES SHALL BE CONTROLLED TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG. AS THE BAG BECOMES FILLED WITH SEDIMENT THE PUMPING RATE SHALL BE REDUCED.
- THE FILTER BAG SHALL BE DEWATERED, REMOVED AND DISPOSED OF UPON COMPLETION OF PUMPING OPERATIONS OR AFTER IT HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. THE DEWATERED SEDIMENT FROM THE BAG SHALL BE SPREAD IN AN UPLAND AREA AND STABILIZED WITHIN 24 HOURS.
- THE GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WITH PROPERTIES DETERMINED IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:
 

WEIGHT	10 OZ/YD	ASTM D-3776
GRAIN TENSILE	210 LBS.	ASTM D-4833
PUNCTURE	70 GAL/MIN/FIT	ASTM D-4833
FLOW RATE	1.3	ASTM D-4891
PERMEABILITY (SEC)	105	ASTM D-4891
RESISTANCE TO TENSILE	70%	ASTM D-4851
APPARENT OPENING SIZE (AOS)	40-80	ASTM D-4851

NOTE: ALL WATER COLLECTED WITHIN THE LIMIT OF DISTURBANCE WITH THE EXCEPTION OF SHALE BE PUMPED THROUGH THE FILTER BAG.

DETAIL 20B - SUMP PIT



- Construction Specifications
- Pit dimensions are variable, with the minimum diameter being 2 times the standpipe diameter.
  - The standpipe should be constructed by perforating a 12" to 24" diameter corrugated or PVC pipe. Then wrapping with 1/2" hardware cloth and geotextile Class E. The perforations shall be 1/2" x 6" slots or 1" diameter holes.
  - A base of filter material consisting of clean gravel or #47 stone should be placed in the pit to a depth of 12". After installing the standpipe, the pit surrounding the standpipe should then be backfilled with the same filter material.
  - The standpipe should extend 12" to 18" above the lip of the pit or the clear stand elevation (above dewatering only) and the filter material should extend 3" minimum above the anticipated standing water elevation.

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SILT FENCE

Silt Fence Design Criteria

Slope Steepness	(Maximum) Slope Length	(Minimum) Silt Fence Length
Flatter than 50:1	Unlimited	Unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

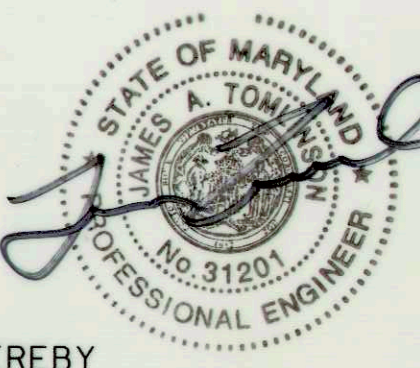
Note: In areas of less than 2% slope and sandy soils (USDA general classification system, soil class A) maximum slope length and silt fence length will be unlimited. In these cases a silt fence may be the only perimeter control required.

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THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

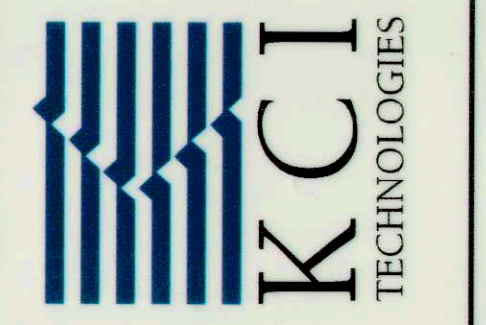
3/5/08  
DATE

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, LICENSE NO. 31201 EXPIRATION DATE: JANUARY 24, 2009



NO.	REVISIONS DESCRIPTION	DATE

10 NORTH PARK DRIVE  
HUNT VALLEY, MD 21030  
PHONE: (410) 316-7800  
FAX: (410) 316-7817  
WWW.KCI.COM



WAVERLY WOODS  
SECTION 1, AREA 1  
STORMWATER MANAGEMENT RETROFIT  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6700 COLUMBIA, MARYLAND 21046  
PLAT #7269, TAX MAP 16.16 & 17, GRID 7, PARCEL 687,  
LOT 46, ELECTION DISTRICT 2

E & S  
NOTES AND  
DETAILS

SCALE: N/A  
DATE: FEBRUARY 2008  
KCI JOB NO.: 01-043223.28  
CAPITAL PROJECT NO.:  
PERMIT ISSUE:  
CONSTRUCTION ISSUE: