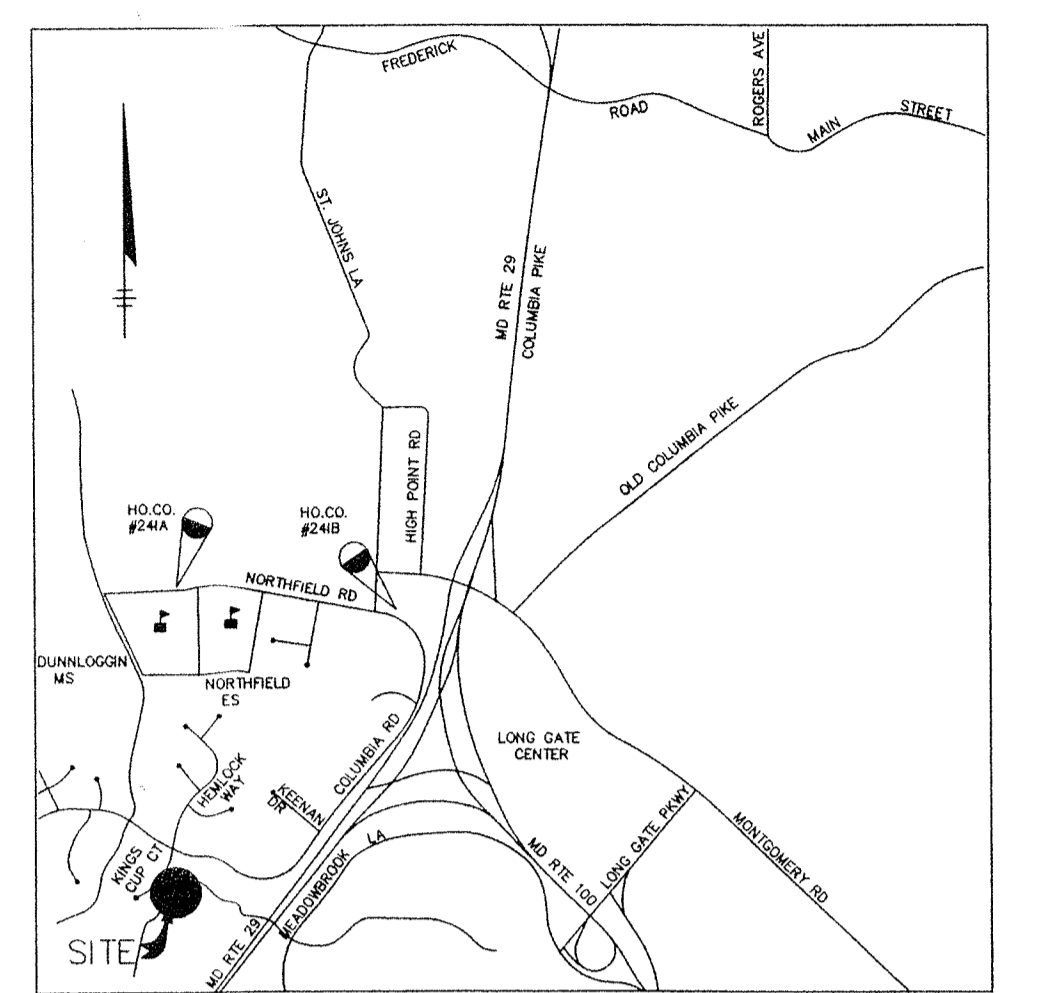


SHEET INDEX	
NO	DESCRIPTION
1	TITLE SHEET
2	GRADING PLAN
3	SEDIMENT AND EROSION CONTROL PLAN
4	PLANTING AND STREAM STABILIZATION PLAN
5	SEDIMENT CONTROL DETAILS
5 ADDEND.	SEDIMENT CONTROL DETAILS/BIOENGINEERING DETAILS AND SPECIFICATIONS
6	DETAILS

# KINGSCUP COURT STREAM RELOCATION

## GENERAL NOTES

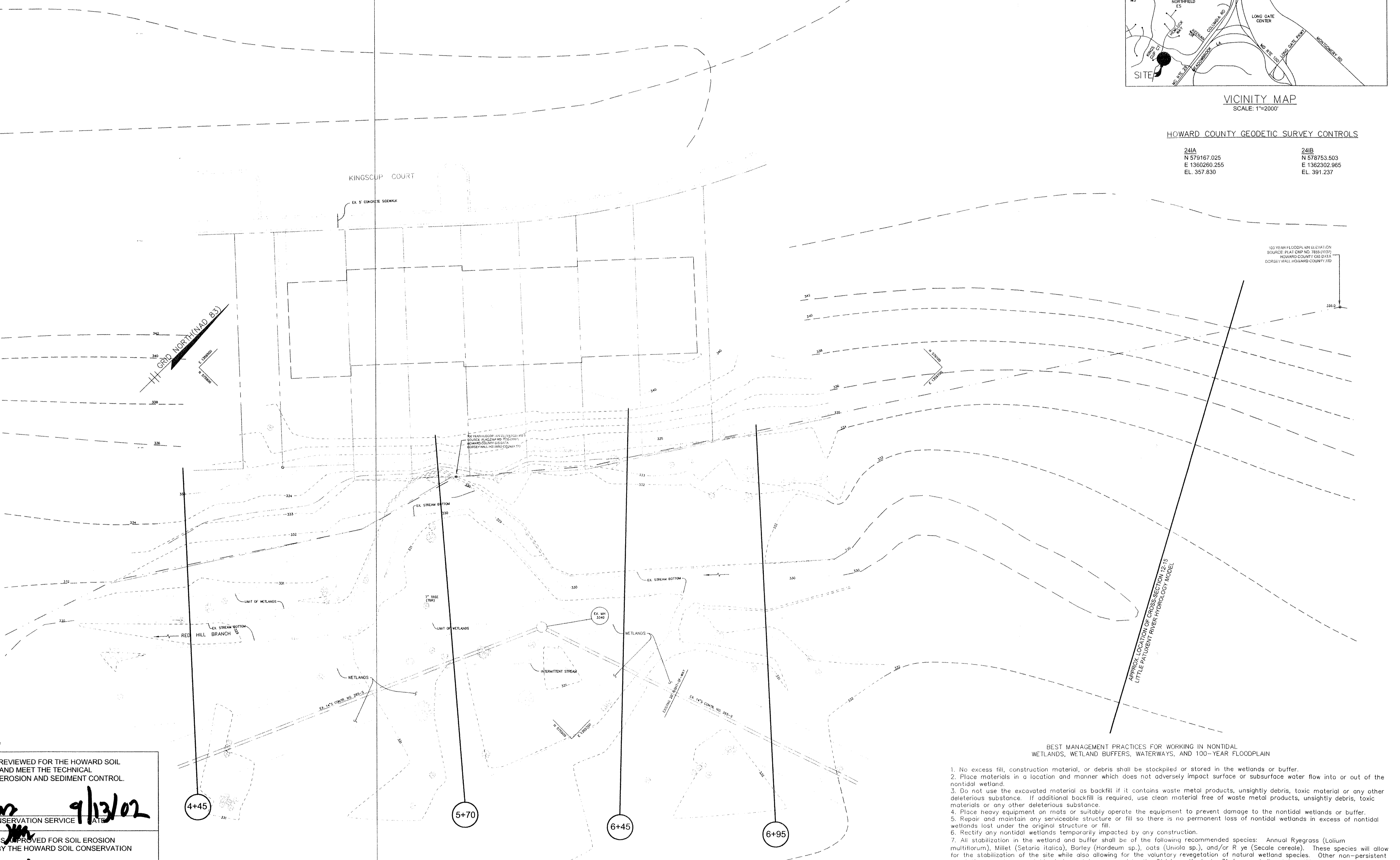
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY.
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-4900 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL NOTIFY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, INSPECTION DIVISION AT 410-631-3510 AT LEAST FIVE (5) DAYS PRIOR TO START OF WORK.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK. 24IA AND 24IB WERE USED.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM.
- ALL ELEVATIONS SHOWN ARE BASED ON THE U.S.C. AND G.S. MEAN SEA LEVEL DATUM, 1929.
- APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. EXISTING UTILITIES ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION.
- UTILITY LOCATIONS OBTAINED BY PLANS PREPARED BY CLARK, FINEFROCK AND SACKETT, PROVIDED BY HOWARD COUNTY, JOB NO. F-86-025, FILE NO. 86025SE, DATED SEPTEMBER, 1986 AND WATER AND SEWER CONTRACT NO. 265-S.
- THE CONTRACTOR SHALL FIELD VISIT AND FAMILIARIZE THEMSELVES WITH THE SITE PRIOR TO BIDDING AND CONSTRUCTION.
- NO IN-STREAM CONSTRUCTION SHALL OCCUR MARCH 1 THROUGH JUNE 15.
- THE APPROPRIATE FEDERAL/STATE AND LOCAL PERMITS MUST BE OBTAINED BEFORE WORK COMMENCES.
- THERE WILL BE NO STAGING OR STORING OF EQUIPMENT WITHIN THE LIMIT OF THE NONTIDAL WETLANDS OR THE 25' WETLANDS BUFFER UNLESS OTHERWISE INDICATED.
- CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, AND SAFETY PRECAUTIONS AND PROGRAMS.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY BY RIEMER MUEGGE AND ASSOCIATES, INC. DATED NOVEMBER, 1999, AND HOWARD COUNTY APPROVED FINAL DEVELOPMENT PLANS FOR KINGSCUP COURT.
- TURF REINFORCEMENT MAT PERFORMANCE SPECIFICATIONS MAY BE FOUND ON NORTH AMERICAN GREEN'S INTERNET SITE FOR THEIR 'C350' PRODUCT. [www.nagreen.com/products/permanent/c350/c350.html](http://www.nagreen.com/products/permanent/c350/c350.html)
- THE SOIL CODORUS SILT LOAM (Co) IS THE SOIL TYPE WITHIN THE LIMITS OF THE PROJECT AS PER THE HOWARD COUNTY SOILS CONSERVATION SERVICE SURVEY MANUAL.
- CONTRACTOR MAY RELOCATE SEDIMENT/EROSION CONTROLS TO BETTER FIT FIELD CONDITIONS WITH APPROVAL OF D.I.L.P. SEDIMENT CONTROL INSPECTOR.
- CONTRACTOR SHALL TAKE EVERY PRECAUTION TO KEEP SEDIMENT FROM ENTERING STREAM. ADDITIONAL CONTROLS MAY BE REQUIRED BY THE D.I.L.P. SEDIMENT CONTROL INSPECTOR.
- ALL STREAM STABILIZATION MATERIALS (E.G., TURF REINFORCEMENT MAT, SEED, FERTILIZER, ETC.) SHALL BE ON SITE PRIOR TO ANY EXCAVATION.
- THERE SHALL BE NO STANDING WATER WHEN PLACING FILL IN THE OLD STREAM BED.
- CONTRACTOR SHALL NOT STORE ANY MATERIAL AND/OR EQUIPMENT WITHIN 2' OF PRIVATE PROPERTY.
- CONTRACTOR SHALL TAKE CAUTION NOT TO DAMAGE ANY EXISTING TREES, EXCEPT THOSE DESIGNATED ON THE PLAN TO BE REMOVED. ANY DAMAGED TREE SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
- 100 YEAR FLOODPLAIN WAS TAKEN FROM RED HILL BRANCH SHEAR STRESS ANALYSIS PREPARED BY RIEMER MUEGGE AND ASSOCIATES, INC., DATED FEBRUARY 4, 2000.



VICINITY MAP  
SCALE: 1"=200'

### HOWARD COUNTY GEODETIC SURVEY CONTROLS

24IA N 579167.025 E 1360260.255 EL. 357.830	24IB N 578753.503 E 1362302.965 EL. 391.237
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EXISTING CONDITIONS PLAN  
SCALE: 1"=20'

### BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAIN

- No excess fill, construction material, or debris shall be stockpiled or stored in the wetlands or buffer.
- Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of the nontidal wetland.
- Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic materials or any other deleterious substance.
- Place heavy equipment on mats or suitably operate the equipment to prevent damage to the nontidal wetlands or buffer.
- Repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands in excess of nontidal wetlands lost under the original structure or fill.
- Rectify any nontidal wetlands temporarily impacted by any construction.
- All stabilization in the wetland and buffer shall be of the following recommended species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), oats (Avena sp.), and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Division. Kentucky 31 fescue shall not be utilized in the wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.
- After installation has been completed, make post construction grades and elevations of nontidal wetlands the same as the original grades and elevations in temporarily impacted areas, where applicable.
- To protect aquatic species, in-stream work is prohibited as determined by the classification of the stream.
- In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.

BY THE DEVELOPER:  
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, 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 BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.

Steve Sharav 9/12/02  
DEVELOPER DATE

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

9/10/02  
ENGINEER DATE

GP02-89  
THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

Jim Meyer 9/13/02  
NATURAL RESOURCES CONSERVATION SERVICE DATE

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

John R. Roberts 9/13/02  
HOWARD SOIL CONSERVATION DISTRICT DATE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
9/20/02  
DIRECTOR OF PUBLIC WORKS DATE  
9/23/02  
DIRECTOR, DEPARTMENT OF RECREATION & PARKS DATE

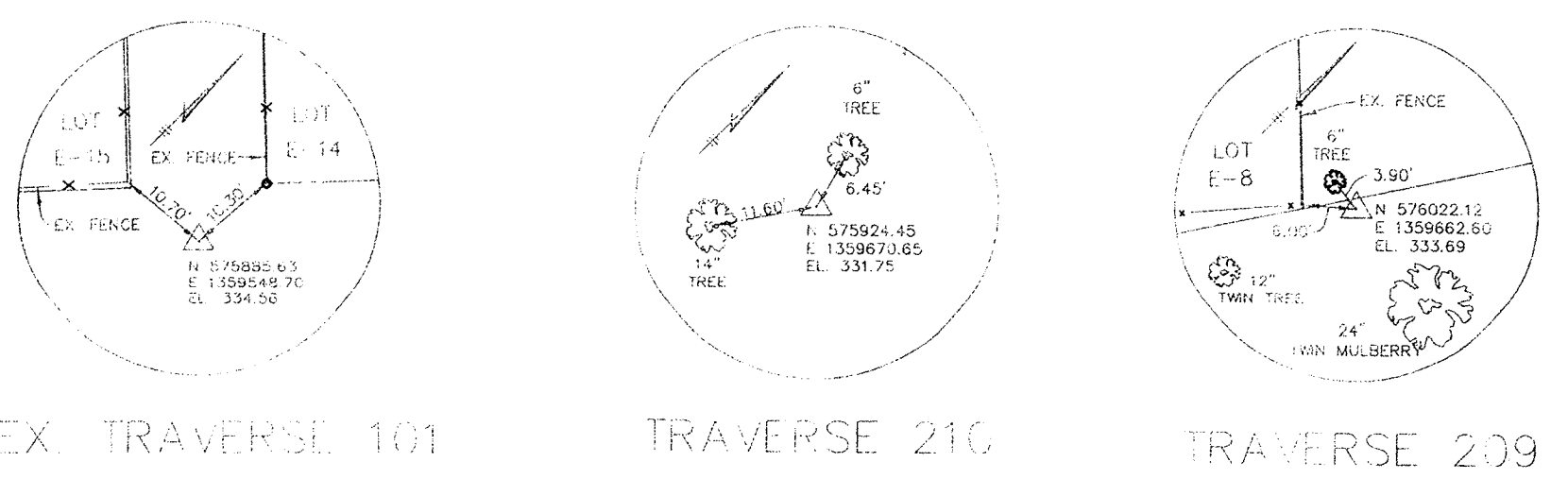
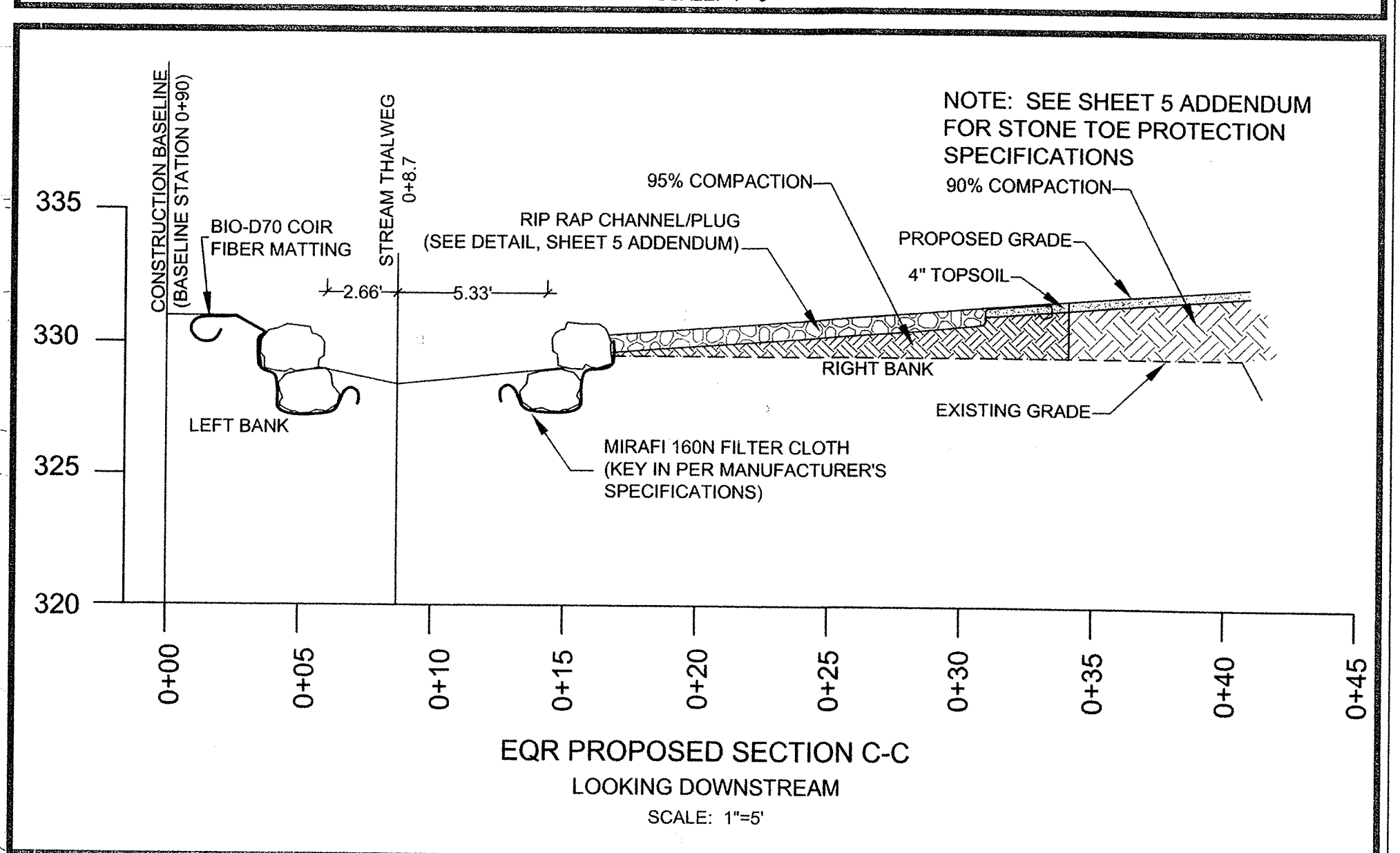
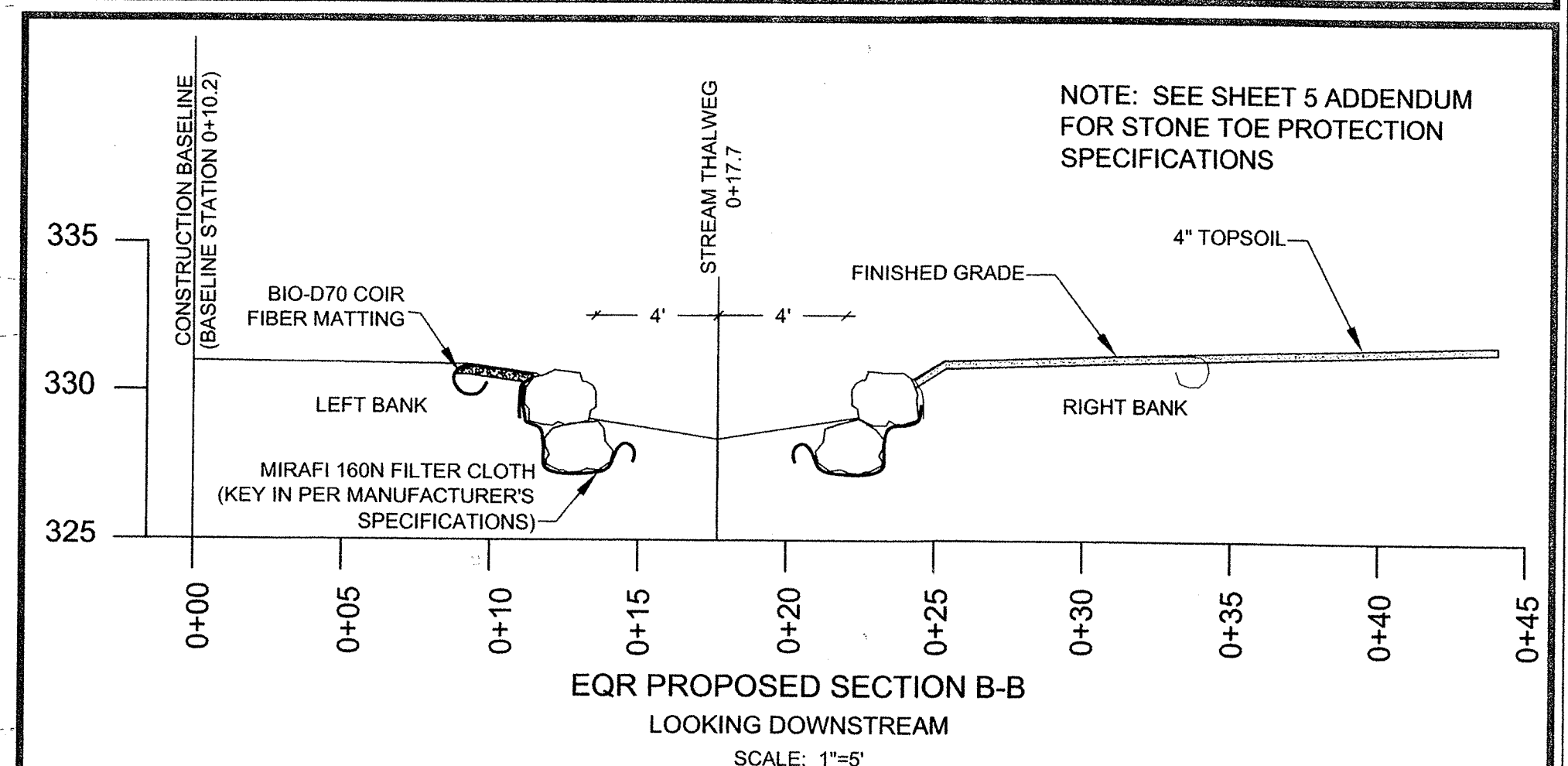
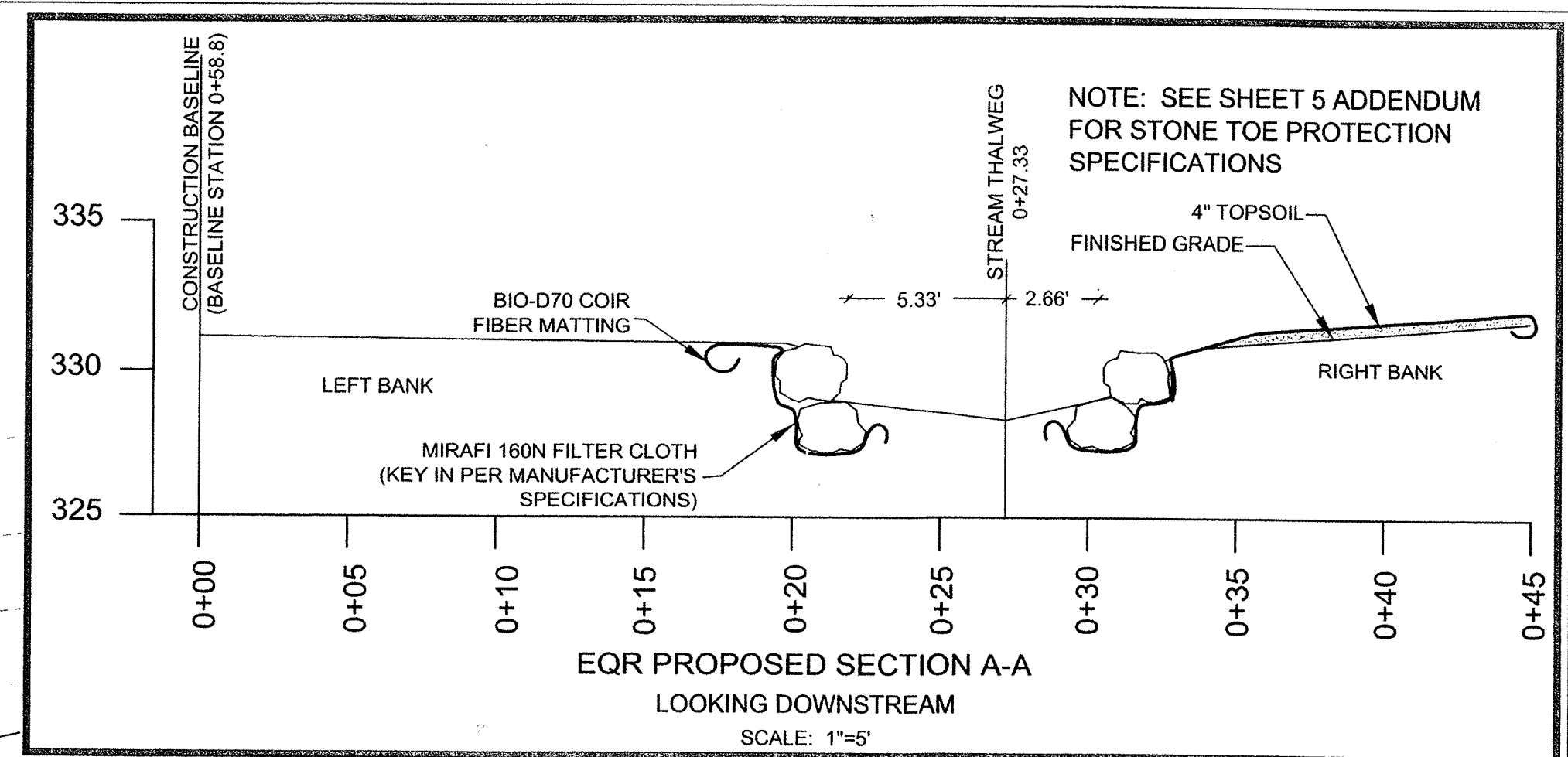
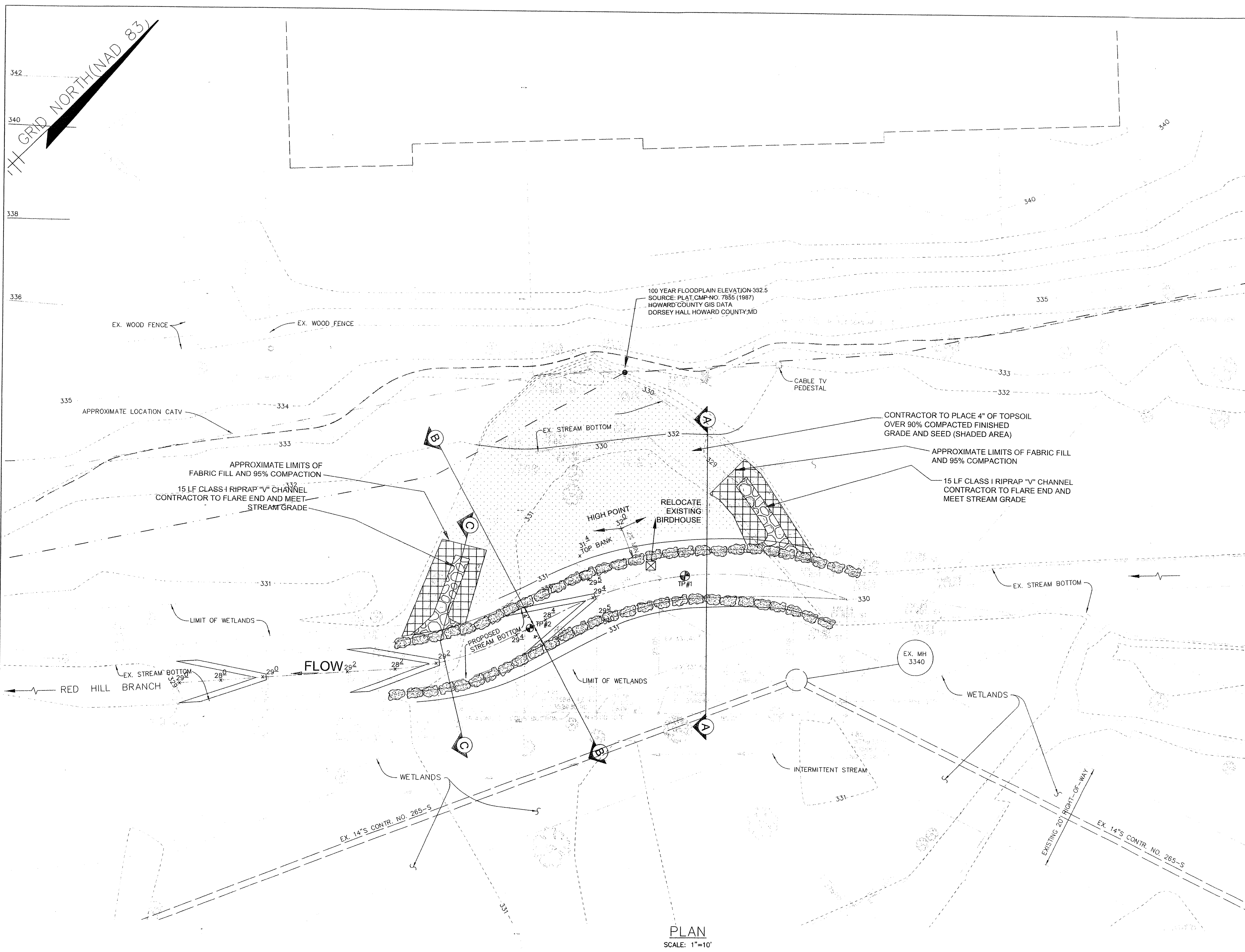
RIEMER MUEGGE & ASSOCIATES INC.  
ENGINEERING • ENVIRONMENTAL SERVICES • PLANNING • SURVEYING  
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tel 410.997.8900 fax 410.997.9282  
Environmental Quality Resources, L.L.C.  
A Natural Resources Management Company  
Consulting • Design • Construction • Maintenance  
3930 Gwynn Oaks Road  
Guthrieburg, Maryland 20878  
Tel 301-528-9973 Fax 301-528-4551

ARTHUR E. MUEGGE #8707  
TIMOTHY C. SCHUELER #20207  
9/10/02  
DATE: 11/14/00

DES: CJR	EOR: 1	EOR REVISIONS	02/2002
DRN: MAD			
CHK:			
DATE: 11/14/00			
BY NO.		REVISION	DATE

600' SCALE MAP NO. 30	BLOCK NO. 4
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KINGSCUP COURT  
STREAM RELOCATION  
2nd ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CAPITAL PROJECT  
SCALE AS SHOWN  
SHEET 1 OF 6



NOTE: SEE TYPICAL SECTION FOR RELOCATED STREAM SHEET 5

STREAM CHANNEL VELOCITIES

V<sub>1</sub> = 3.4 FPS MAX.

V<sub>2</sub> = 3.4 FPS

SOIL TEST PITS (1/28/02, to 2' depth)  
#1 & #2 Soil type: Clayey-Silt Loam

**LEGEND**

---	EXISTING ONE FOOT CONTOURS		V-LOG DROP (DETAIL 5, SHEET 5 ADDENDUM)
---	EXISTING FIVE FOOT CONTOURS		STONE TOE PROTECTION (DETAIL 3, SHEET 5 ADDENDUM)
---	PROPOSED ONE FOOT CONTOURS		SOIL TEST PIT
---	PROPOSED FIVE FOOT CONTOURS		
---	EXISTING BOTTOM OF STREAM		
---	PROPOSED BOTTOM OF STREAM		
TBR	TO BE REMOVED		
TRM	TURF REINFORCEMENT MAT		

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *James A. Lewis* DATE: 9/23/02

Chief, Bureau of Environmental Services: *John J. O'Neil* DATE: 9/19/02

Director, Department of Recreation & Parks: *Garrett A. Carter* DATE: 9/19/02

Chief, Stormwater Management Division: *Howard E. Sattlyman* DATE: 9/19/02

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Fax 301.928.4561

ARTHUR E. MUEGGE #8707

TIMOTHY C. SCHUELER #20207

DES:	CJR	EQR	1	EQR REVISIONS	02/2002
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CHK:					
DATE:	11/14/00				
BY	NO.	REVISION			

GRADING PLAN

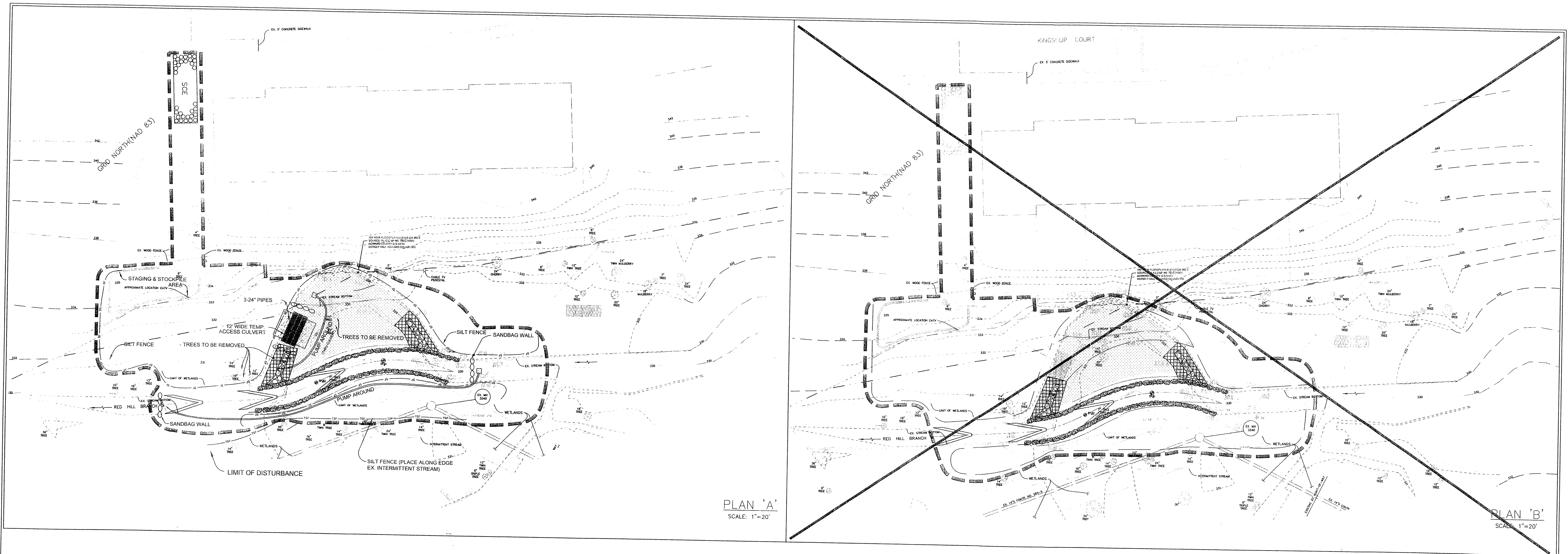
600' SCALE MAP NO. 30 BLOCK NO. 4

KINGSCUP COURT  
STREAM RELOCATION  
2nd ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CAPITAL PROJECT

SCALE AS SHOWN

SHEET 2 OF 6





PLAN 'A'  
SCALE: 1"=20'

PLAN 'B'  
SCALE: 1"=20'

SEQUENCE OF CONSTRUCTION

1. THE CONTRACTOR SHALL OBTAIN THE MARYLAND DEPARTMENT OF THE ENVIRONMENT WATERWAY CONSTRUCTION PERMIT, THE HOWARD COUNTY DRAINAGE PERMIT, AND SEDIMENT EROSION CONTROL PERMIT. OTHER PERMITS SHALL BE OBTAINED BY THE CONTRACTOR. (1 DAY)
2. CLEAR AND GRUB TO INSTALL THE STABILIZED CONSTRUCTION ENTRANCE, TEMPORARY ACCESS CULVERT, AND PERIMETER SILT FENCE. DO NOT DISTURB EXISTING STAGINGS TREES. (1 DAY)
3. INSTALL THE STABILIZED CONSTRUCTION ENTRANCE, TEMPORARY ACCESS RIMP AROUND, TEMPORARY ACCESS CULVERT, AND PERIMETER SILT FENCE. (1 DAY)
4. CLEAR AND REMOVE ONLY FALLEN TREES/BRANCHES IN THE STREAM AND 5 FEET ON EACH SIDE OF STREAM BOTH 40 FEET DOWN AND UPSTREAM OF THE STREAM RELOCATION WORK. REMOVE ONLY THE TRUNK PORTION OF THE TREE. REMOVE BEAVER DAMS (2 DAYS)
5. PLACE A DOUBLE SANDBAG WALL (2 FT MIN HEIGHT) ALONG THE EDGE OF THE EXISTING STREAM AT THE JUNCTION OF THE EXISTING AND PROPOSED STREAMS AS SHOWN ON THE PLAN "A" AND AT END OF DOWNSTREAM WORK AREA "B" (1 DAY)
6. CONSTRUCT NEW STREAM CHANNEL BEGINNING AT THE DOWN STREAM END. EXCAVATED CHANNEL SHALL MAINTAIN A UNIFORM (CONSTANT) SLOPE CONNECTING THE DOWNSTREAM CHANNEL TO THE UPSTREAM CHANNEL. INVERT. MAINTAIN THE PROPOSED CROSS SECTION AND AVOID OVER CUTTING THE NEW STREAM BANKS SHALL BE IN CUT ONLY (EXCEPT AT JUNCTIONS WITH OLD STREAM) (1 DAY)
7. STABILIZE THE NEWLY CONSTRUCTED CHANNEL WITH NOD, LIVE STAKES AND EROSION CONTROL MATTING PER DETAIL AND SUPERIMPOSE PLACED SILT FENCE ALONG THE WEST EDGE OF THE RELOCATED STREAM OUTSIDE OF THE EROSION CONTROL MATTING STABILIZATION. (1 DAY)
8. WITH PERMISSION OF THE SEDIMENT AND EROSION CONTROL INSPECTOR AND ON A DAY WITH A DRY FORECAST, PLACE A SANDBAG WALL AT EACH END TO BLOCK THE EXISTING STREAM CHANNEL BOTH UP AND DOWNSTREAM - AS IN STEP #5.
9. IMMEDIATELY AFTER STEP #8 ABOVE, CONTRACTOR SHALL DE-WATER THE OLD CHANNEL AND SALVAGE EXISTING STREAM BED MATERIAL AND PLACE IN THE NEW CHANNEL.
10. CONSTRUCT A "PLUG" IN THE OLD STREAM CHANNEL AT THE OLD/NEW STREAM JUNCTIONS BY COMPACTING A 10 FT MINIMUM SEGMENT (IN OLD STREAM SHAPE REMAINING NEW CHANNEL). THE PLUG COMPACTION SHALL BE 90% STREAM BANKS IN THE PLUG AREA PER DETAIL IN ORDER TO PROVIDE SMOOTH TRANSITION BETWEEN NEW CHANNELS AND EXISTING CHANNEL. IMMEDIATELY STABILIZE THE BANKS WITH SEED AND EROSION CONTROL MATTING.
11. WITH PERMISSION OF THE SEDIMENT AND EROSION CONTROL INSPECTOR, REMOVE SANDBAGS TO ALLOW FLOW TO THE NEW CHANNEL.
12. DE-WATER THE OLD CHANNEL AND FILL THE OLD CHANNEL WITH CLEAN COMPACTED (90%) SOIL AND PLACE 4" LAYER OF TOP SOIL. REMOVE THE TEMPORARY ACCESS CULVERT. THE NEW FILL SHALL MAINTAIN POSITIVE DRAINAGE (2% SLOPE MIN.) TOWARD THE NEW STREAM. THE GRADING INTO THE EXISTING GROUND AT THE TOWNHOUSE BACKYARDS, WHERE 90% COMPACTION CANNOT BE ACHIEVED, CONTRACTOR MUST USE DETAIL #1 - GEOTEXTILE EROSION CONTROL FOR POOR QUALITY BACKFILL PLACEMENT.
13. STABILIZE ALL DISTURBED AREAS PER PERMANENT SEEDING SPECIFICATIONS. (1 DAY)
14. WITH PERMISSION OF THE SEDIMENT AND EROSION CONTROLS AND STABILIZE AREAS DISTURBED BY THIS PROCESS. (1 DAY)
15. INSTALL LANDSCAPING PER PLANNING AND STREAM STABILIZATION PLAN. (1 DAY)

NOTE: STEPS #5 AND #6, AS WELL AS #8 THRU #11 MUST OCCUR IN ONE (1) WORKING DAY AS NO OVERNIGHT PUMPING WILL BE ALLOWED.

\* APPROXIMATE LOCATION OF EXISTING UTILITIES HAS SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONSTRUCTION PREPARATION TO EXISTING SUBURBAN, UTILITY, OR PRIVATE PROPERTIES SHALL BE REPAIRED TO THE SATISFACTION OF HOWARD COUNTY AT CONTRACTOR'S EXPENSE.

3-YEAR ANNUAL MAINTENANCE MONITORING PLAN:

AT CONSTRUCTION STAGE (3 INITIAL REPORTS):

1. CONTRACTOR TO ESTABLISH FLOOD PLAIN BANK PINS AT LOCATION SHOWN ON PLAN. PINS TO BE EPOXY COATED #6 REBAR 30 INCHES LONG AND SHALL BE CAPPED WITH PLASTIC CAPS UPON INSTALLATION. CONTRACTOR TO INSTALL PINS AT LEAST 15 FEET BACK FROM TOP OF BANK IN THE PROPOSED CONDITION. CONTRACTOR TO ESTABLISH ELEVATIONS OF LEFT AND RIGHT PINS FROM AVAILABLE ESTABLISHED BENCHMARK/TRAVELER AND RECORD GPS LATITUDE AND LONGITUDE VALUES WITH THESE VALUES ESTABLISHED. CONTRACTOR SHALL THEN RECORD THE VERTICAL VALUE ACROSS THE SECTION ROUGHLY EVERY FOOT. IN ADDITION, TOP OF BANK, BOTTOM OF BANK, AND WETTED PERIMETER LOCATIONS ARE TO BE MEASURED. FIELD INFORMATION IS TO BE RECORDED AND TRANSLATED INTO A PICTORIAL CROSS SECTION GRAPHIC, LABELED "CONSTRUCTED CONDITION."

2. CONTRACTOR TO PHOTOGRAPH SITE CONDITIONS AT COMPLETION OF PROJECT AND PROVIDE SHORT WRITTEN SUMMARY OF CONDITIONS INCLUDING RETEMENT STABILITY, BEAVER ACTIVITY AND NUMBER AND HEALTH OF INSTALLED PLANTINGS. MAJOR ITEMS TO BE SHOWN ON THE PROJECT FINAL RECORD DRAWING. ONE PHOTOGRAPH OF THE CROSS SECTION AREA SHALL BE TAKEN BY SOMEONE STANDING ON THE EXISTING SANITARY MANHOLE AS SHOWN ON THE PLAN.

3. A SUMMARY LETTER WITH ATTACHED RECORD DRAWING, PHOTOGRAPH LOG AND CROSS SECTION IS TO BE SENT TO THE MARYLAND DEPARTMENT OF THE ENVIRONMENT.

ANNUAL REPORTING (3 TOTAL REPORTS):

1. CONTRACTOR TO RECOVER LOCATION OF PINS. CONTRACTOR SHALL RECORD THE VERTICAL VALUE ACROSS THE SECTION ROUGHLY EVERY FOOT. IN ADDITION, TOP OF BANK, BOTTOM OF BANK, AND WETTED PERIMETER LOCATIONS ARE TO BE MEASURED. FIELD INFORMATION IS TO BE RECORDED AND TRANSLATED INTO A PICTORIAL CROSS SECTION GRAPHIC LABELED "1ST YEAR", OR AS APPROPRIATE EACH YEAR'S CROSS SECTION IS TO BE SUPERIMPOSED OVER THE PREVIOUS YEAR TO ESTABLISH STREAM MEANDER DIRECTION AND AGGREGATION DEGRADATION VALUES.

2. CONTRACTOR TO PHOTOGRAPH SITE CONDITIONS EACH YEAR AND PROVIDE SHORT WRITTEN SUMMARY OF CONDITIONS INCLUDING RETEMENT STABILITY, BEAVER ACTIVITY AND NUMBER AND HEALTH OF INSTALLED PLANTINGS. MAJOR SITE CONDITION CHANGES TO BE SHOWN ON THE PROJECT FINAL RECORD DRAWING AND LABELED AS TO DATE OF OBSERVATION. ONE PHOTOGRAPH OF THE CROSS SECTION AREA SHALL BE TAKEN BY SOMEONE STANDING ON THE EXISTING SANITARY MANHOLE AS SHOWN ON THE PLAN.
3. A SUMMARY LETTER WITH ATTACHED RECORD DRAWING, PHOTOGRAPH LOG AND CROSS SECTION IS TO BE SENT TO THE MARYLAND DEPARTMENT OF THE ENVIRONMENT. INITIAL AND SUBSEQUENT REPORTS (4 TOTAL) SHALL BE FORWARDED AS FOLLOWS:

MARYLAND DEPARTMENT OF THE ENVIRONMENT  
NON-TIDAL WETLANDS AND WATERWAYS DIVISION  
2500 BROENING HIGHWAY  
BALTIMORE, MD 21224

ATTN: PROJECT MANAGER FOR NTWW DIVISION NUMBER: 96-NI-0918  
PROJECT: KINGS CUP COURT SUBDIVISION STREAM RELOCATION IN COLUMBIA, HOWARD COUNTY, MARYLAND

LEGEND

- TSF TREE SAVE FENCE (DETAIL 5, SHEET 5 ADDENDUM)
- SF SILT FENCE (SEE DETAIL, SHEET 5)
- Coffee Dam (Detail 4, Sheet 5 Addendum)
- SCE STABILIZED CONSTRUCTION ENTRANCE (SEE DETAIL, SHEET 5)
- Temporary Access Culvert (See Detail, Sheet 5)

Reviewed for HOWARD S.C.D.  
Name  
Signature  
Date 9/13/02  
USDA, NATURAL RESOURCES CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD COUNTY CONSERVATION DISTRICT.  
Approved by Howard S.C.D. Date 9/13/02

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
Director of Public Works: *Jan 7/02* DATE: 9/26/02  
Chief, Bureau of Environmental Services: *John J. O'Hara* DATE: 9/19/02  
Director, Department of Recreation & Parks: *Paul A. Arthur* DATE: 9/23/02  
Chief, Stormwater Management Division: *Howard E. Saltzman* DATE: 9/19/02

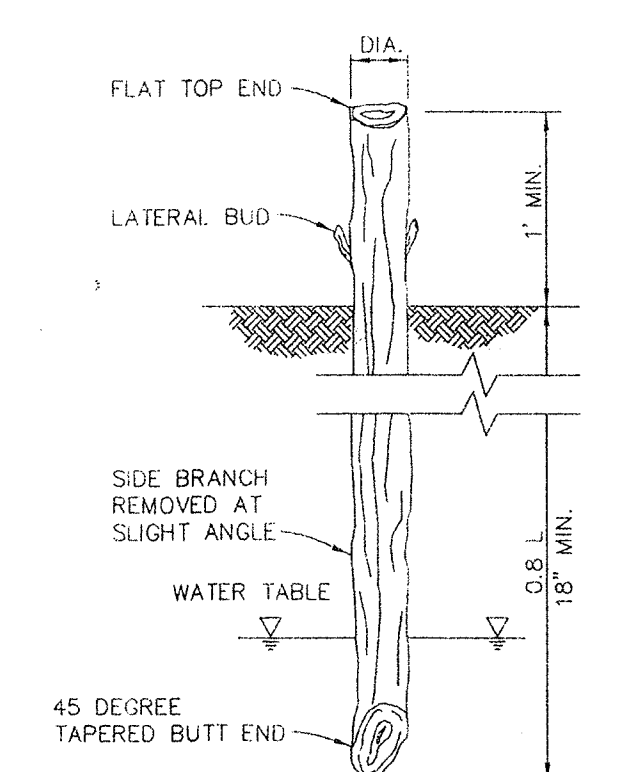
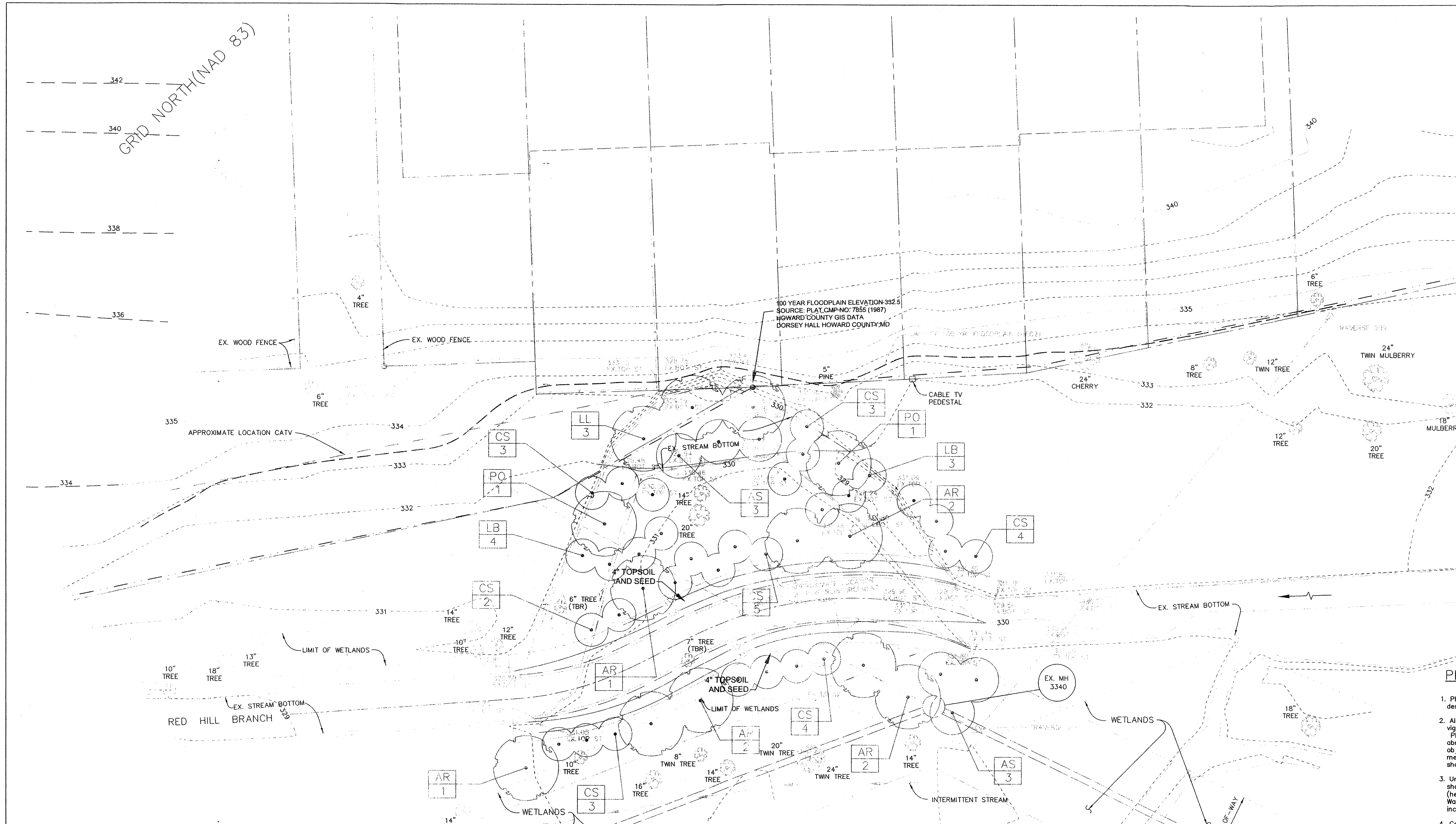
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ARTHUR E. MUEGGE #8707  
TIMOTHY C. SCHUELER #20207

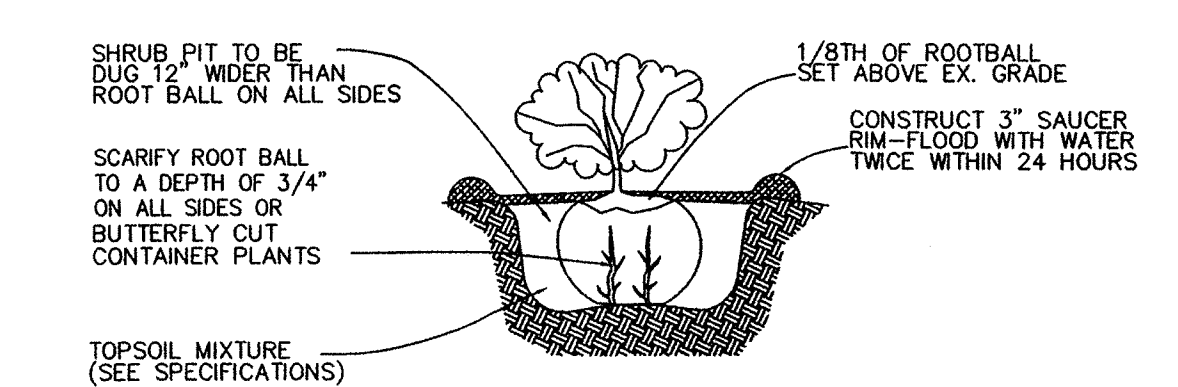
DES: CJR	EQR: 1	EQR REVISIONS	02/2002
DRN: MAD			
CHK:			
DATE: 11/14/00			
BY: NO.	REVISION	DATE	600' SCALE MAP NO. 30 BLOCK NO. 4

SEDIMENT AND EROSION CONTROL PLAN  
KINGSCUP COURT  
STREAM RELOCATION  
2nd ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CAPITAL PROJECT  
SCALE AS SHOWN  
SHEET 3 OF 6





LIVE STAKE DETAIL  
NO SCALE

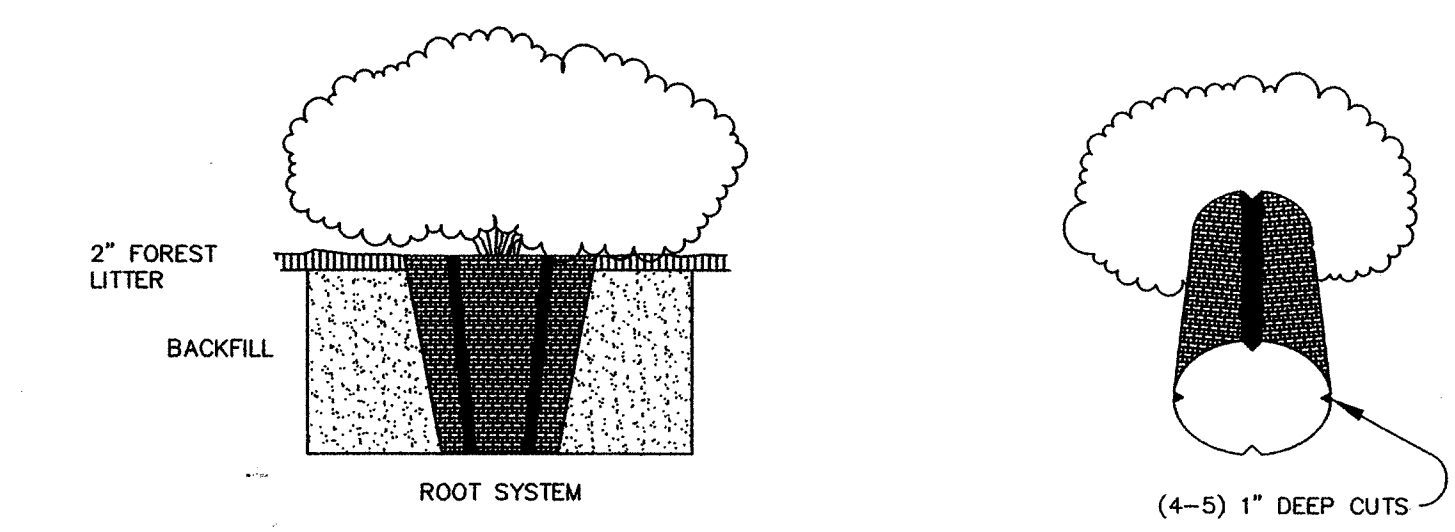


SHRUB PLANTING DETAIL  
NOT TO SCALE

PLANTING SPECIFICATIONS

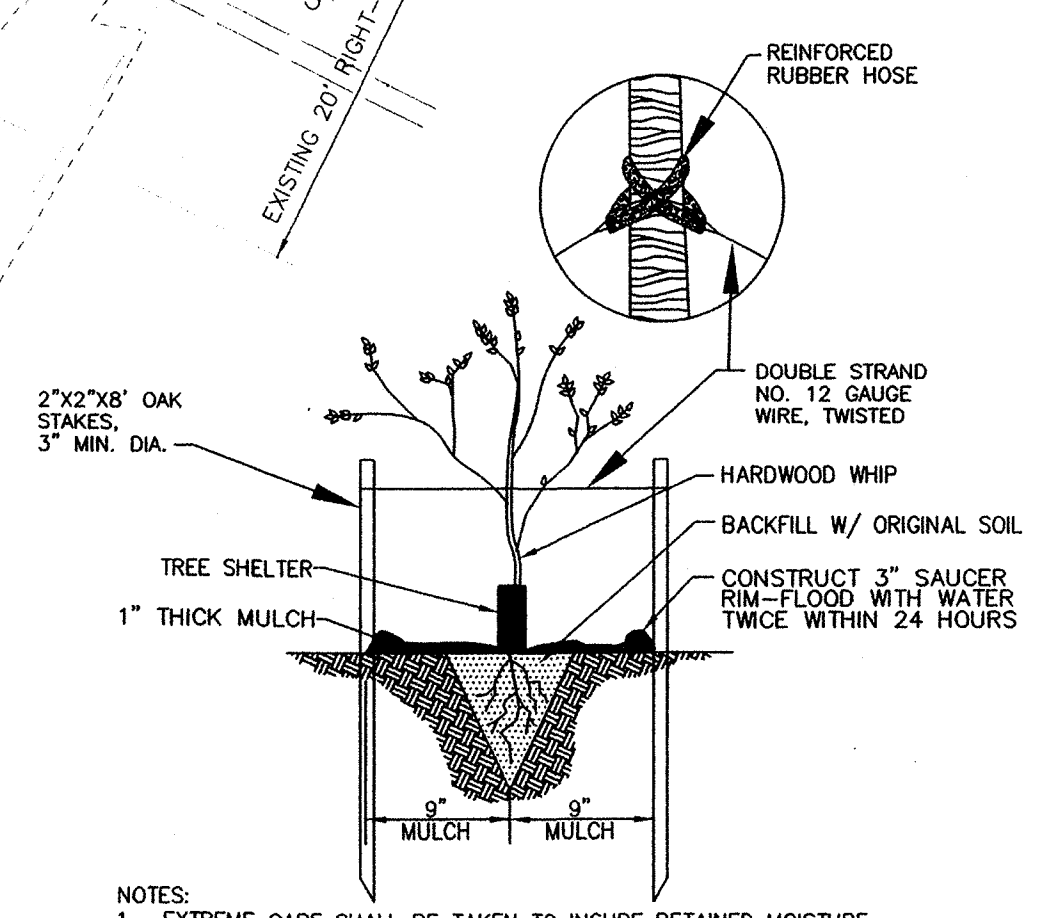
- Plants, related material, and operations shall meet the detailed description as given on the plans and as described herein.
- All plant material, unless otherwise specified, shall be nursery grown, uniformly branched, have a vigorous root system, and shall conform to American Association of Nurserymen (AAN) Standards. Plant material shall be healthy, vigorous, free from defects, decay, disfiguring roots, sunscald injuries, abrasions of the bark, plant disease, insect pest eggs, borers and all forms of insect infestations or objectionable disfigurements. Plant material that is weak or which has been cut back from larger grades to meet specified requirements will be rejected. Trees with forked leaders will not be accepted. All plants shall be freshly dug; no headed-in plants or plants from cold storage will be accepted.
- Unless otherwise specified, all general conditions, planting operations, details and planting specification shall conform to "Landscape Specification Guidelines for Baltimore-Washington Metropolitan Areas", (hereinafter "Landscape Guidelines") approved by the Landscape Contractors Association of Metropolitan Washington and the Potomac Chapter of the American Society of Landscape Architect, latest edition, including all addenda.
- Contractor shall be required to guarantee all plant material for a period of one year after date of acceptance in accordance with the appropriate section of the Landscape Guidelines. Contractor's attention is directed to the maintenance requirements found within the one year specifications including watering and replacement of specified plant material.
- Contractor shall be responsible for notifying utility companies, utility contractors and "Miss Utility" a minimum of 48 hours prior to beginning any work. Contractor may make minor adjustments in spacing and location of plant material to avoid conflicts with utilities. Damage to existing structure and utilities shall be repaired at the expense of the Contractor.
- Protection of existing vegetation to remain shall be accomplished by the temporary installation of 4 foot high snow fence at the drip line.
- Contractor is responsible for installing all material in the proper planting season for each plant type. All planting is to be completed within growing season of completion of site construction.
- Bid shall be based on actual site conditions. No extra payment shall be made for work arising from site conditions differing from those indicated on drawings and specifications.
- Plant quantities are provided for the convenience of the contractor only. If discrepancies exist between quantities shown on plan and those shown on the plant list, the quantities on the plan take precedence.
- Positive drainage shall be maintained in planting beds (minimum 2 percent slope).
- Planting mix shall only be used if soil tests show the existing soils to be inadequate. If necessary, planting mixes shall be as follows: Deciduous Plants - Two parts topsoil, one part well-rotted cow or horse manure. Add 3 lbs of standard fertilizer per cubic yard of planting mix. Topsoil shall conform to the Landscape Guidelines.
- Weed Control: No weed control in naturalized planting. No herbicide is to be used within 100 yd. floodplain.
- Mulch: Prior to site disturbance, forest litter to be collected and stockpiled. After planting, redistribute forest litter over newly planted areas to a depth of 2". If 2" thickness cannot be achieved with existing forest litter, supplement with shredded, composted hardwood mulch, leafy, conifer, or approved equivalent. Supplemental material shall be approved by Howard County prior to spreading.
- Deer Repellent: Repellex<sup>TM</sup> ML2 Systemic Tablets and Repellex<sup>TM</sup> Liquid Concentrate shall be used with all plantings. Plants shall be pre-fed Repellex<sup>TM</sup> ML2 Systemic Tablets prior to installation, if possible. Quantities for the tablets and liquid concentrate shall be according to the Repellex<sup>TM</sup> application rate guidelines.
- All areas within contract limits disturbed during or prior to construction not designated to receive plants and mulch shall be fine graded and seeded.
- This plan is intended for landscape use only. See other plan sheets for more information on grading, sediment control, layout, etc.
- No trees or shrubs are to be planted in soil compacted greater than 90%.
- Plant Layout: Randomly locate the listed plants within the bounded area. Space out plants to cover entire area.

PLANT LIST				
KEY	QTY	BOTANICAL + COMMON NAME	SIZE	ROOT
<b>TREES</b>				
PO	2	Platanus occidentalis Sycamore	4'-5" Ht.	2 gal.
LL	3	Larix laricina Tamarack	3'-4" Ht.	2 gal.
AR	8	Acer rubrum Red Maple	4'-5" Ht.	2 gal.
<b>SHRUBS</b>				
AS	6	Alnus serrulata Smooth Alder	18"-24" Ht.	1 gal.
CS	24	Cornus sericea Red Osier Dogwood	18"-24" Ht.	1 gal.
LB	7	Lindera benzoin Spicebush	18"-24" Ht.	1 gal.
-	*	Cornus Amomum Silky Dogwood	*	*SEE TRM & LIVE STAKE DETAIL



- REMOVE THE PLANT EITHER BY CUTTING OR INVERTING THE CONTAINER.
- USE A KNIFE OR A SHARP BLADE TO MAKE (4-5) 1" CUTS THE LENGTH OF THE ROOT BALL.
- PLANT SHRUB OR TREE 1-2" ABOVE THE EXISTING GRADE.
- APPLY 2-3" THICK LAYER OF FOREST LITTER PER PLANTING SPECIFICATIONS.

CONTAINER GROWN TREE AND SHRUB PLANTING DETAIL  
NO SCALE



- NOTES:
- EXTREME CARE SHALL BE TAKEN TO INSURE RETAINED MOISTURE OF THE ROOTS. A MOIST CARRYING CONTAINER SHALL BE USED WHEN TRANSPORTING WHIPS TO THE FIELD.
  - DO NOT SUBMERGE ROOTS OF WHIPS IN WATER OVERNIGHT.

WHIP PLANTING W/  
TREE SHELTER DETAIL  
NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND Director of Public Works: <i>James J. Chew</i> DATE: 9/10/02 Director, Department of Recreation & Parks: <i>Clayton Arthur</i> DATE: 9/23/02		RIEMER MUEGGE & ASSOCIATES INC. ENGINEERING • ENVIRONMENTAL SERVICES • PLANNING • SURVEYING 8818 Curtis Park Drive, Columbia, MD 21046 Tel: 410.997.8000 Fax: 410.997.8282 Environmental Quality Resources, L.L.C. A Natural Resources Management Company Consulting • Design • Construction • Maintenance 895 Quince Orchard Road Gaithersburg, Maryland 20878 Tel: 301.288.8878 Fax: 301.288.4551		ARTHUR E. MUEGGE #8707 TIMOTHY C. SCHUELER #20207 Date: 9-10-02		DES: EQR 1 02/2002 DRN: MAD CHK: DATE: 11/14/00		EQR REVISIONS 02/2002 PLANTING AND STREAM STABILIZATION PLAN		KINGS CUP COURT STREAM RELOCATION 2nd ELECTION DISTRICT HOWARD COUNTY, MARYLAND CAPITAL PROJECT		SCALE AS SHOWN SHEET 4 OF 6	
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**Vegetative Stabilization Specifications**

**A. Site Preparation**  
1. Insult sediment and erosion control structures (either temporary or permanent) such as diversions, grade stabilization structures, berms, waterways or sediment control basins.  
2. Perform all grading operations at right angles to the slope, final grading and shaping is not usually necessary for temporary seeding.  
3. Schedule required soil tests to determine soil amendment composition and application rates.

**B. Soil Amendments**  
1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer. Soil analysis may be performed by the University of Maryland at a recognized commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analysis. Appropriate soil parameters are as follows:  
a. Soil pH shall be between 6.0 and 7.0.  
b. Soluble salts shall be less than 500 parts per million (ppm).  
c. The soil shall contain less than 4% clay but enough fine grained material (>50% fill plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is grasses: a serecia repens/lella is to be planted, then sandy soil (<30% silty clay) may be acceptable.  
d. Soil shall contain 1.5% minimum organic matter by weight.  
e. Soil must contain sufficient phosphorus to permit adequate crop production.  
f. If these conditions cannot be met by soil on site, appropriate amendments must be agreed upon by the contractor and Howard County Department of Recreation and Parks.  
g. Fertilizer shall be uniform in composition, free flowing, and suitable for accurate application by approved equipment. Fertilizer may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers shall be delivered to the site fully labeled according to the applicable state fertilizer law, and shall bear the name, trade name, trade name and warranty of the producer.

2. Lime material shall be ground limestone (hydrated or burnt lime may be substituted) which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to such fineness that at least 50% will pass through a #100 mesh sieve and 90% will pass through a #20 mesh sieve.  
3. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.  
**C. Temporary Seeding**  
1. Apply to graded or cleared areas ready to be re-vegetated where a short term vegetative cover is needed.  
2. Seedbed Preparation:  
a. Seedbed preparation shall consist of loosening soil to a depth of 3-4" by means of suitable agricultural or construction equipment, such as disc harrow or chisel plow or rippers provided on construction equipment. After the soil is loosened, it should not be rolled or dragged in any direction. Slope areas (greater than 3:1) should be tracked leaving the surface in an irregular condition with rough running parallel to the contour of the slope.  
b. Apply fertilizer and lime if recommended based on the soil test as described in Section B. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.  
3. Seed Specifications:  
a. All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to retesting by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job. Note: Seed tags shall be made available to the inspector to verify type and rate of seed used.  
b. Inoculant: The inoculation for treating legume seeds in the mixture shall be a pure culture of nitrogen-fixing bacteria prepared especially for the species. Inoculants shall not be used later than the date indicated on the container. Add fresh inoculant as directed on package. Use four times the recommended rate when hydrosowing. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75-80°F can weaken bacteria and make the inoculant less effective.  
c. Seed Mixtures for Temporary Seeding Along Construction Access Route Only:  
Dates: See Mix Application Rate  
March 1-April 30 Annual Ryegrass 2-1/2 bushel per acre  
April 15-May 15 Annual Ryegrass (2 1/2 lbs/1000 sq ft)  
May 1-August 14 Weeping Lovegrass 1 bushel per acre (6.0 lbs/1000 sq ft)

**D. Permanent Seeding**  
1. Apply permanent seeding to graded or cleared areas of Howard County Department of Recreation and Parks property not subject to immediate further disturbance, create a permanent long lived vegetative cover as desired. For full establishment, areas along the temporary access route on Howard County Department of Recreation and Parks Property, refer to Section G (Soil Specifications).  
2. Seeding must meet minimum conditions required for vegetative stabilization, as described in Section B. Areas previously graded in accordance with the drawings shall be maintained in a true and even grade, then scarified or otherwise loosened to a depth of 3" to permit banding of the topsoil to the surface area and to create non-parallel erosion check slots to prevent topsoil from sliding down a slope.  
3. Apply soil amendments as per soil test and approval by Howard County Department of Recreation and Parks (refer to Section B).  
4. If soil amendments are determined necessary, mix soil amendments into the top 3-5" of soil by disking or other suitable means. Lawn areas should be raked to smooth the surface, remove large objects such as stones and branches, and ready the area for seed application. Where site conditions will or permit normal seeded preparation, loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface. Sleep spikes (greater than 3:1) should be tracked by a dozer leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. The top 1-1/2" of soil should be loose and friable. Seeding frequency may not be necessary on newly disturbed areas.  
5. Seed Specifications:  
a. All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to retesting by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job. Note: Seed tags shall be made available to the inspector to verify type and rate of seed used.  
b. Inoculant: The inoculation for treating legume seeds in the mixture shall be a pure culture of nitrogen-fixing bacteria prepared especially for the species. Inoculants shall not be used later than the date indicated on the container. Add fresh inoculant as directed on package. Use four times the recommended rate when hydrosowing. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75-80°F can weaken bacteria and make the inoculant less effective.  
c. Seed Mixtures for Permanent Seeding on Howard County Department of Recreation and Parks Property:  
Dates: See Mix Application Rate  
March 1-Oct. 15 ERNIA 154 35 lbs/acre  
ERNA 154 see at 15 bulk pounds per acre basis of 15% Andropogon gerardi 2 1/2 bushels per acre  
3% Elymus virginicus Virginia Blue Rye 2% Asclepias incarnata Swamp Milkweed  
3% Elymus canadensis Canada Blue Rye 2% Panicum virginicum Switchgrass  
8% Elymus villosus Silky Blue Rye 2% Rindiba purpurea Grey-headed Coneflower  
8% Silphium laciniatum Caperplant 2% Sarcocolla purpurea Maryland Senna  
5% Asclepias syriaca Indian Hemp 2% Vernonia noveboracensis New York Ironweed  
4% Aster umbellatus Common Milkweed 1% Aster novae angliae New England Aster  
4% Verticillium alternifolium Wagon Wheel 1% Desmodium canadense Snow Tick-Trefoil  
1% Bidens cernua Nodding Bur-Mangold 1% Solidago rigida Winkie-leaf Goldenrod  
1% Eupatorium maculatum Spotted Joe-pye-weed 1% Zizia aurea Golden Alexanders

**E. Methods of Seeding**  
1. Hydrosowing: Apply seed uniformly with hydrosower, which includes seed and fertilizer. Broadcast or drop seeder, or a out-packer seeder.  
a. If fertilizer is being applied at the time of seeding, the application rates will not exceed the following: Nitrogen, maximum of 100 lbs/acre total of soluble nitrogen; P-205 (Phosphorous) 200 lbs/acre; K2O (Potassium) 200 lbs/acre.  
b. Lime - use only ground agricultural limestone (up to 3 tons per acre) may be applied by hydrosowing. Normally, no more than 2 tons are applied by hydrosowing at any one time. Do not use burnt or hydrated lime when hydrosowing.  
c. Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without interruption.  
2. Dryseeding: This includes use of conventional, drop or broadcast spreaders.  
a. Seed spread dry shall be incorporated into the substrate at the rates prescribed on the temporary or permanent seeding summaries. The seeded area shall then be rolled with a weighted roller to provide good seed to soil contact.  
b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.  
3. Drill or out-packer seeding: Mechanical seeders that apply and cover seed with soil.  
4. Out-packer seeders are required to lay the seed in such a fashion as to provide at least 1/2 inch of soil covering. Seedbeds must be firm after planting.  
5. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.

**F. Mulch Specifications**  
1. Straw shall consist of thoroughly threshed wheat, rye or oat straw, heavily bright in color and shall not be dusty, moldy, green, decayed, or excessively dirty. It shall be free of noxious weed seeds as specified in the Maryland Seed Law.  
2. Wood Cellulose Fiber Mulch (WCFM)  
a. WCFM shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state.  
b. WCFM shall be dyed green or contain a green dye in a package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.  
c. WCFM, including dye, shall contain no germination or growth inhibiting factors.  
d. WCFM materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.  
e. WCFM material shall contain no elements or compounds at concentration levels that will be phytotoxic.  
f. WCFM must conform to the following physical requirements: Fiber length to approximately 10 mm, diameter approximately 1 mm, pH range of 4.0 to 8.5, ash content of 1.6 % maximum and water holding capacity of 90% minimum. Note: Only sterile straw mulch should be used in areas where one species of grass is desired.

**G. Mulching Seeded Areas**  
1. If grading is completed outside the seeding season, mulch alone shall be applied as prescribed in this section and maintained until the seeding season returns and seeding can be performed in accordance with these specifications.  
2. When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is to be used, the rate should be increased to 25 tons/acre.  
3. Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,500 lbs/acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a minimum of 50 lbs of wood cellulose fiber per 100 gallons of water.  
4. Securing Straw Mulch (Mulch Anchoring): Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon size of area and erosion hazard:  
a. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. It used on sloping land, this practice should be used on the contour if possible.  
b. Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lbs/acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lbs of wood cellulose fiber per 100 gallons of water.  
c. Application of liquid binders should be heavier at the edges where wind carries mulch, such as in valleys and on crests of banks. The remainder of area should appear uniform after binder application. Synthetic binders such as acrylic DLR (Agra-Tack), DEC-70, Phosret, Terra-Tax II, Terra-Tack AR or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.  
d. Lightweight plastic netting may be stapled over the mulch according to manufacturer's recommendations. Netting is usually available in rolls of 1-1/2 feet wide and 300-3,000 feet long.  
**H. Sod Specifications**  
1. To provide quick cover on disturbed areas (2:1 grade or flatter) Sod will only be used to stabilize the area disturbed by the channel drain installation, or in unusual or emergency situations as deemed necessary by the Sediment Control Inspector, Design Engineer, and job foreman.  
2. GENERAL SPECIFICATIONS  
a. Class of turfgrass sod shall be Maryland or Virginia State Certified or Approved. Sod labels shall be made available to the job foreman and inspector.  
b. Sod shall be machine cut at a uniform soil thickness of 3/4" plus or minus 1/8", at the time of cutting.  
c. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut to the suppliers width and length. Maximum allowable deviation from standard widths and lengths shall be 5%.  
d. Broken pads and torn or uneven ends will not be acceptable.  
e. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10% of the section.  
f. Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.  
g. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be approved by an agronomist or soil scientist prior to its installation.  
3. SOD INSTALLATION  
a. During periods of excessively high temperature or in areas having dry subsoil, the subsoil shall be lightly irrigated immediately prior to laying the sod.  
b. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly wedge against each other. Lateral joints shall be staggered to promote more uniform growth and strength.  
c. Ensure that sod is not stretched or overlapped and that all the joints are butted tight in order to prevent voids which would cause air drying of the roots.  
d. Whenever possible, sod shall be laid with the long edges parallel to the contour and with staggering joints.  
e. Sod shall be rolled and tamped, pegged or otherwise secured to prevent slippage on slopes and to ensure solid contact between sod roots and the underlying soil surface.  
f. Sod shall be watered immediately following rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. The operations of laying, tamping and irrigating for any piece of sod shall be completed within eight hours.  
4. SOE MAINTENANCE  
a. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of 4". Watering should be done during the heat of the day to prevent wilting.  
b. After the first week, sod watering is required as necessary to maintain adequate moisture content.  
c. The first mowing of sod should not be attempted until the sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2" and 3" unless otherwise specified.

**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 (410-3155).
- ALL NEGATIVE AND SINKHOLE ARE TO BE INSTALLED ACCORDING TO THE PHYSICTIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1994 MARYLAND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL, AND REVISIONS THERETO.
- FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMITS OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN 48 CALENDAR DAYS FOR ALL PERMETER SEDIMENT CONTROL STRUCTURES, DILLS, FOR ALL PERMETER SLOPES, AND ALL SLOPES STEEPER THAN 3:1, 14 DAYS AS TO ALL OTHER AND ALL SLOPES DISTURBED OR GRADED ON THE PROJECT SITE.
- ALL PERMITS (TRAPS/BASINS) SHOW MUST BE FENCED AND WARNING SIGNS POSTED AROUND THE PERMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 7, 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 SPECIFICATIONS FOR SOLE EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING, SOE, TEMPORARY SEEDING, AND MULCHING (SEC. 6). TEMPORARY STABILIZATION WITH MULCH ALONE WHEN RECOMMENDED SEEDING DATES DO NOT APPLY.
- 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:  
AREA DISTURBED 0.3 ACRES  
AREA TO BE ROOFED OR PAVED 0 ACRES  
AREA TO BE VEGETATIVELY STABILIZED 0.3 ACRES  
TOTAL CU. YARDS 60 CU. YARDS  
TOTAL FILL 10 CU. YARDS
- 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 CONTROLS 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 PERMETER EROSION AND SEDIMENT CONTROL, BUT BEFORE PROCEEDING WITH ANY OTHER DISTURBANCE OR GRADING, OTHER BUILDING OR GRADE ADJUSTMENT APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.  
11. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.  
12. SITE GRADING WILL BEGAIN ONLY AFTER ALL PERMETER SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED AND ARE IN A FUNCTIONING CONDITION.  
13. SEDIMENT WILL BE REMOVED FROM TRAPS WHEN ITS DEPTH REACHES CLEAN OUT ELEVATION SHOWN ON THE PLANS.  
14. CUT AND FILL QUANTITIES PROVIDED UNDER SITE ANALYSIS DO NOT REPRESENT BIG QUANTITIES. THESE QUANTITIES DO NOT DISTINGUISH BETWEEN STRUCTURAL FILL OR EMBANKMENT MATERIAL, NOR DO THEY REFLECT CONSIDERATION OF UNDESIRABLE OR REMOVAL OF UNSUITABLE MATERIAL. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH SITE CONDITIONS WHICH MAY AFFECT THE WORK.

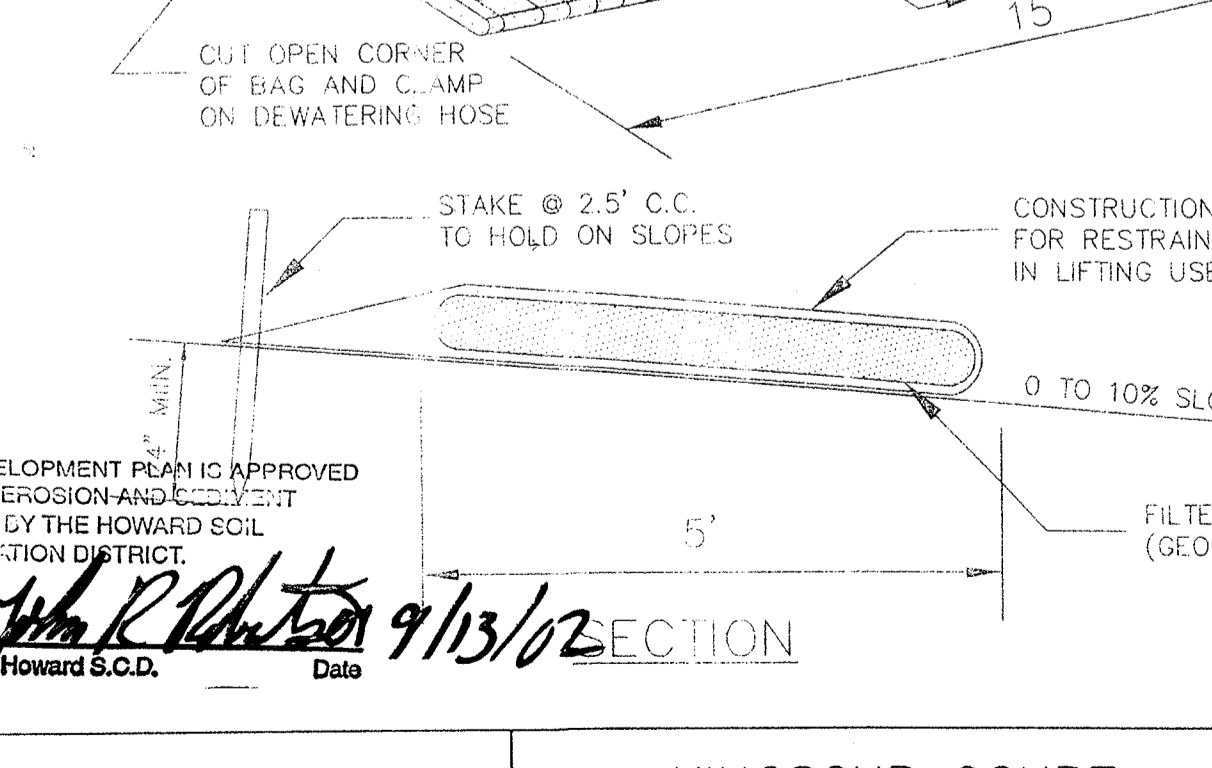
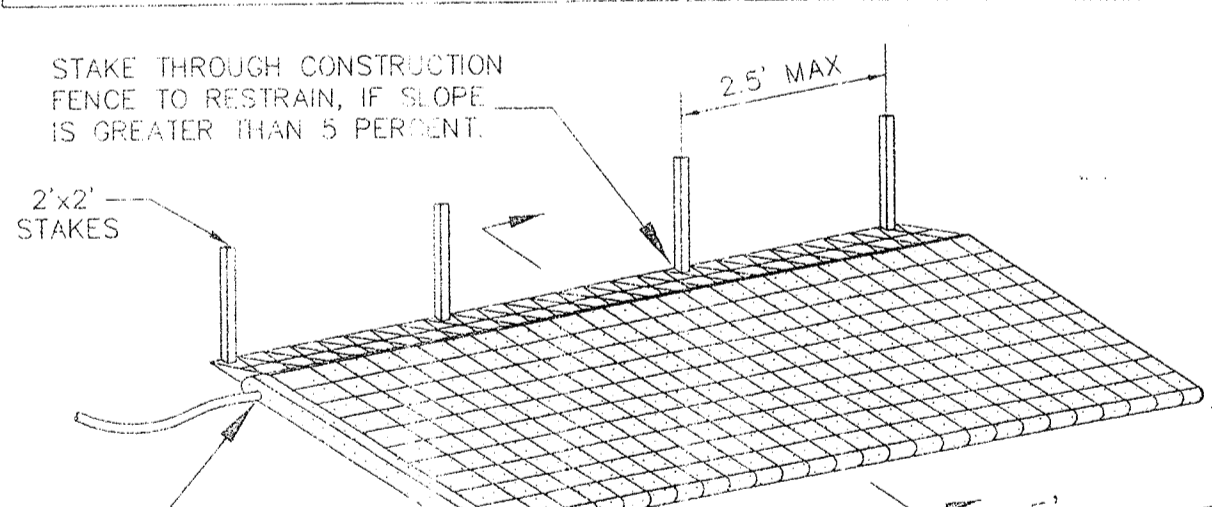
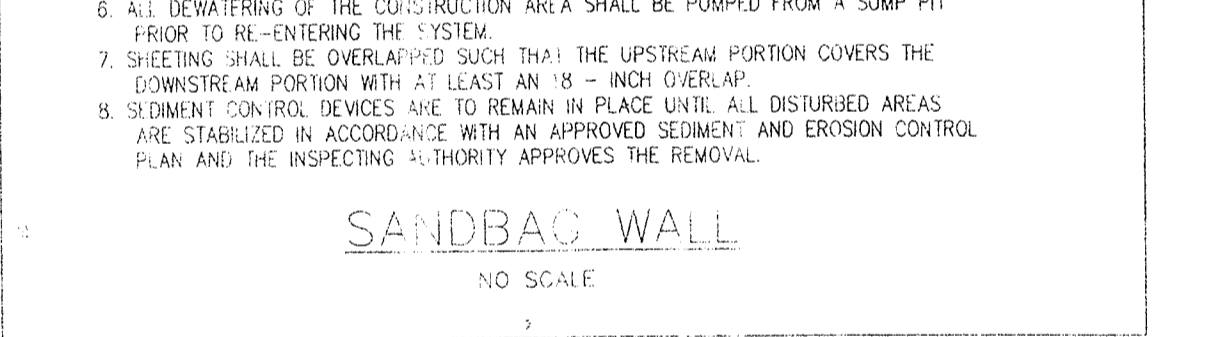
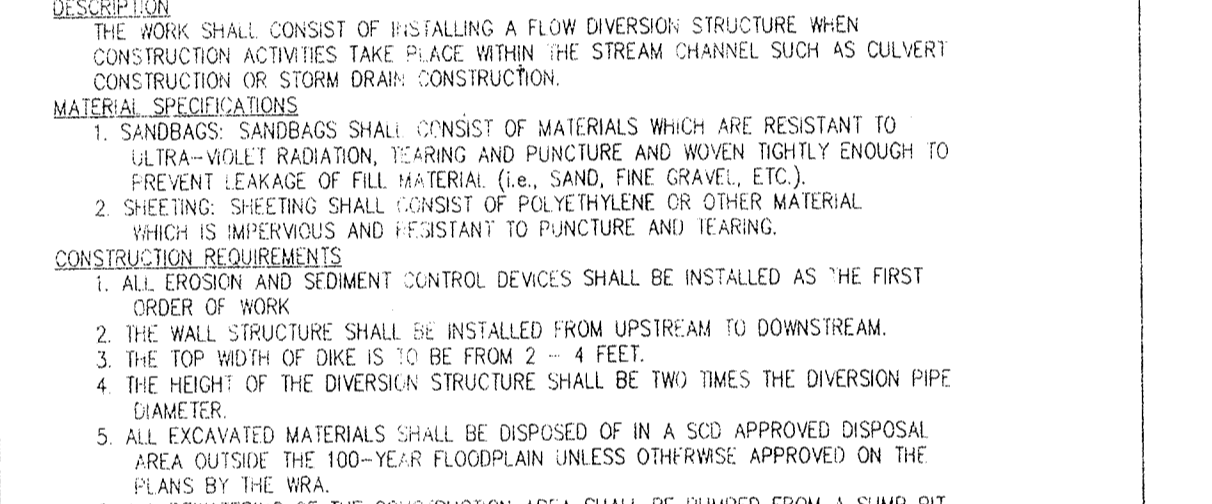
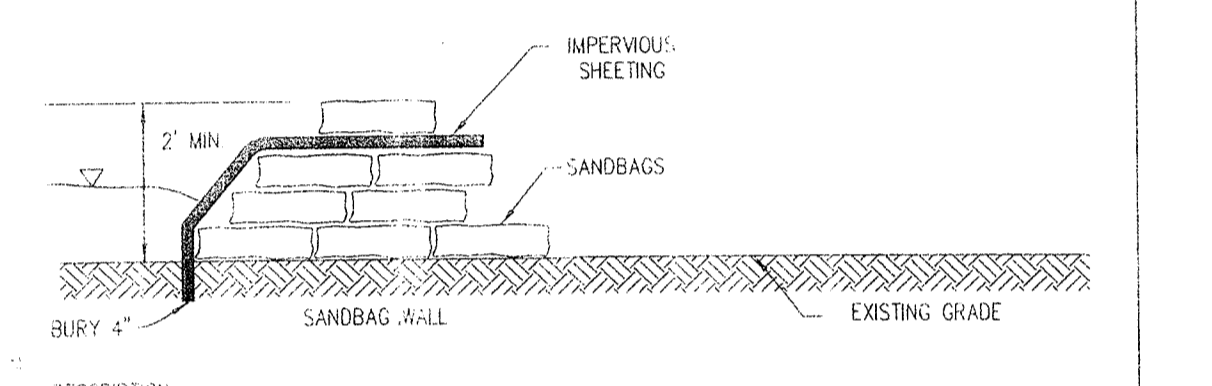
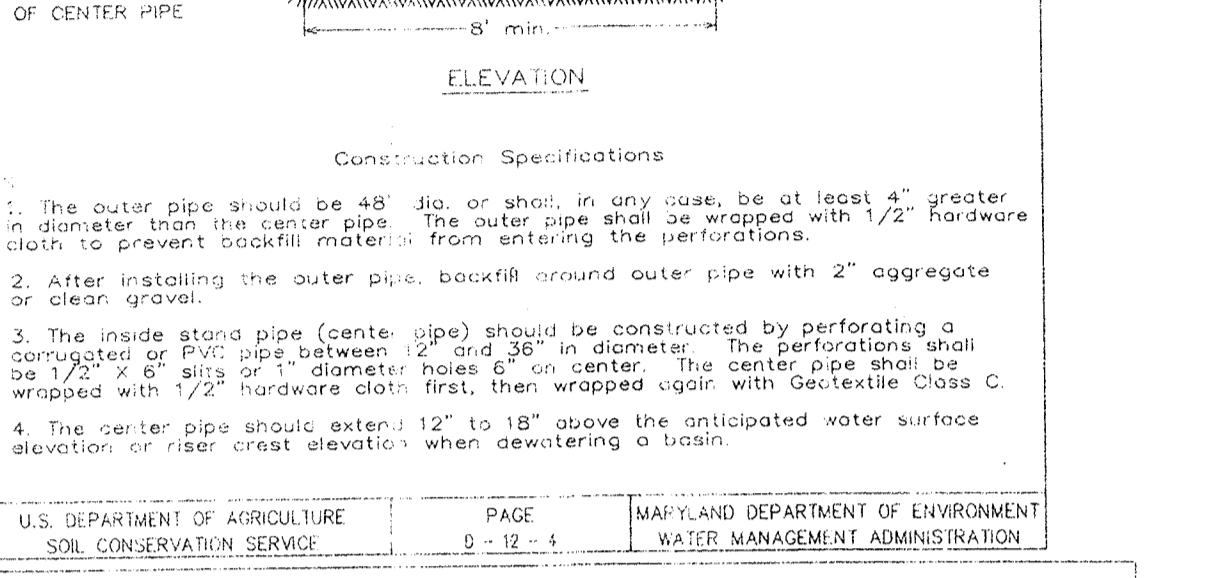
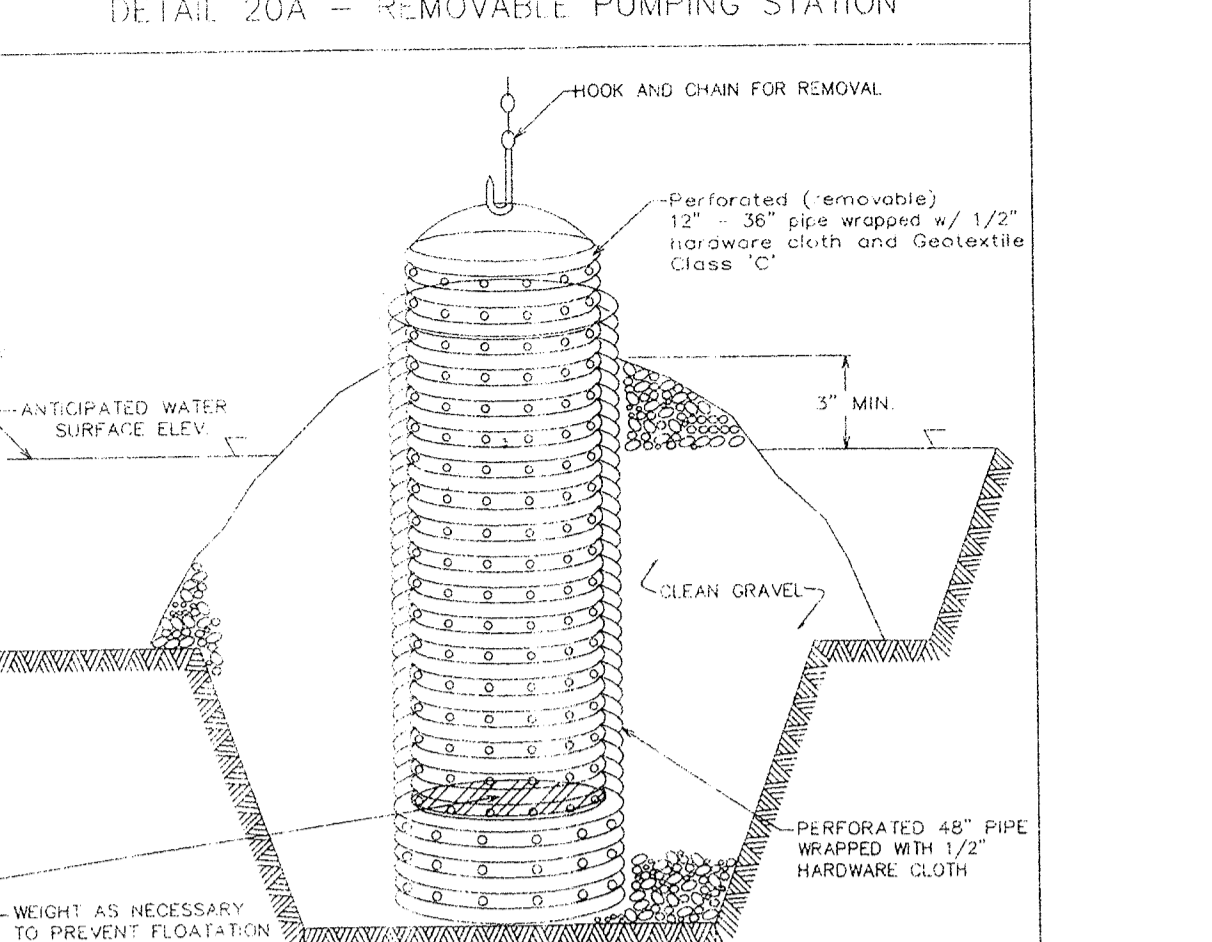
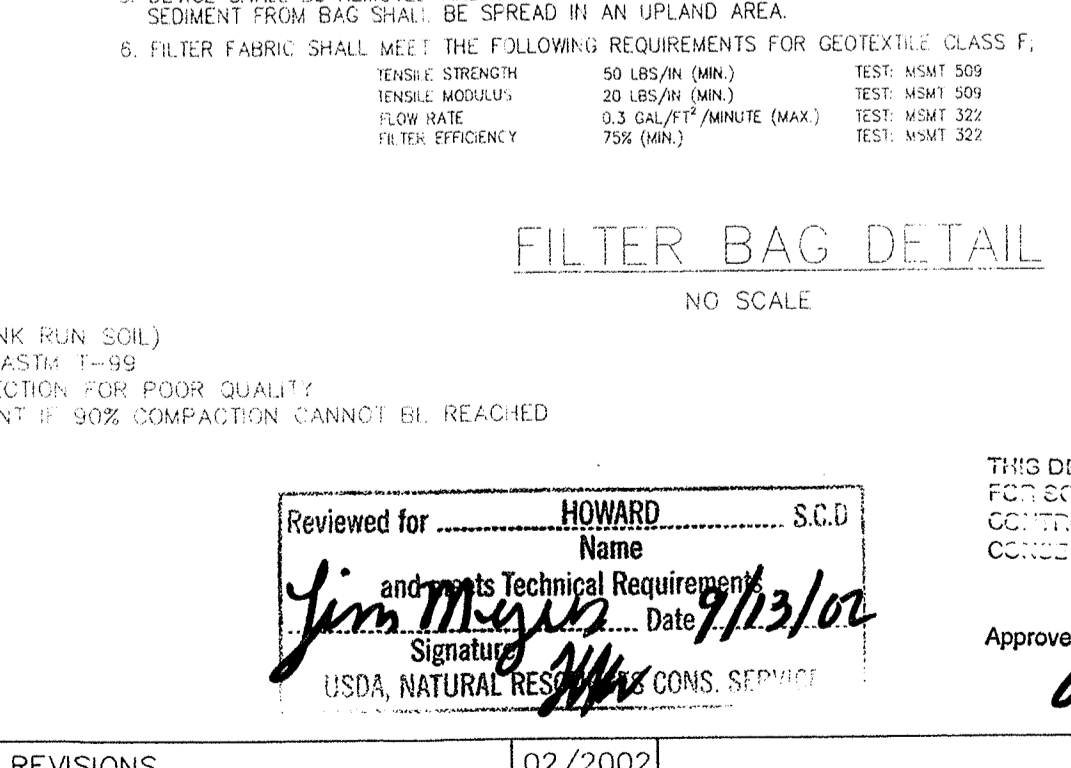
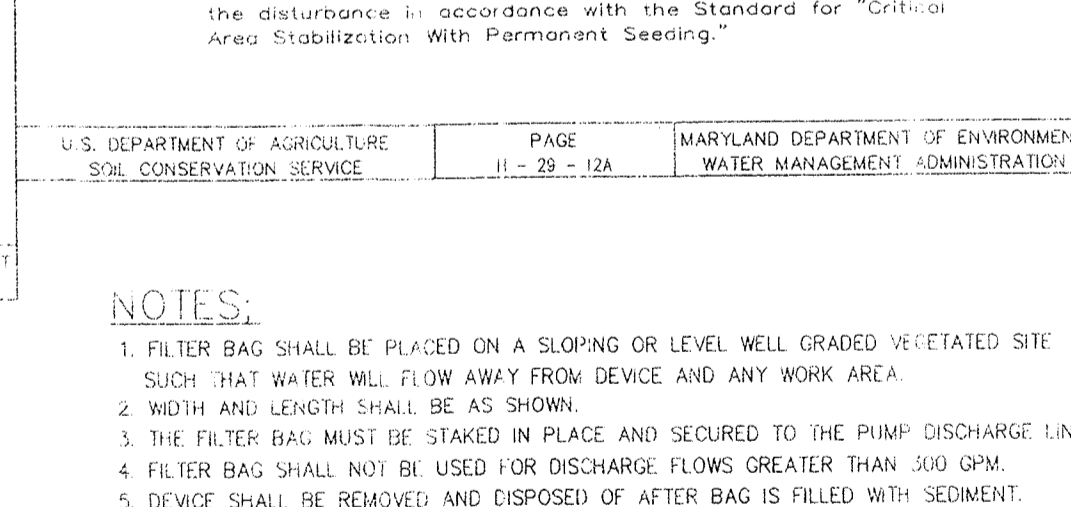
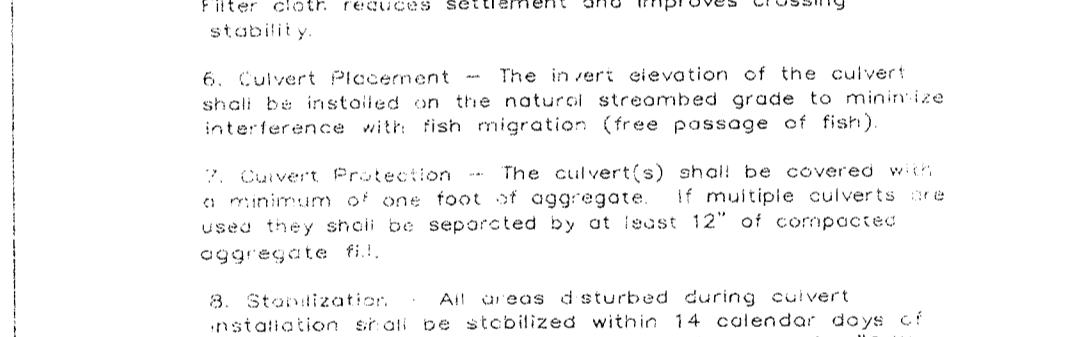
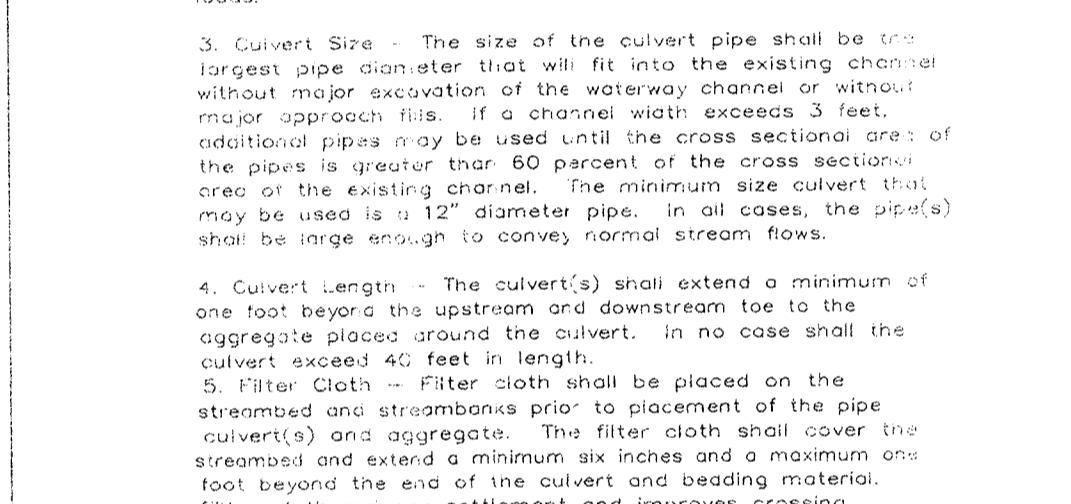
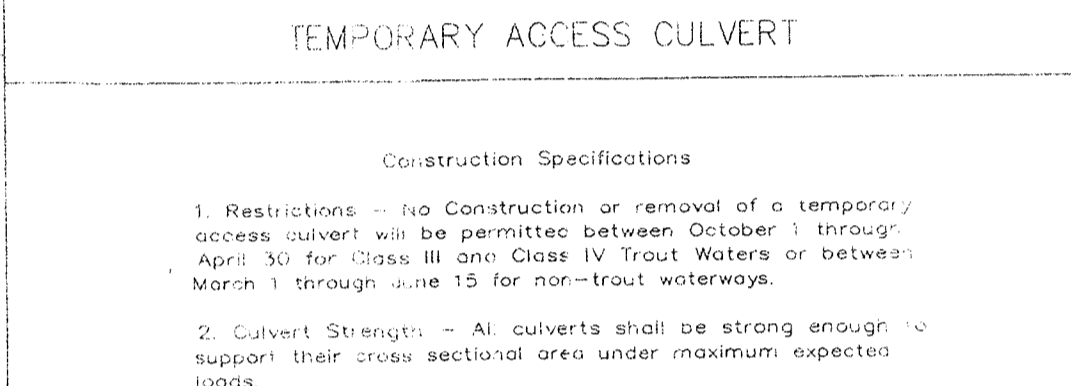
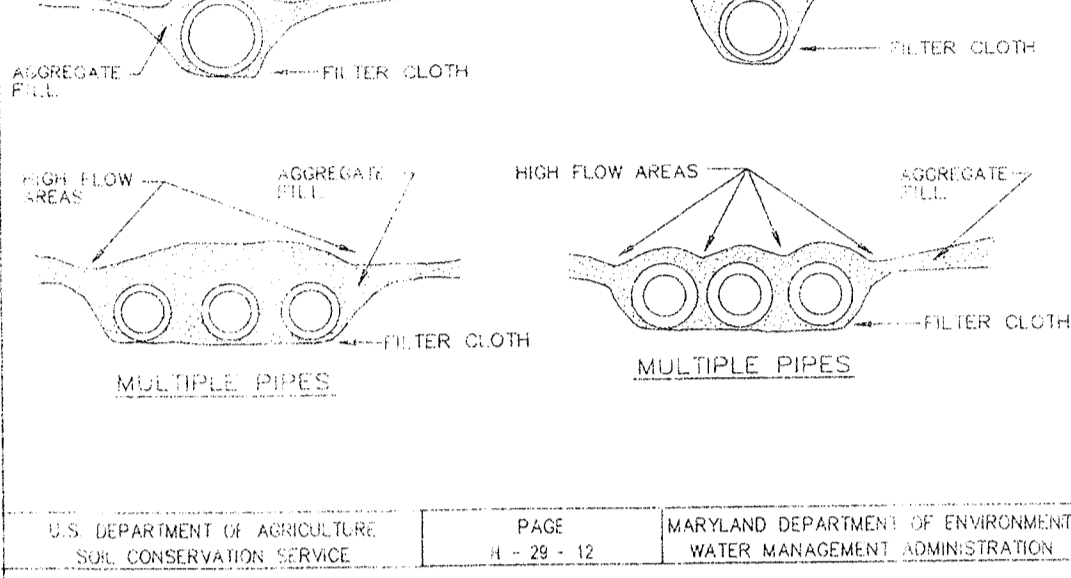
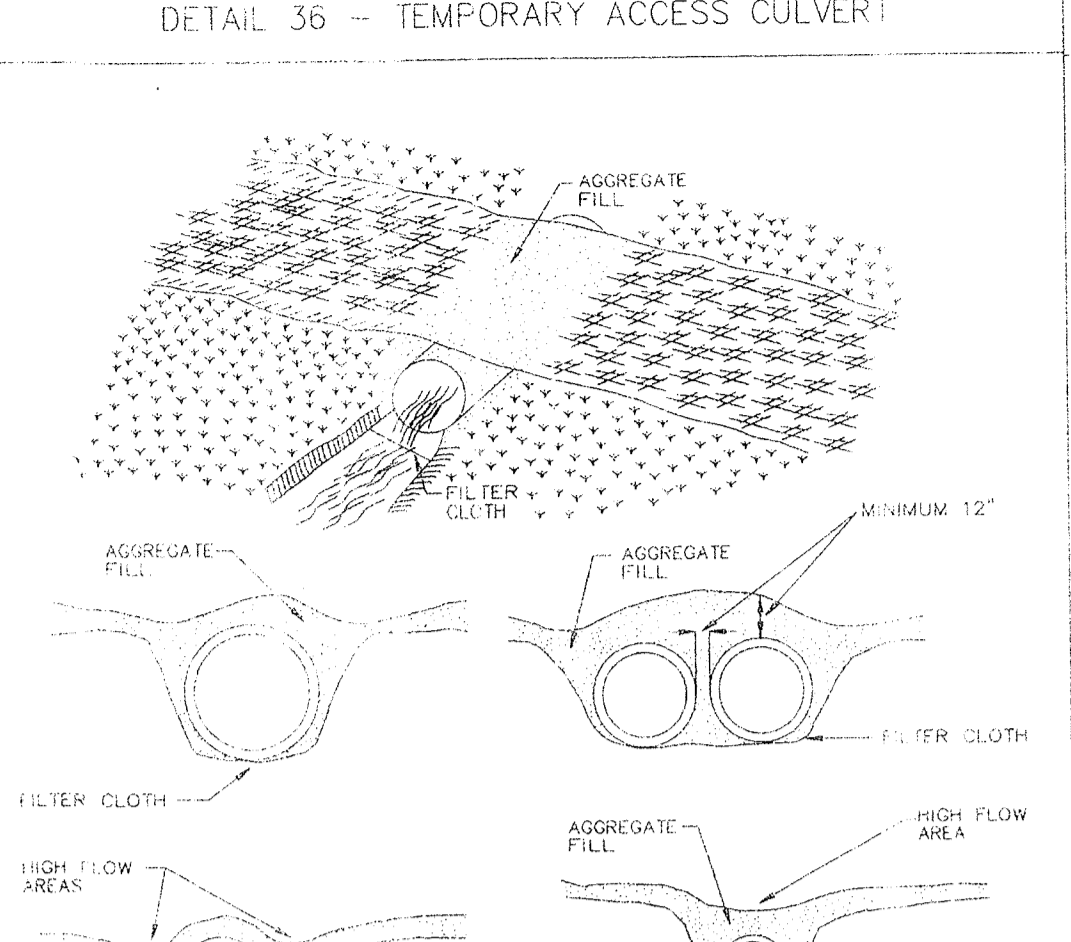
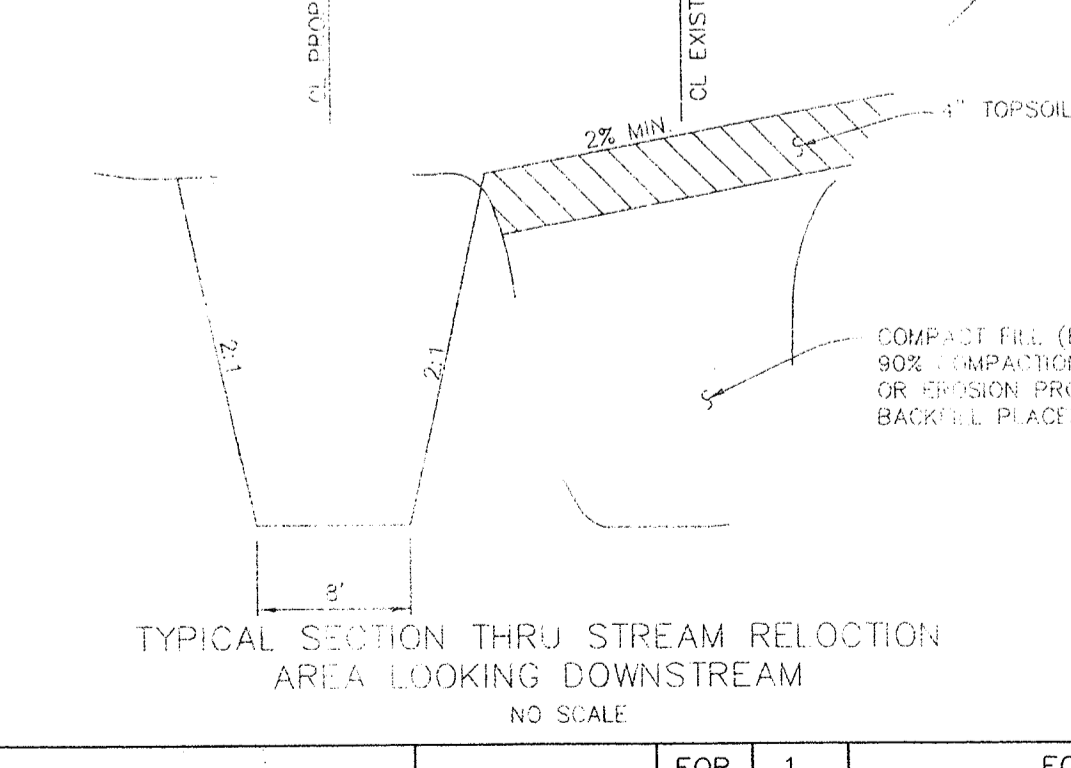
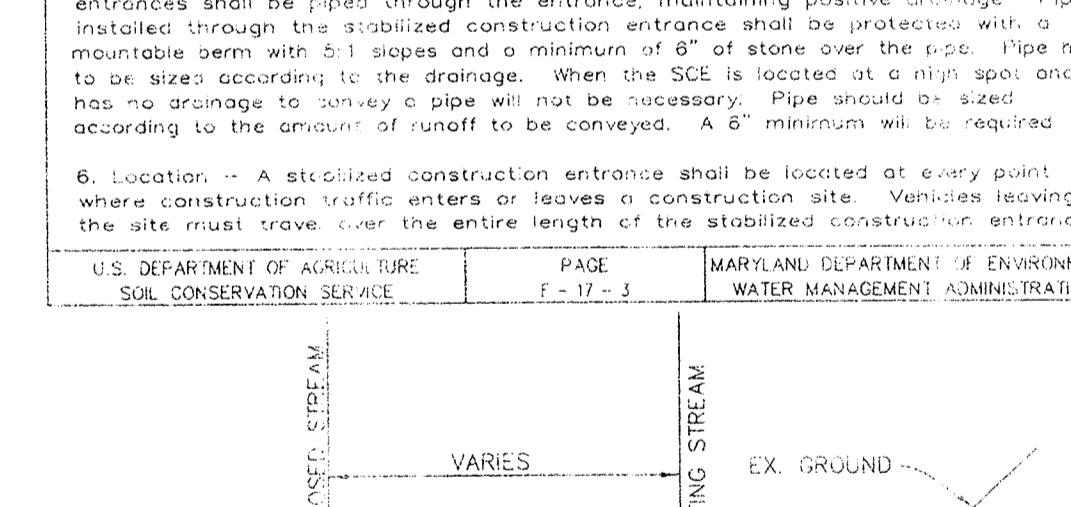
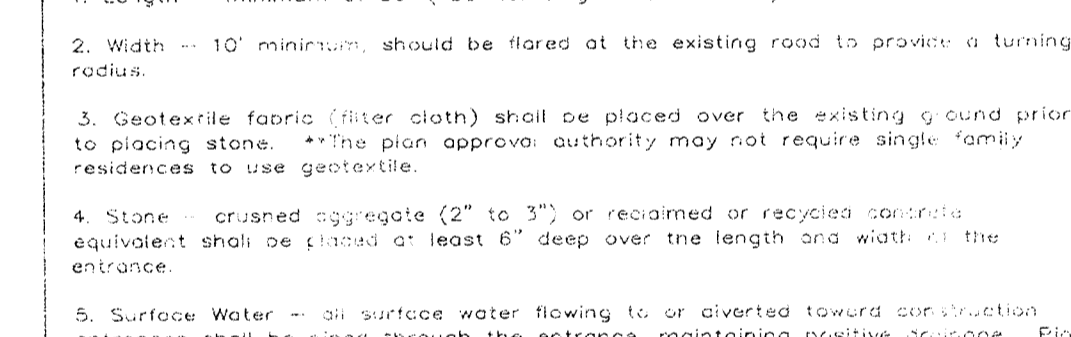
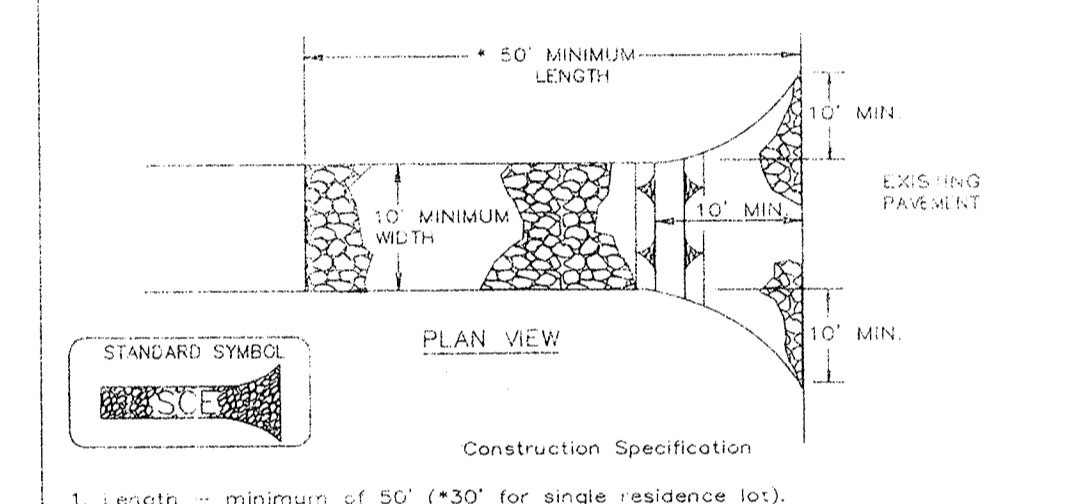
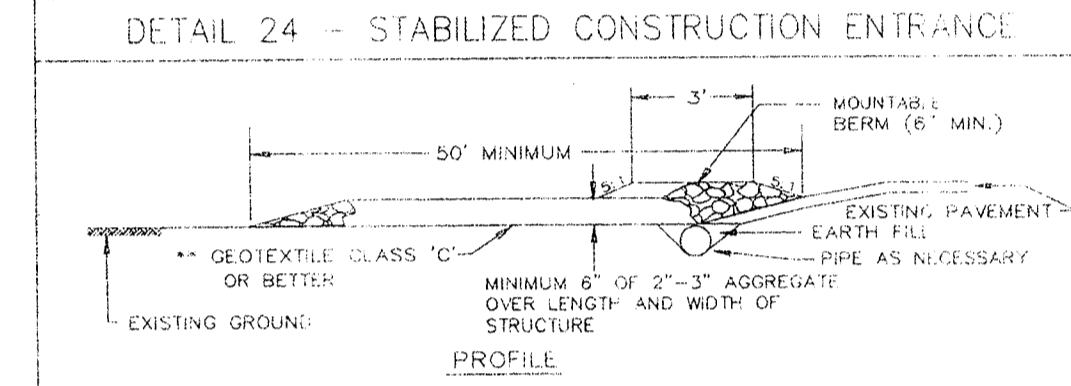
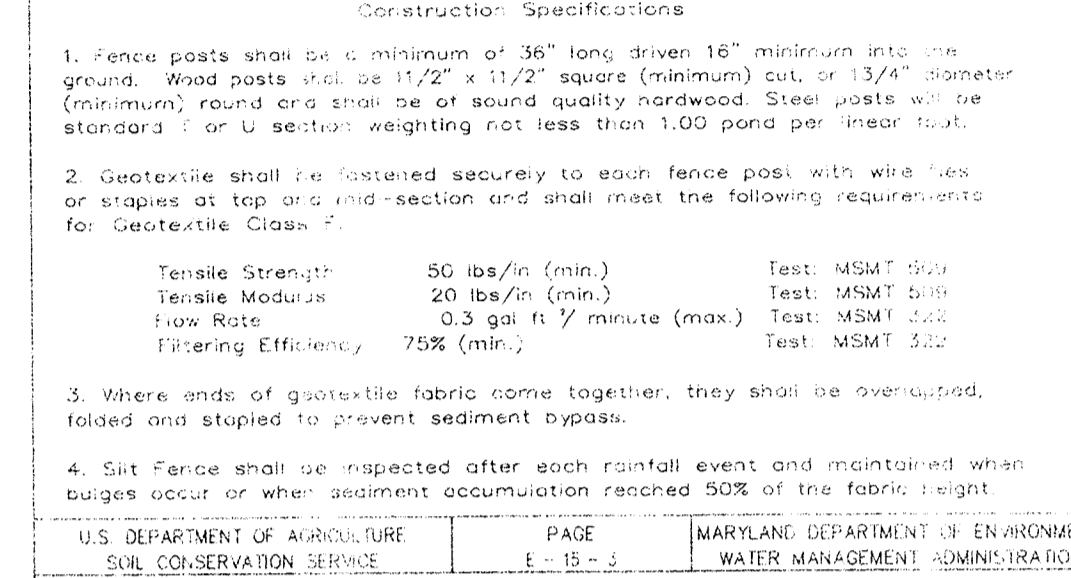
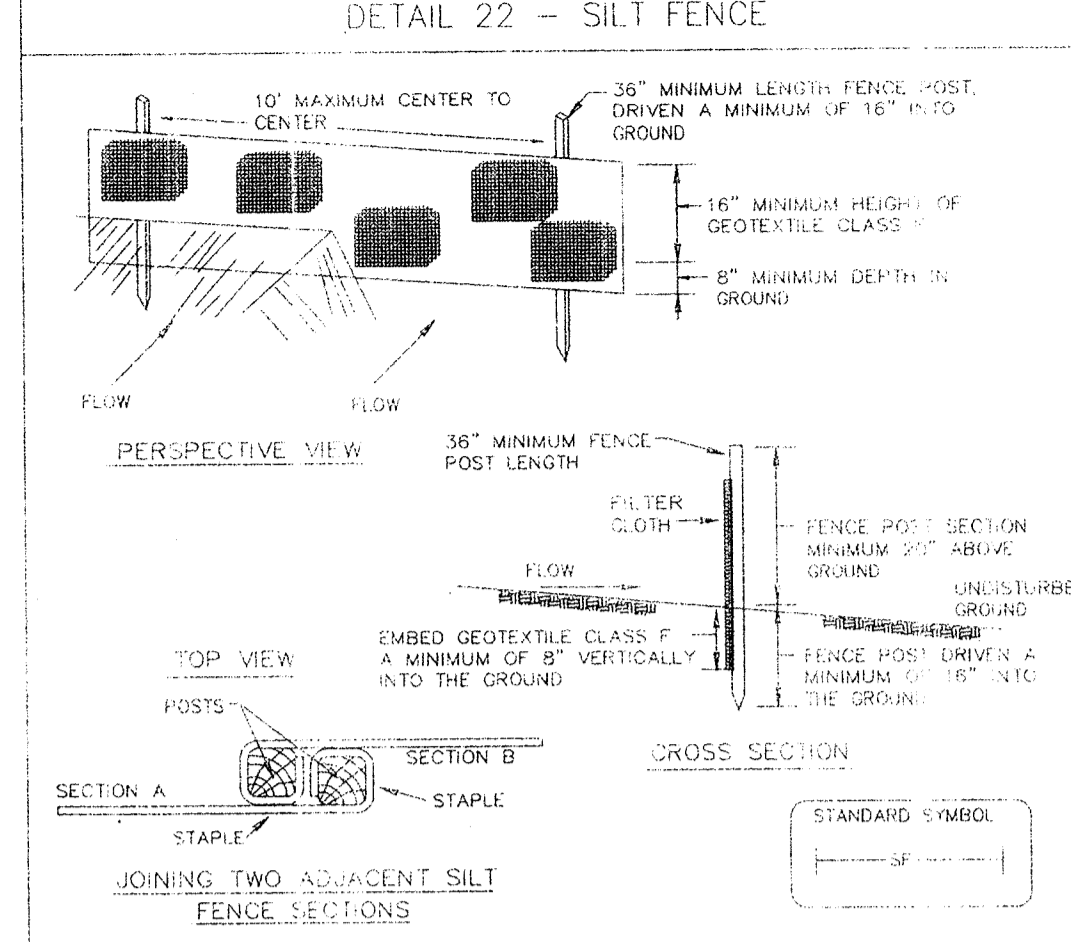
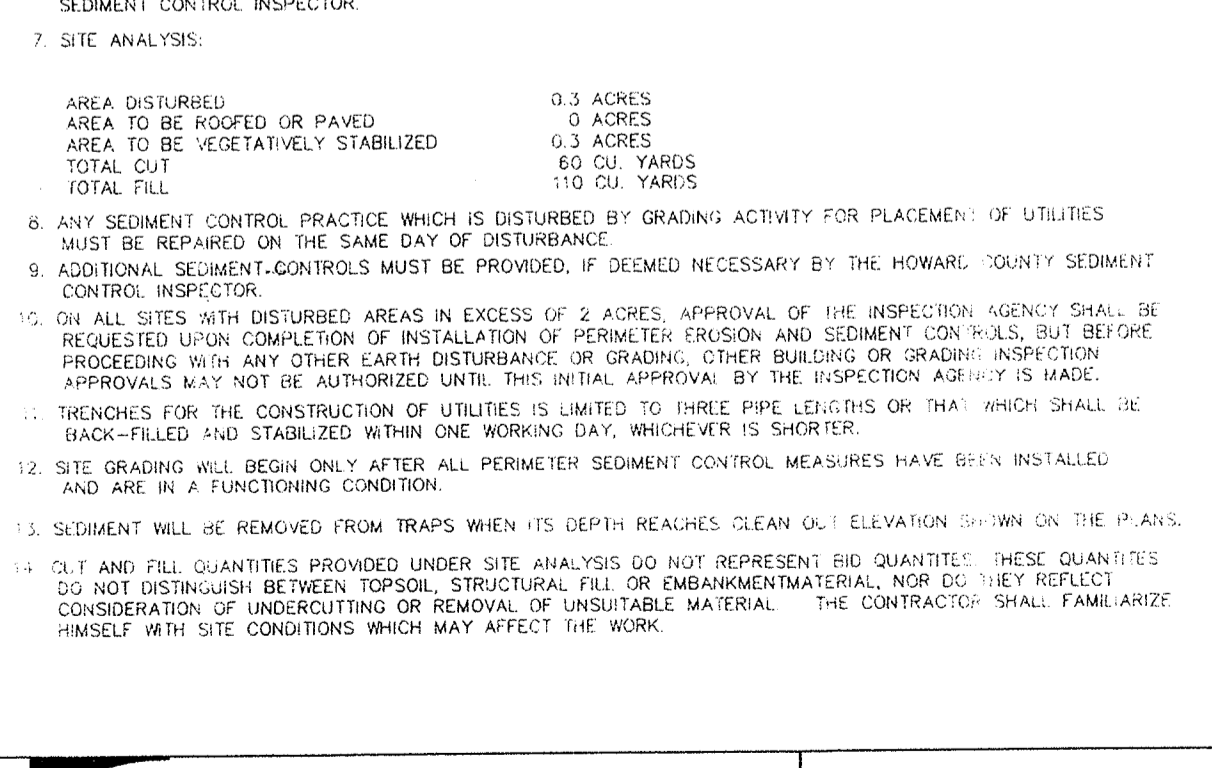
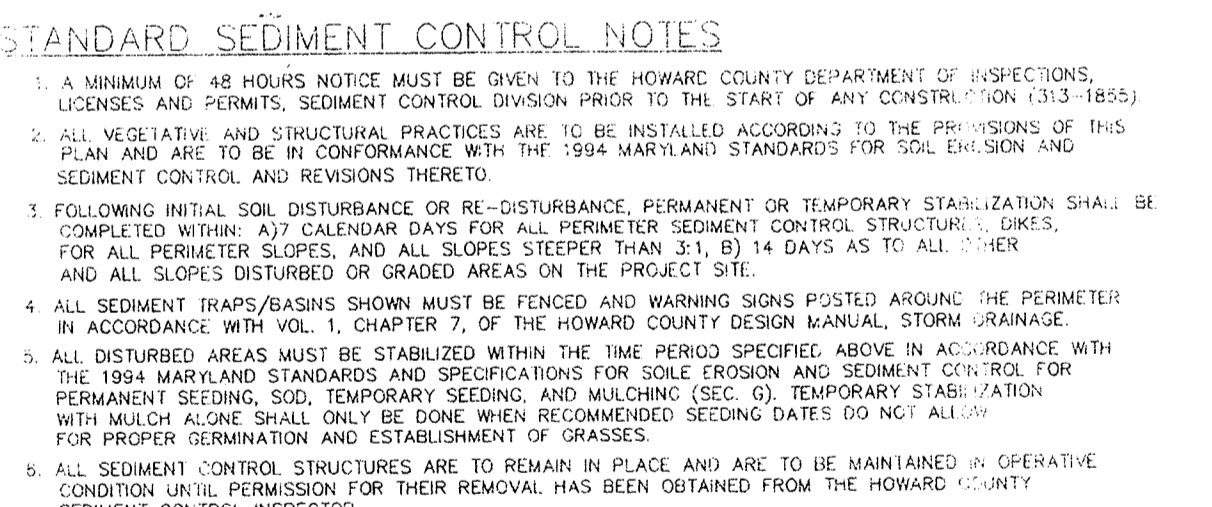
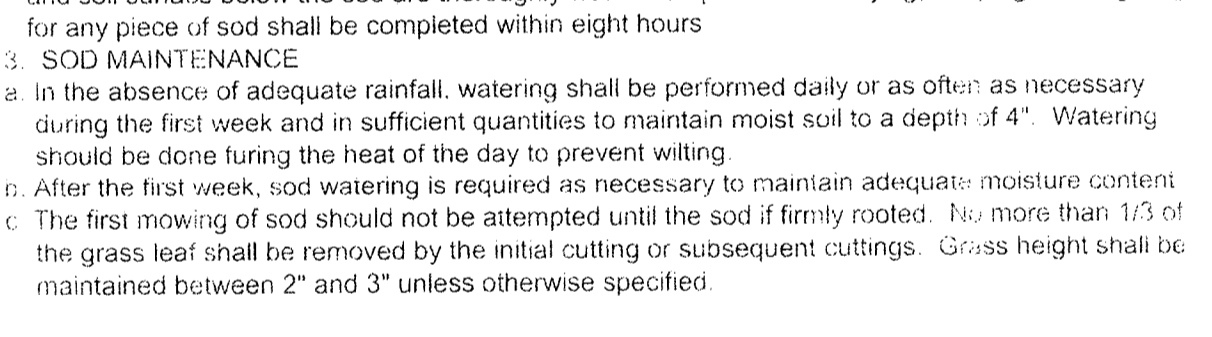
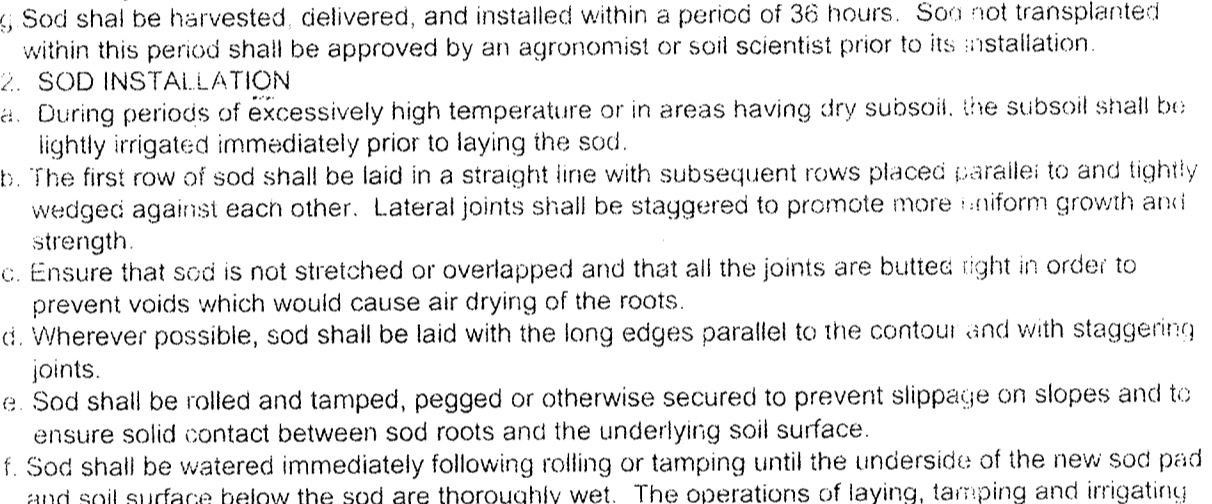
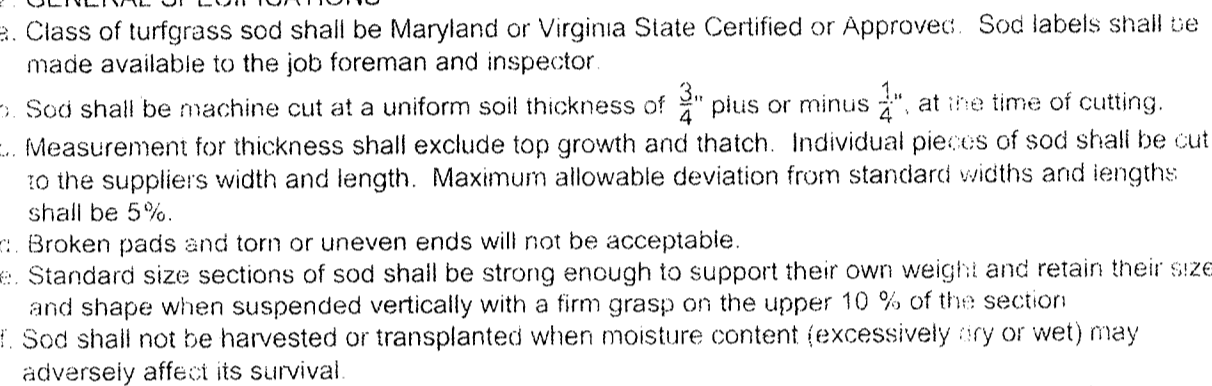
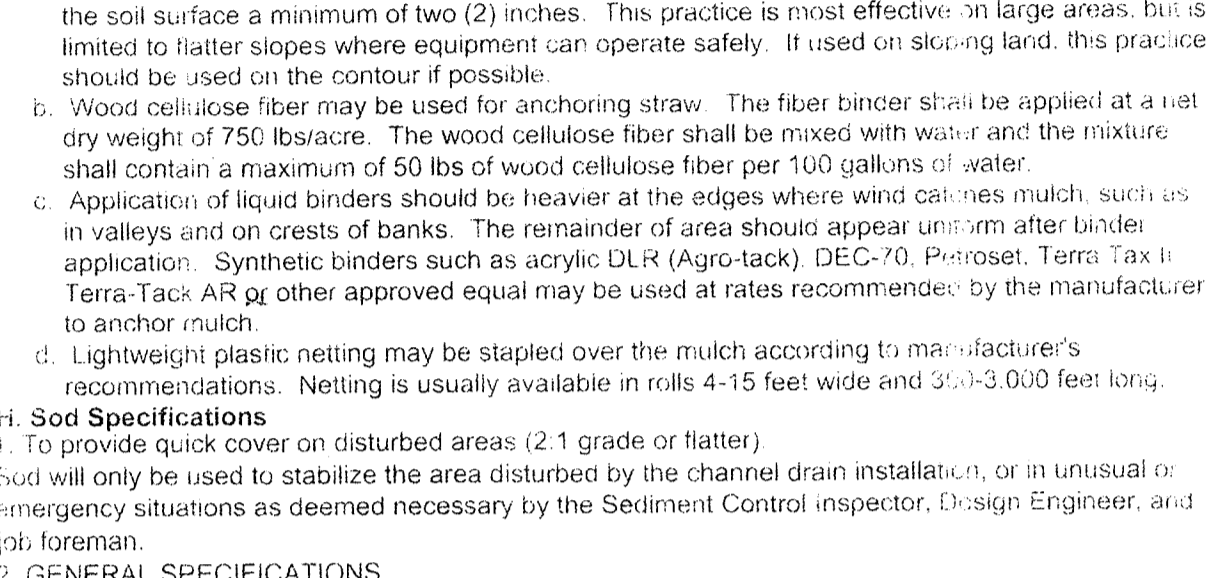
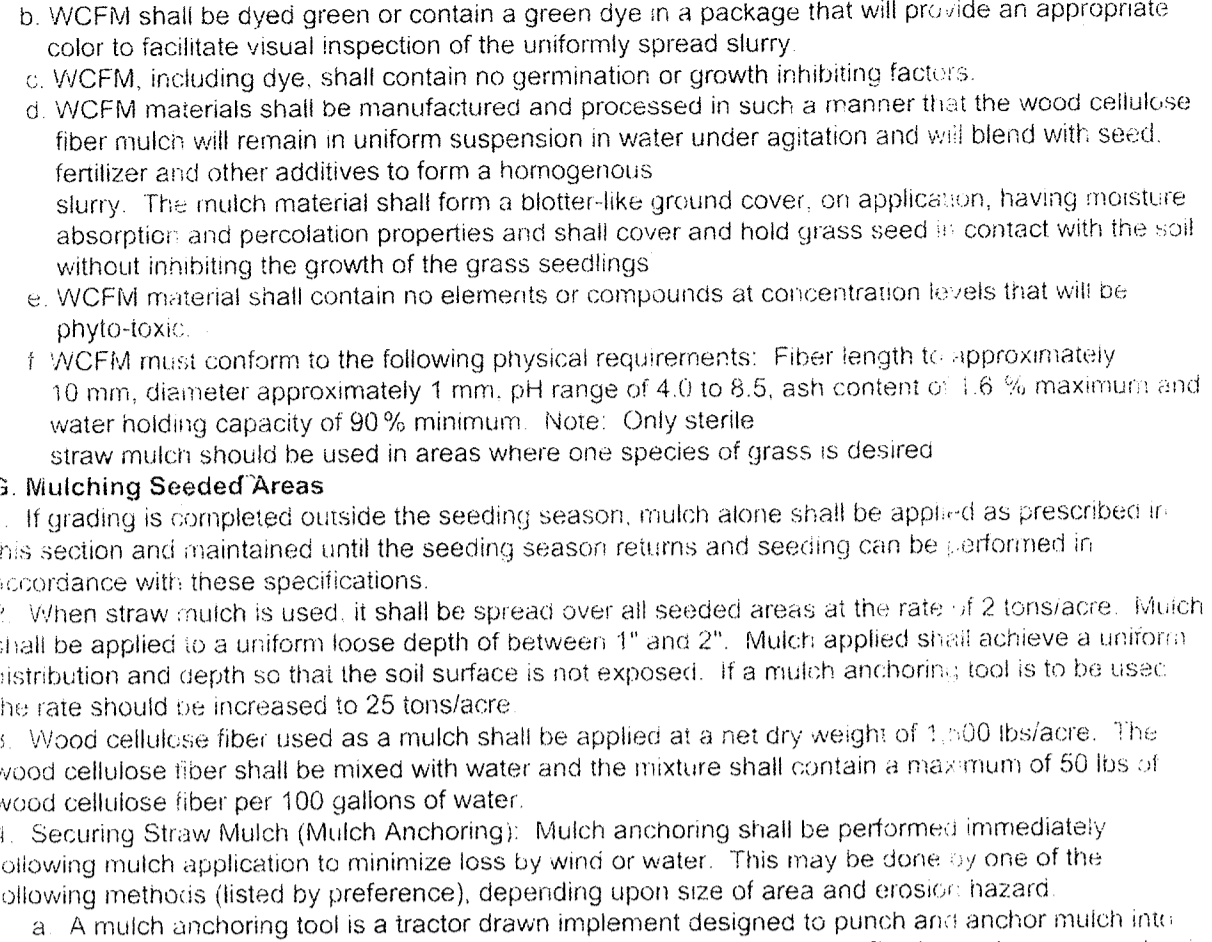
**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*James G. Shaw* 9/19/02  
DIRECTOR OF PUBLIC WORKS DATE

*John J. O'Hara* 9/19/02  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

*Shaun A. Carter* 9-23-02  
DIRECTOR, DEPARTMENT OF RECREATION & PARKS DATE

*Howard E. Saltzman* 9/19/02  
CHIEF, STORMWATER MANAGEMENT DIVISION DATE



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BY: NO.  
REVISION

9-10-02

TIMOTHY C. SCHUELER #20207

02/2002  
EQR REVISIONS  
600' SCALE MAP NO. 30  
BLOCK NO. 4

**KINGSCUP COURT  
STREAM RELOCATION  
2nd ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CAPITAL PROJECT**

SCALE AS SHOWN  
SHEET 5 OF 6



**1.0 GEOTEXTILE EROSION PROTECTION FOR POOR QUALITY BACKFILL PLACEMENT**

**1.1 Allowable Fill:** Contractor may fill old stream meander with any on or offsite backfill material conforming to the backfill specifications described under Section 6.0. If suitable material is used then NO ADDITIONAL GEOTEXTILE EROSION PROTECTION IS REQUIRED. However, if onsite material is not suitable, then geotextile protection must be used. No vegetative material greater than 2" in diameter is allowed. To this, contractor is to add sand at 1 part sand and 2 parts organic material ratio to reduce settlement risk. In addition, all finished grades under this hybrid material shall be finished 3 inches higher than shown in plans and graded in such a way so ponding is not an issue.

**1.2 Geotextile Placement:** Class 'C' (MSHA 921.09) geotextile shall be placed on the prepared subgrade with the adjacent edges overlapped a minimum of 2-ft. (0.6 m). Geotextile torn or damaged shall be replaced or repaired at the Contractor's expense in a manner acceptable to the Engineer.

**1.3 Coir Fiber Matting:** Unless specified otherwise, all erosion control matting (ECM) shall be BIO D-70, or approved equal.

**1.4 Fabric Overlap and Securing Pins:** Overlap 1' minimum and secure with 12" x 1.5" x 0.5" wooden stakes (or larger), in pairs at 12" on center spacing.

**2.0 RIPRAP CHANNEL**

**2.1 Riprap Stone:** Stone shall be MSHA class "O" stone durable and free of cracks. Stone shall be between 2" and 7" in diameter. Stone shall be uniformly graded from the smallest to the largest pieces. Stone will be accepted upon visual inspection of point of usage. Riprap shall not contain more than 10 percent by weight of the smallest size stone for the specified class.

**2.2 Excavation:** Excavation shall conform to the line and grade specified in the Contract Documents. Ditch sides and bottom shall be smooth and firm, free from protruding objects that would damage the geotextile and constructed in a manner acceptable to the Engineer.

**2.3 Geotextile Placement:** Class 'C' (MSHA 921.09) geotextile shall be placed on the prepared subgrade with the adjacent edges overlapped a minimum of 2-ft. (0.6 m). Geotextile torn or damaged shall be replaced or repaired at the Contractor's expense in a manner acceptable to the Engineer.

**2.4 Riprap Placement:** Stones shall be placed by mechanical or other acceptable methods to produce a reasonably graded mass of stone. Placing the stones by methods that cause extensive segregation will not be permitted. The depth of the riprap shall be as specified in the Contract Documents.

**2.5 Backfill:** Any excavation voids existing along the edges and ends of the places riprap shall be backfilled with suitable material to blend in with contiguous slopes, ditch lines of existing ground.

**3.0 STONE TOE PROTECTION**

**3.1 Description:** The contractor shall furnish all labor, material and equipment required to install the rock toe protection as described in these specifications and shown on the plans. This work shall consist of transporting and installing materials for rock toe protection as specified on the plans or as directed by the Agent.

Prior to the start of work on this item, the Contractor shall submit a construction schedule, including source of supply of all materials, to the Agent for review. No work shall be performed until this schedule is approved by the Agent.

**3.2 Materials:** Stone for bank toe treatment areas shall consist of angular rock, similar in color, texture and density to the native rock onsite. The dry unit weight of the rock shall be 150 lb/cu ft or greater. The rock shall weigh 150-400 lbs. The rock shall range from 15 inches to 28 inches along the median (b) axis. The rock shall have D<sub>50</sub>=18". Concrete and white stone will not be accepted. The Contractor shall supply samples of stone to the Agent for approval prior to starting construction.

**3.3 Construction:** The placement of rock toe protection shall begin BELOW THE INVERT OF THE STREAM as shown on the plans. The larger stones shall be placed along the outside edge or face of the limit of the toe protection. The rock toe shall be placed to produce a uniformly graded mass of stones that is secure enough to remain in place during normal stream flow. Placing stones by methods that cause segregation is prohibited.

The surface elevation of completed rock toe installations shall be flush with adjacent channel bed or bank slope elevations, and shall not create an obstacle to flow. The plus or minus tolerance of the surface of the finished rock toe installation shall be 6 inches from the lines and grades shown on the Contract Documents when measured perpendicular to the exterior surface of the stonework.

Placed material not conforming to the specified limits shall be removed and replaced as directed by the Agent at no additional cost.

The stone shall be placed and distributed so the resulting layer will contain a minimum of voids and there will be no pockets of same size material. The stone shall be placed to its full course thickness in one operation in a manner that the underlying material will not be displaced or worked into the course of rock toe being placed.

**4.0 PUMP AROUND AND COFFER DAM**

**4.1 Description:** Pump around shall be installed prior to beginning construction.

**4.2 Materials:** Pump and piping size shall be determined by the Contractor.

**4.3 Construction:** Install coffer dam upstream of work area. Install clearwater intake and pump at upstream end of the work area. Set up piping, downstream coffer dam, and stabilized outfall. Repeat procedure as work area moves.

Work area length may vary and change within the LOD as determined by the Design Engineer as field conditions dictate.

**5.0 V-LOG DROPS**

**5.1 Materials:**

Logs: Logs shall be a minimum of 12" in diameter and a minimum of 20 feet in length. Recommended species include catalpa, cedars, black locust, walnut, butternut, honey locust, white oak, persimmon, and sycamore. Species that cannot be used are aspen, basswood, cottonwood, balsam fir, black gum, jack pine, poplar, and willow.

Filter Cloth: The logs shall be underlain with non-woven filter cloth such as Mirafil 160N.

Rebar: Rebar shall be 42" long hooked #4 rebar installed at 3' spacing.

Stone: Stone shall be minimum 18" Ø rip rap.

**5.2 Construction:**

Once stream work area is dry via a "pump-around", excavate for log placement. Upstream end to have top of top log FLUSH WITH EXISTING stream invert.

Both downstream ends are to be embedded three feet minimum into the stream bank. Logs should be planned-shaved for tighter connection. Logs to be secured with #6 rebar; it is advisable to not pre-drill one-inch holes, as they won't line up once installed. Use of a 1-inch gas-powered field auger drill is recommended. Once these ends are secured with hooked #6 rebar, backfill the ends and protect the newly filled stream bank with riprap as specified on plan.

If an armored scour pool is not specified on the plans, do not excavate for a scour pool. If armored stone is called for, excavate for placement of stone ON FILTER CLOTH to the specified depth on the plan.

**6.0 BACKFILL AND COMPACTION**

**6.1 MATERIALS:**

Fill and backfill within the limits of the design points and beneath appurtenant structures shall be those materials classified in ASTM D 2487 as GW, GP, GM, GC, SW, SM, SC, or combinations thereof. The Contractor shall maintain proper specified compaction as directed by a qualified Geotechnical Engineer.

"Conditioned Soil" is defined as a 50/50 mix of (1) imported or onsite soil free of deleterious materials, trash, organics, and stones larger than 6 inches, and (2) "river jack" harvested onsite from gravel bars. River jack stones shall have a D<sub>50</sub> of three inches. No stones larger than 6" are allowable. The Design Engineer and DEPRM Project Manager will mark borrow areas in the field.

**6.2 CONSTRUCTION:**

**6.2.1 STRIPPING:** The top 6 inches of soil and organic matter shall be stripped within the designated excavations and grading lines and deposited in storage piles. All excavated materials not suitable as topsoil or for other uses at the site shall be disposed offsite.

**6.2.2 SUBGRADE PREPARATION:** Unsatisfactory subgrade material shall be removed and replaced with satisfactory material as directed by the Design Engineer. All exposed subgrades shall be scarified to a depth of 3 inches before the fill is started. Slope surface steeper than 1 vertical to 3 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by tamping (sheepfoot) rollers, pneumatic-tires rollers, steel-wheeled rollers, or other approved well suited to the soil being compacted. The contractor shall be prepared to moisten or aerate as necessary to provide an in-place moisture content within plus or minus 2 percent of optimum within the compacted lifts and/or subgrades for each material. Minimum subgrade density shall be as specified in paragraph filling and backfilling. Soil test results are to be forwarded to the design engineer.

**6.2.3 FILLING AND BACKFILLING:** Satisfactory materials shall be used in bringing fills and backfill to the proposed contours indicated on the plan and for replacing unsatisfactory materials. Satisfactory materials will be determined by the Design Engineer. Satisfactory materials shall be placed in horizontal layers not exceeding 8 inches in uncompacted thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be moistened or aerated as necessary to obtain plus or minus 2 percent of optimum moisture, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested approved, and forms removed.

**7.0 LIVE STAKES**

**7.1 MATERIALS:**

Live stakes shall be composed of freshly cut, dormant branches consisting of the species listed herein. The term "dormant" is used here to describe live cuttings taken in the late fall/early winter (November 1 to December 31) or the late winter/early spring (March 1 to April 15), after the trees have lost their leaves or before they bud, while the ground is unfrozen. Live branch cuttings for live stakes shall be 1/2 to 2 inches in diameter and 3 to 4 feet in length.

Live branch cuttings shall consist of a mix of three or more of the following species with at least one willow (salix) and one dogwood (cornus) species included. Each species shall comprise no more than 50% and no less than 20% of the mix.

Cornus amomum silky dogwood  
Salix nigra black willow  
Sambucus canadensis American elderberry  
Viburnum dentatum arrowwood

**7.1.1 HARVESTING AND HANDLING**

Harvesting of bioengineering plant materials from existing native or naturalized stands shall be within practical hauling distance to the site, and/or within the same physiographic ecoregion and plant hardness zone as the site. If harvest sites are selected off-site, the Contractor shall obtain written permission to harvest materials at the site from the Agent.

Live cuttings shall be bundled together securely at the collection site for easy loading, handling and protection during transport. If transport by vehicles is necessary, the bundles shall be covered with a tarpaulin, transported in unheated vehicles, and moistened to prevent drying-out and additional stress.

Live cuttings shall be transported to the construction site and installed within 8 hours of harvest (especially if the ambient temperature is 50°F or above). If the cuttings are not installed on the day of harvesting, they shall be promptly placed in controlled storage conditions (i.e. refrigeration at 34-42°F) and protected until installation is possible. If storage is required, live branch cuttings shall be stored for a period no longer than three (3) days. Any storage of live branch cuttings must be approved by the Agent prior to storing.

In lieu of harvesting the plant materials, the cuttings may be obtained from a certified nursery that specializes in production of bioengineering plant materials, with prior approval of the source by the Agent. Nursery grown materials shall be handled and stored in the same manner as harvested materials, as described above.

Live stakes shall receive continuous shade, shall be sheltered from the wind, and shall be continuously protected from drying-out by heeling the cuttings into moist soils. Where water is available, live stakes shall be sprayed, or the bundles shall be immersed. Warm water (over 15° C) stimulates plant growth and should be used only upon approval of the Agent.

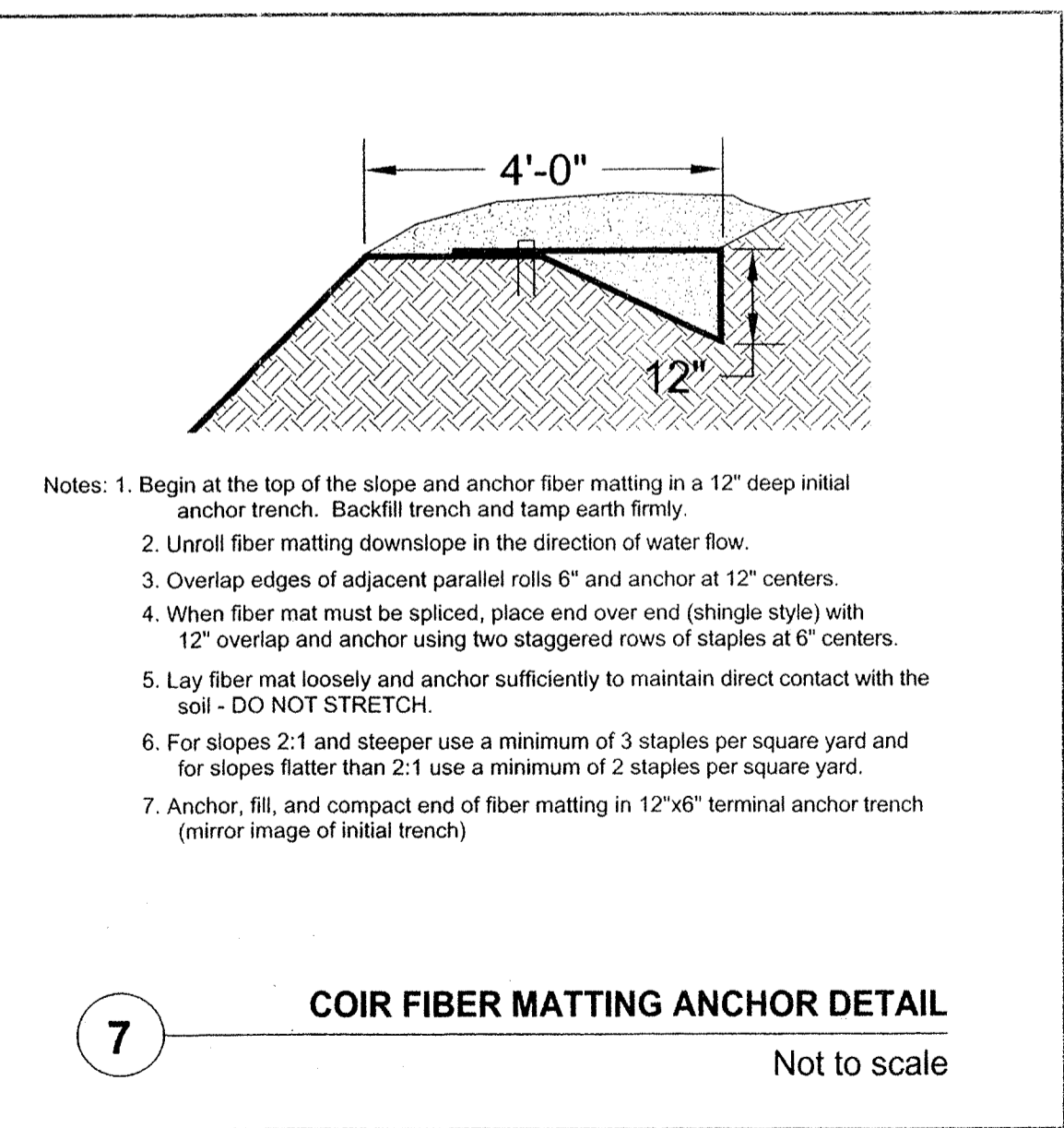
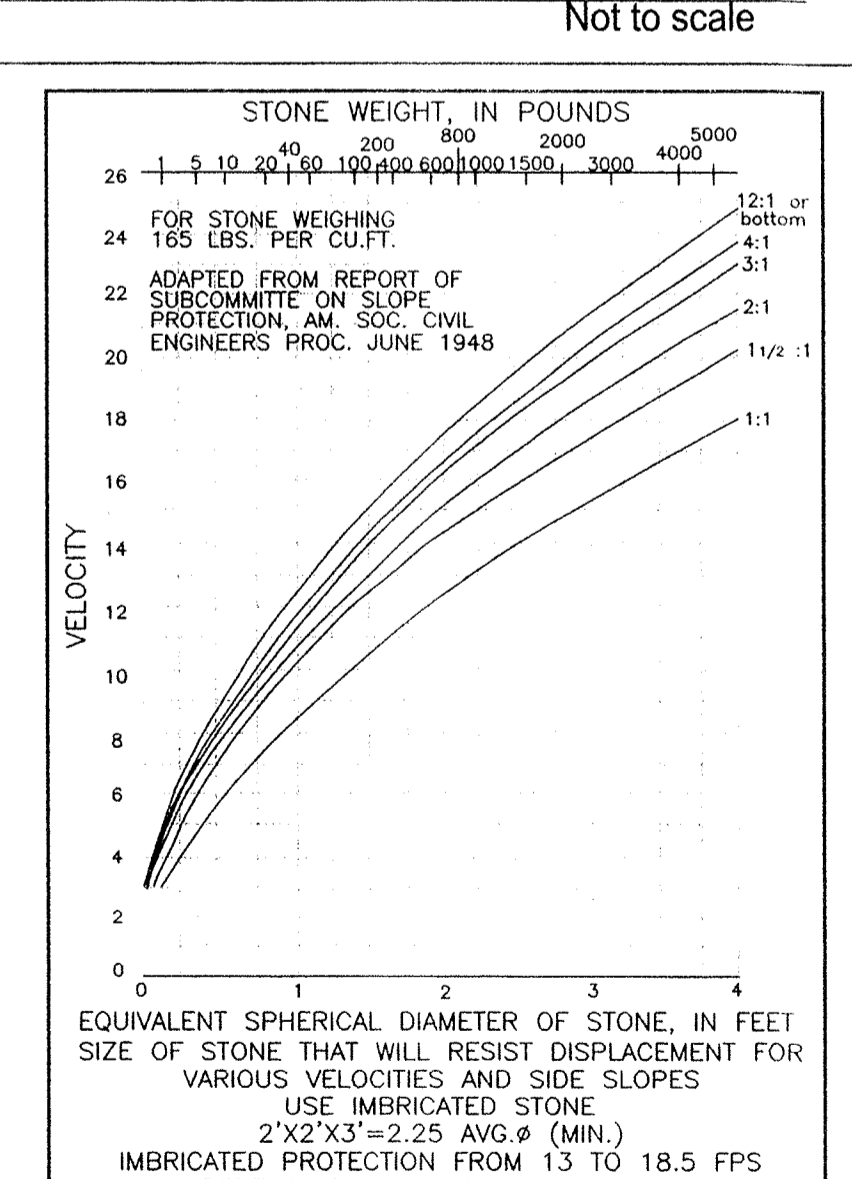
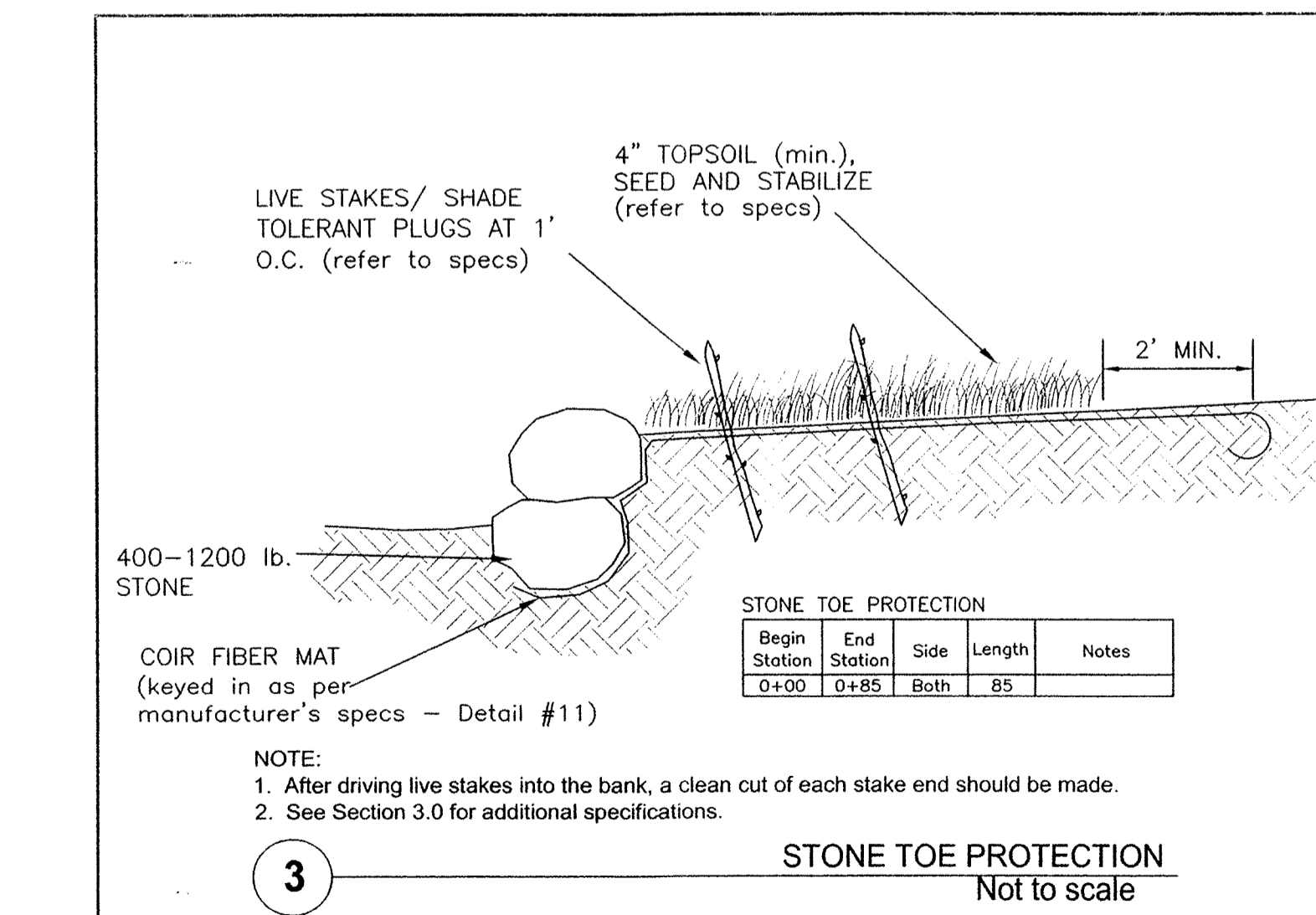
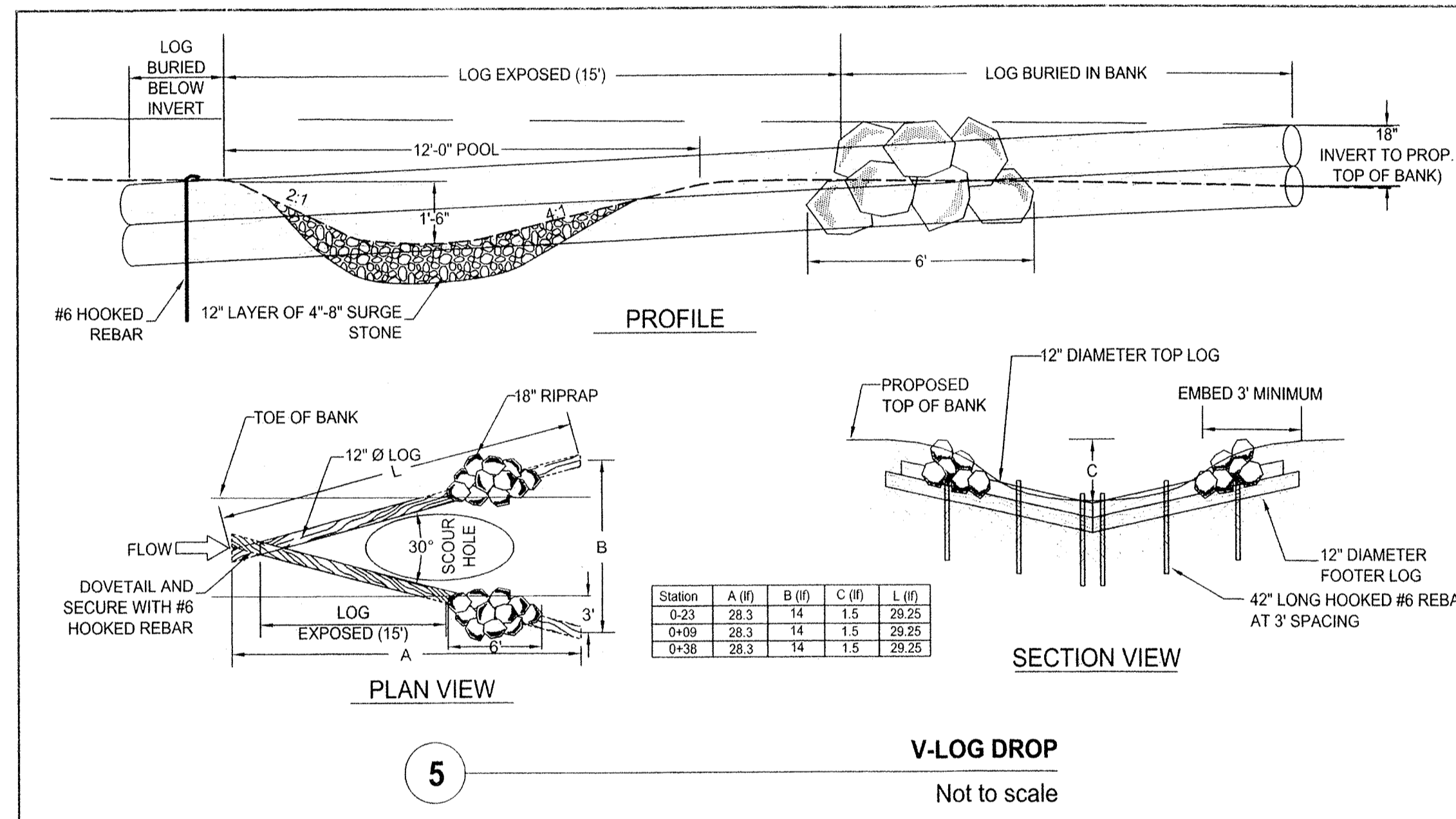
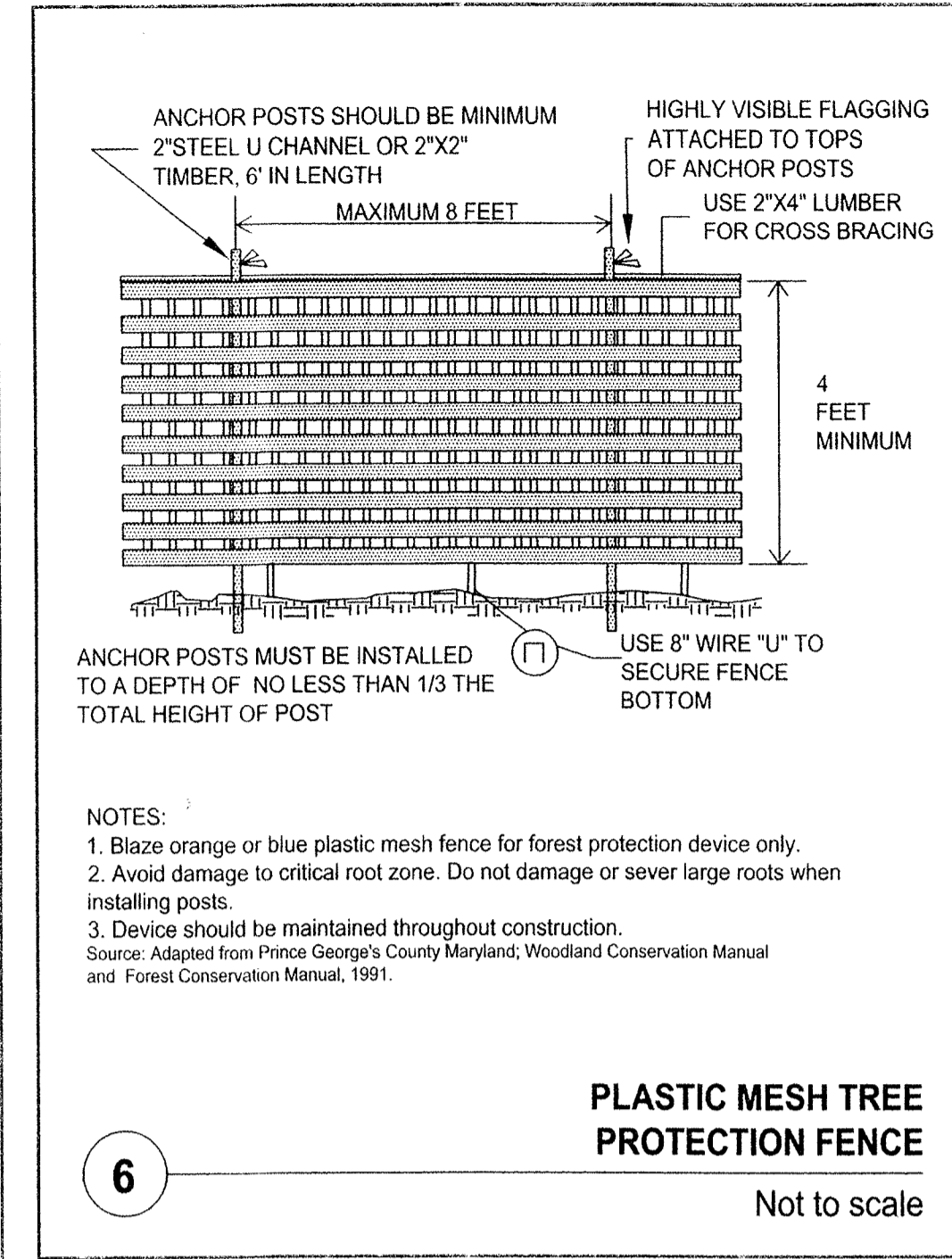
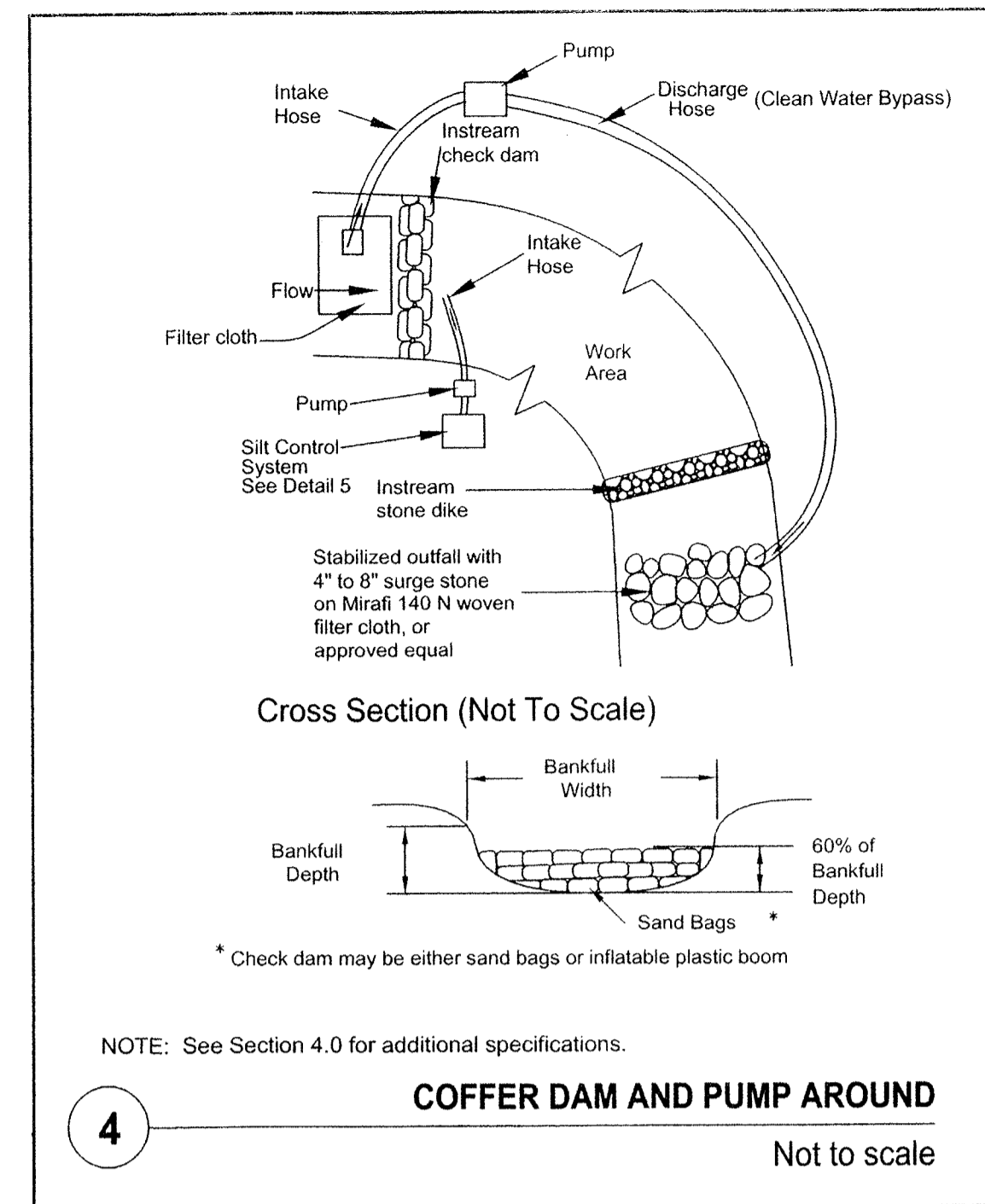
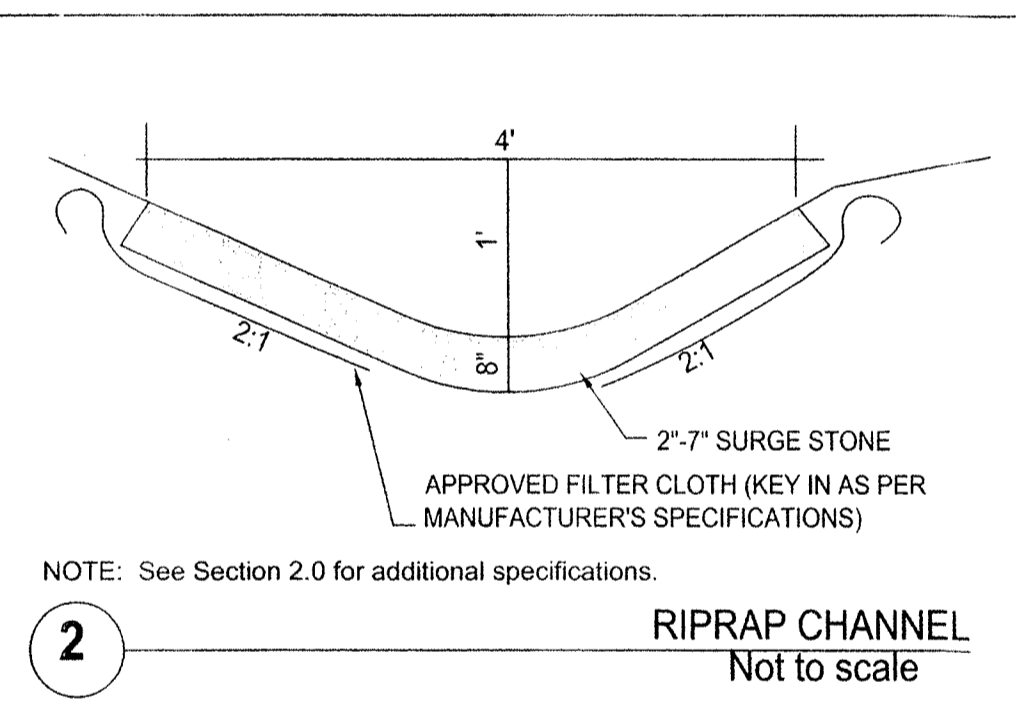
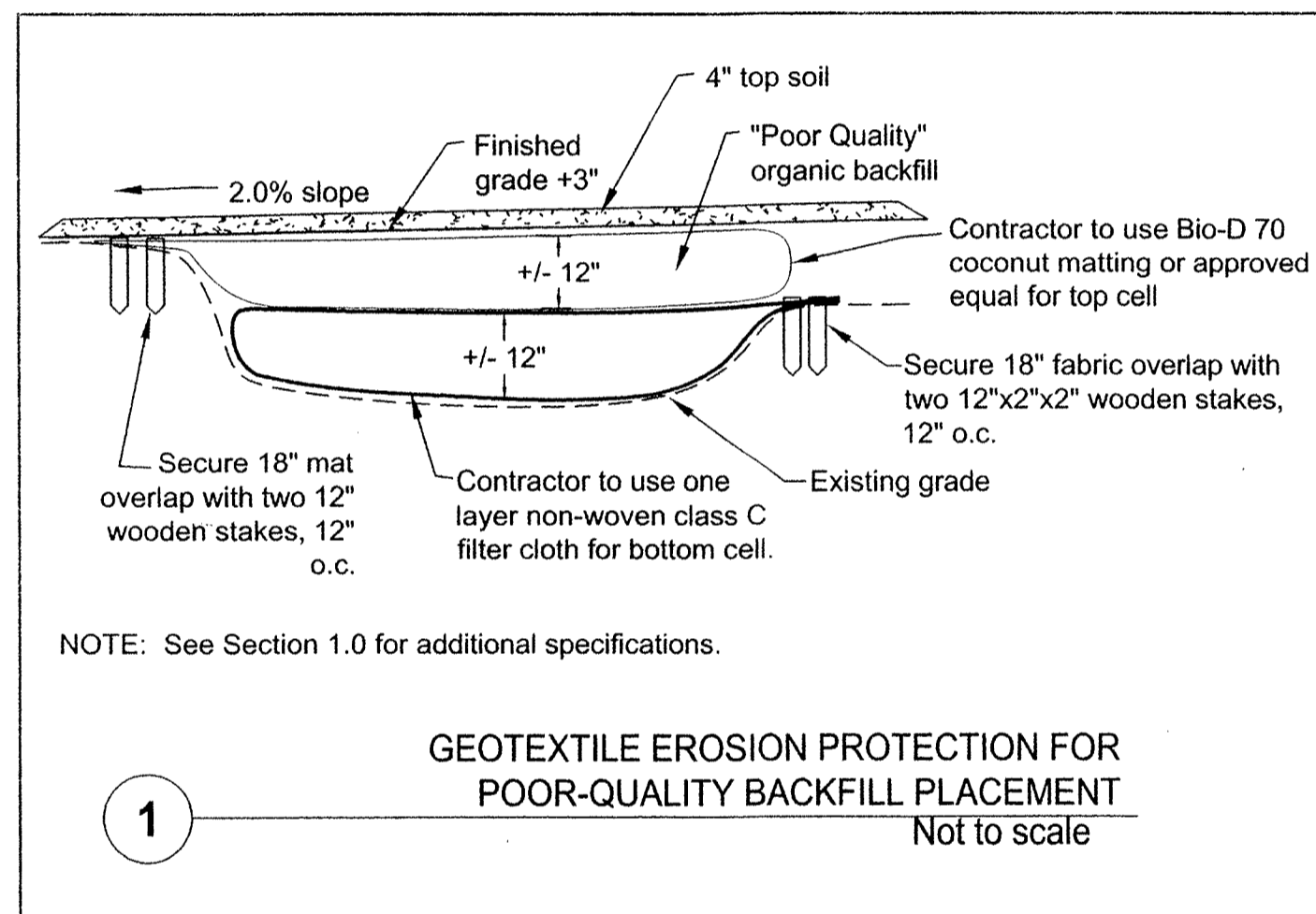
**7.1.2 LIVE STAKE PREPARATION AND INSTALLATION**

Live stakes shall be installed between February 15-May 1 or September 15-November 15.

Live stakes shall be 1/2" - 2" diameter and cut to 3' - 4' long.

Shrubs and young trees used for harvesting shall be cut directly above the ground. Trees greater than three inches in diameter shall be topped. All cuts shall be smooth. Side branches and brushy limbs shall be cleanly removed and the bark must remain intact.

The cut on the bottom end of the stake shall be angled to 30 to 45 degrees for easy insertion into the soil. The cut on the top end of the stake shall be at a 90 degree angle to the stake to ensure a flat surface for hammering into the slope. The use of large pruning shears or power saws may be required with larger branches.



**Design Methodology:**

The hydraulic summary table shown hereon was collated from a report entitled *Kingscup Court Red Hill Branch Shear Stress Analysis* prepared by Riemer Muegge & Associates, Incorporated (RMA) dated February, 2000. Environmental Quality Resources, LLC (EQR) reviewed this information (at station 5+70) as well as field conditions in January, 2002. Based on a maximum modeled 100-year shear force of 1.15 pounds per square foot (psf) and a maximum velocity of 3.7 feet per second (fps), EQR chose to enhance the existing RMA coconut coir matting and live stake channel design with toe scour protection for the bank and three log cross vanes for grade control and habitat restoration. The additional measures were deemed necessary due to increased risk of matting failure due to initial construction instability (one to two growing seasons necessary for live stake germination and root growth) and probable repeated flooding and drawdown from beaver activity.

PRODUCT	Unit Weight (oz/sy)	Recommended shear stress (w/out vegetation) (lbs/ft <sup>2</sup> )	Recommended Slope	Velocity Recommended (ft/sec)
BioND-TRM	29.6	8.0	+1:1	18
BioD-Mat 90	29	5.0	+1:1	16
BioD-Mat 70	23	4.5	+1:1	12
BioD-Mat40	13.6	3.10	+1:1	8

SOURCE: RoLanka International, Inc. 365 Tocca Place, Jonesboro GA 30236 (717) 529-4099

REVETMENT	Max Allowable Velocity (fps)	Max Allowable Shear (psf)	Max Modeled Velocity (fps)	Max Modeled Shear (psf)
D50=21" stone	11.5@1:1 slope*	N/A	3.7	1.15
BioD-Mat 70	12"	4.5	3.7	1.15
Log Vane	N/A	N/A	3.7	1.15
Channel Bed Stone D50=4"	7"	N/A	3.7	1.15

\* source of allowable velocities: adapted from Report of Subcommittee on Slope Protection, American Society Civil Engineers Proc. June 1948  
 \* source of allowable velocities: RoLanka International, Inc. 365 Tocca Place, Jonesboro, GA 30236 (717) 529-4099

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

Director of Public Works: *John J. O'Hara* 9/19/02  
 Chief, Bureau of Environmental Services: *John J. O'Hara* 9/19/02

Director, Department of Recreation & Parks: *John J. O'Hara* 9/19/02  
 Chief, Stormwater Management Division: *John J. O'Hara* 9/19/02

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ARTHUR E. MUEGGE #8707  
 TIMOTHY C. SCHUELER #20207

DES: CJR	EQR 1	EQR REVISIONS	02/2002
DRN: MAD			
CHK:			
DATE: 11/14/00	BY NO.	REVISION	DATE

600' SCALE MAP NO. 30 BLOCK NO. 4

SEDIMENT CONTROL DETAILS  
 BIOENGINEERING DETAILS AND SPECIFICATIONS

KINGSCUP COURT  
 STREAM RELOCATION  
 2nd ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND  
 CAPITAL PROJECT

SCALE AS SHOWN  
 SHEET 5 OF 6  
 ADDENDUM



VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. SOIL PREPARATION

1. WEED, SOIL BOUND AND EROSION CONTROL STRUCTURES (ENTIRE TEMPORARY OR PERMANENT) SHALL BE REMOVED OR GRADUALLY DESTROYED. WEEDS, WEATHERS OR WEEDS CONTROL BASINS.
2. PERFORM ALL GRADING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. FINAL GRADING AND SHAPING IS NOT USUALLY NECESSARY FOR TEMPORARY STRUCTURES.
3. SCHEDULE REQUIRED SOIL TESTS TO DETERMINE SOIL AMENDMENT COMPOSITION AND APPLICATION RATES FOR AREAS HAVING DISTURBED AREAS OVER 5 ACRES.
4. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS):
  1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATES AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OVER 5 ACRES. SOIL ANALYSIS MAY BE PERFORMED BY THE USER OR A PROFESSIONAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSIS.
  2. FERTILIZERS SHALL BE UNIFORM IN COMPOSITION. THE FLOWING AND SCHEDULING FOR ACCURATE APPLICATION BY APPROVED EQUIPMENT. LIME MAY BE SUBSTITUTED FOR FERTILIZER WITH PROPER APPROVAL FROM THE APPROVED AGENCIES. FERTILIZERS SHALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE STATE FERTILIZER LAW AND SHALL BEAR THE NAME, TRADE NAME OR TRADEMARK AND WEIGHT OF THE PRODUCT.
  3. LIME MATERIAL SHALL BE GRINDING LIME (MATERIALS CONTROLLED OR BURNED LIME) OR SCHEDULED LIME CONTAINED AT LEAST 85% LIME. LIME SHALL BE APPLIED THROUGH A SPREADER THROUGH A 1/2" MESH SIEVE AND SHOULD BE APPLIED THROUGH A 1/2" MESH SIEVE.
  4. FERTILIZER LIME AND FERTILIZER SHALL BE APPLIED TO THE SITE IN ACCORDANCE WITH APPLICABLE MEANS.
  5. SOIL AMENDMENTS SHALL BE APPLIED TO THE SITE IN ACCORDANCE WITH APPLICABLE MEANS.
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  20. SOIL AMENDMENTS SHALL BE APPLIED TO THE SITE IN ACCORDANCE WITH APPLICABLE MEANS.
5. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES AMOUNTS WILL NOT EXCEED THE FOLLOWING: NITROGEN: MAXIMUM OF 100 LBS/AC; TOTAL OF SOLUBLE NITROGEN: 200 LBS/AC; PHOSPHORUS: 200 LBS/AC; POTASSIUM: 200 LBS/AC.
6. LIME - USE ONLY GRINDING AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE) MAY BE APPLIED BY HYDROSEEDING. NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNED OR HYDRATED LIME WHEN HYDROSEEDING.
7. SEED AND FERTILIZER SHALL BE APPLIED ON SITE AND SEEDING SHALL BE DONE IMMEDIATELY AND WITHOUT INTERRUPTING.
8. DRYSEEDING: THIS INCLUDES USE OF CONVENTIONAL, DROP OR BROADCAST SPREADERS.
9. SEED SPREADERS SHALL BE INDOCTRINATED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON THE TEMPORARY OR PERMANENT SEEDING SUMMARIES OR TABLES ON 2B. THE SEEDED AREA SHALL THEN BE MULCHED WITH A MULCHING TOOL TO PROVIDE GOOD SEED TO SOIL CONTACT.
10. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
11. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
12. MULCH SPECIFICATIONS (SEE TABLE 2B):
  1. STRAW SHALL CONSIST OF THROUGHLY THRESHED WHEAT, RYE OR OAT STRAW REASONABLY HIGH IN COLOR AND SHALL NOT BE UNCLE, MOIST, WET, OR EXCESSIVELY DUSTY, AND SHALL BE FREE OF FOREIGN MATTER AS SPECIFIED IN THE MARYLAND SEED LAW.
  2. WOOD CELLULOSE FIBER SHALL BE UNIFORM IN LENGTH AND SHALL BE FREE OF FOREIGN MATTER AS SPECIFIED IN THE MARYLAND SEED LAW.
  3. WORM SHALL CONSIST OF SPECIALLY PREPARED WORM CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
  4. WORM SHALL BE 100% GREEN OR CONTAIN A GREEN DYE IN A PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMITY OF THE SEEDING.
  5. WORM INCLUDING THE SMALL COUSIN TO GERMINATION OR GROWTH INHIBITING FACTORS.
  6. WORM MATERIALS SHALL BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER IS REMOVED AND REMAINS UNIFORM IN DISPERSION IN WATER UNDER STIRRING AND SETTLING WITH SOLE FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL SHALL FORM A BLOTTER-LIKE GROUND COVER, WHICH WILL PERMIT WATER AND MOISTURE PENETRATION AND INCREASE PROPERTIES AND SHALL COVER AND HOLD SEEDS IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.
  7. WORM MATERIALS SHALL CONTAIN NO ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
  8. WORM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH TO APPROXIMATELY 1/4" IN DIAMETER APPROXIMATELY 100% IN RANGE OF 4.0 TO 8.5. ASH CONTENT OF 10% MAXIMUM AT WATER INSOLUBLE CAPACITY OF 10% MINIMUM. NOTE: ONLY STEEL STRAW MULCH SHOULD BE USED IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.
13. MULCHING SEEDS: SEEDS SHALL BE APPLIED TO ALL SEEDING AREAS IMMEDIATELY AFTER SEEDING.
  1. IF GRASSING IS COMPLETED OUTSIDE THE SEEDING SEASON, MULCH ALONE SHALL BE APPLIED AS PRESCRIBED IN THIS SECTION AND MAINTAINED UNTIL THE SEEDING SEASON RETURNS AND SEEDING CAN BE PERFORMED IN ACCORDANCE WITH THESE SPECIFICATIONS.
  2. WHEN STRAW MULCH IS USED, IT SHALL BE SPREAD OVER ALL SEEDING AREAS AT A RATE OF 2 TONS/ACRE. MULCH SHALL BE APPLIED TO A UNIFORM DEPTH OF BETWEEN 1" AND 2". MULCHING SHALL BE PERFORMED TO A UNIFORM DEPTH OF BETWEEN 1" AND 2". THE SURFACE IS NOT EXPOSED. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHOULD BE INCREASED TO 2 1/2 TONS/ACRE.
  3. WOOD CELLULOSE FIBER USED AS A MULCH SHALL BE APPLIED AT A NET DRY WEIGHT OF 1,500 LBS/ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
  4. MULCHING SEEDS SHALL BE APPLIED TO ALL SEEDING AREAS IMMEDIATELY AFTER SEEDING.
  5. MULCH ANCHORING TOOL IS A TRAPEZOIDAL IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE. A MINIMUM OF TWO (2) INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LONG AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IT SHOULD BE USED ON 5.0% SLOPES. THIS PRACTICE SHOULD BE USED ON THE OUTSIDE OF PROBLEMS.
  6. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. THE FIBER BINDER SHALL BE APPLIED AT A NET DRY WEIGHT OF 750 LBS/ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
  7. APPLICATION OF WOOD BINDERS SHOULD BE HEAVIER AT THE EDGES WHERE WIND CATCHES WINDS SUCH AS IN VALLEYS AND ON TRESTLES OF BRIDGES. THE REMAINDER OF AREA SHOULD APPEAR UNIFORM AFTER BINDER APPLICATION. SYNTHETIC BINDERS SUCH AS ACRYLIC OR UREA-FORMALDEHYDE, PESTICIDE, TERTRA-TAXIL, TERTRA-LACK OR OTHER APPROVED EQUAL, MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH.
  8. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4-15 FEET WIDE AND 300-300 FEET LONG.
14. BULKINESS OF SEEDS:
  1. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SHARPER INCREASES SEED SIZE) BROADCAST OR DROP SEEDING, OR - A TRACER SEEDING.

PERMANENT SEEDING SUMMARY

No.	SPECIES**	SEED MIXTURE (HARDNESS ZONE 7a) FROM TABLE 2B		FERTILIZER RATE (10-20-20)			LIME RATE (TONS/AC)
		APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTH (IN)	N	P <sub>2</sub> O <sub>5</sub>	
2	HARD FESCUE (40%)	104	3/1 - 5/15 8/15 - 10/15	1/2"	90	175	175
	BICHORN SHEEP FESCUE (40%)	104	3/1 - 5/15 8/15 - 10/15	1/2"			
	CREeping RED FESCUE (20%)	52	3/1 - 5/15 8/15 - 10/15	1/2"			

\* FOR SEEDING DATES 5/15 - 8/14, ADD 2 LBS/ACRE OF KEEPING LOVE GRASS OR 10 LBS/ACRE OF MILLET TO SEED MIXTURE NO. 1.

\*\* USE ONLY CULTIVARS RECOMMENDED IN AGRICULTURE MINIFIED 77 - TURFGRASS CULTIVAR RECOMMENDATIONS FOR CORRECTED SOIL AND PROFESSIONAL SEED MIXTURES IN MARYLAND. THIS ARTICLE CAN BE FOUND AT <http://www.maryland.gov/online/online/online.htm>

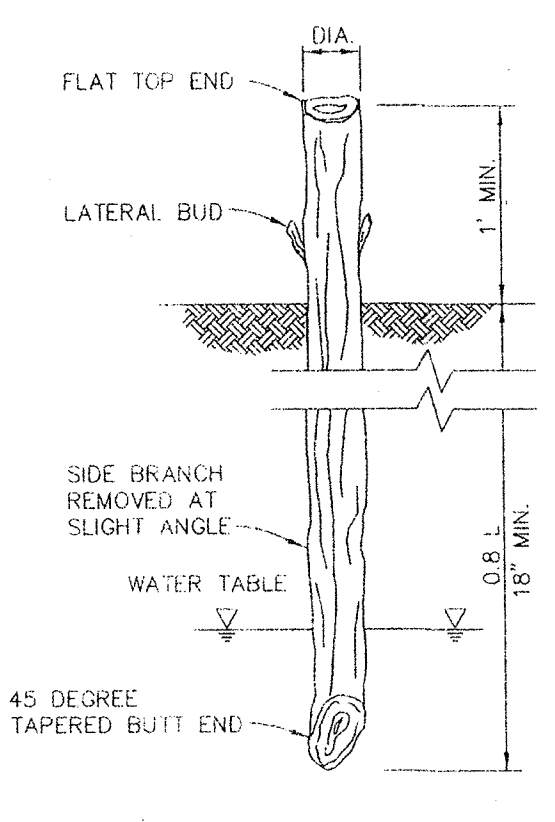
SEED MIX #2 - LOW MAINTENANCE MIX - USE IN AREAS WHERE TURF WILL EITHER NOT BE MAINTAINED OR INFREQUENTLY CARED FOR.

TEMPORARY SEEDING SUMMARY

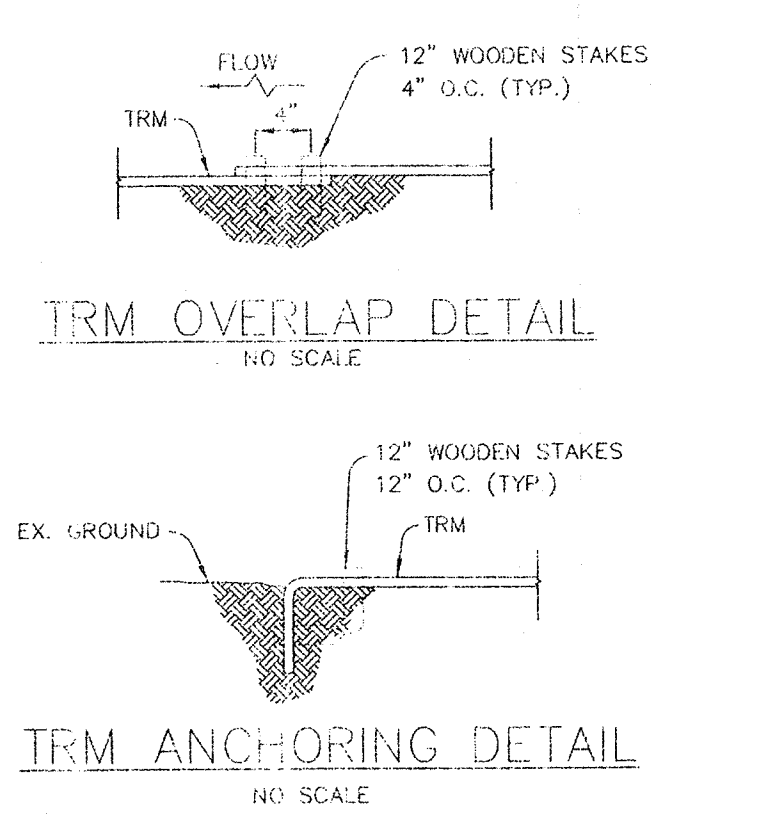
APPLY TO GRADED OR CLEARED AREAS WHERE IT IS RECORDED (WHERE A SHORT-TERM (12 MONTHS MAX) VEGETATIVE COVER IS NEEDED).

No.	SPECIES	SEED MIXTURE (HARDNESS ZONE 7a) FROM TABLE 2B		FERTILIZER RATE (10-20-20)			LIME RATE (TONS/AC)
		APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTH (IN)	N	P <sub>2</sub> O <sub>5</sub>	
1	RYE	140	2/1 - 4/30 8/15 - 11/30	1" - 2"	90	175	175
1	MILLET	50	5/1 - 8/14	1/2"			

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL PRODUCTION AND SEDIMENT CONTROL FOR RATES AND METHODS NOT COVERED.



- NOTES:
1. LIVE STOUT STAKES SHOULD BE LONG ENOUGH TO REACH BELOW THE GROUNDWATER TABLE (GENERALLY A LENGTH OF 4 TO 6 FEET, OR 1.5 TO 1.8 METERS, IS SUFFICIENT). ADDITIONALLY, THE STAKES SHOULD HAVE A DIAMETER BETWEEN 1 AND 2 INCHES.
  2. LIVE STAKES SHOULD BE CUT FROM FRESH, GREEN, HEALTHY PARENT PLANTS (SALIX NIGRA, CORNUS SERICEA SPP., ROBINA PSEUDODACACIA) WHICH ARE ADAPTED TO THE SITE CONDITIONS WHENEVER POSSIBLE.
  3. LIVE STAKES SHALL BE COVERED AND MOIST AT ALL TIMES AND SHALL BE PLACED IN COLD STORAGE IF MORE THAN A FEW HOURS ELAPSE BETWEEN THE CUTTING AND REPLANTING TIMES.
  4. LIVE STAKE ROOTING AREAS SHALL BE SOAKED IN BARRELS OF WATER FOR 24 TO 48 HOURS JUST PRIOR TO INSTALLATION.
  5. WHILE KEEPING THE BARK OF THE LIVE STAKES INTACT, THE SIDE BRANCHES SHOULD BE CLEANLY REMOVED, THE BASAL ENDS ANGLED FOR EASY INSERTION, AND THE TOPS CUT SQUARE.
  6. THE CUTTINGS SHOULD BE IMPLANTED WITH THE ANGLED BASAL END DOWN (BUDS ORIENTED UP) AT A MINIMUM ANGLE OF 10 DEGREES TO THE HORIZONTAL SO THAT ROOTING WILL NOT BE RESTRICTED.
  7. IN SOFT SOILS, THE STAKES CAN BE INSERTED PERPENDICULARLY INTO THE SLOPE USING A RUBBER MAUL. IN HARD SOILS, HOWEVER, A STEEL ROD SHOULD BE EMPLOYED TO CREATE A PILOT HOLE BEFORE THE STAKES ARE PLANTED.
  8. TWENTY PERCENT OF THE LIVE STAKE, AND A MINIMUM OF TWO LATERAL BUDS, SHOULD BE EXPOSED ABOVE THE SLOPE SO THAT GREEN, LEAFY SHOOTS WILL READILY GROW.
  9. SPLIT OR OTHERWISE DAMAGED STAKES SHALL BE DISCARDED.
  10. AFTER THE STAKES HAVE BEEN INSERTED INTO THE GROUND, SOIL SHOULD BE TAMPED FIRMLY AROUND THEIR BASES TO ENCOURAGE ROOT GROWTH.
  11. SUCCESSIVE STAKES SHOULD BE ARRANGED IN A TRIANGULAR CONFIGURATION AND SPACED A DISTANCE OF 2 TO 3 FEET (0.6 TO 0.9 METERS) APART, ALLOWING FOR A TYPICAL DENSITY OF 2 TO 4 CUTTINGS PER SQUARE YARD (0.8 SQUARE METERS). MOUND POSTS REQUIRE ADDITIONAL ROOM FOR GROWTH AND PROPAGATION AND SHOULD BE PLANTED AT 3 TO 5 FOOT (1 TO 1.5 METER) INTERVALS. WHEN INSERTED IN ARRAYS, THE STAKES SHOULD BE SPACED 12 TO 18 INCHES (30 TO 46 CENTIMETERS) APART TO FORM CHEVRON-LIKE ROWS THAT POINT DOWNSTREAM.



TRM OVERLAP DETAIL NO SCALE

TRM ANCHORING DETAIL NO SCALE

TURF REINFORCEMENT MAT MATERIAL SPECIFICATIONS

THE COMPOSITE TURF REINFORCEMENT MAT (TRM) SHALL BE A MACHINE PRODUCED MAT OF 100% COCONUT FIBER MATRIX AND APPROPRIATE WOVEN PERMANENT THREE DIMENSIONAL NETTING STRUCTURE. CONTRACTOR SHALL SUBMIT TYPE AND SOURCE OF COMPOSITE TURF REINFORCEMENT MAT FOR REVIEW BY HOWARD COUNTY AND ENGINEER.

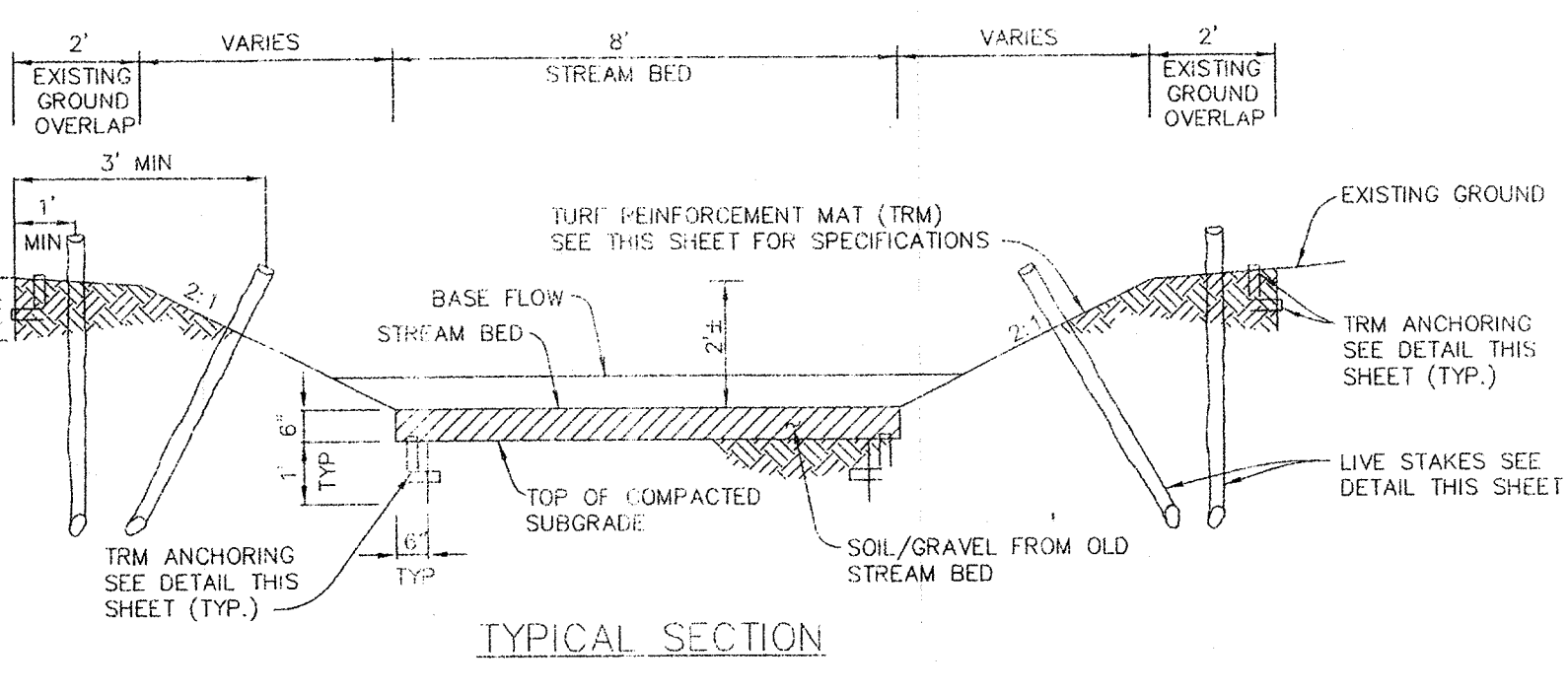
THE MATRIX SHALL BE STITCH TOGETHER BETWEEN A HEAVY DUTY UV STABILIZED BOTTOM NET WITH 0.50 x 0.50 INCH (1.27 x 1.27 CM) OPENINGS, A HEAVY DUTY UV STABILIZED, DRAMATICALLY CLUSTERED (FORMED) INTERMEDIATE NETTING WITH 1.00 x 0.50 INCH (2.54 x 1.27 CM) OPENINGS, AND A SUPER HEAVY DUTY UV STABILIZED TOP NET WITH 1.00 x 1.00 INCH (2.54 x 2.54 CM) OPENINGS. THE CLUSTERED NETTING SHALL FORM PERMANENT, CLOSELY SPACED RIDGES ACROSS THE ENTIRE WIDTH OF THE MAT. THE THREE NETS SHALL BE STITCHED TOGETHER ON 1.50 INCH (3.81 CM) CENTERS WITH UV STABILIZED POLYPROPYLENE THREAD TO FORM A PERMANENT THREE DIMENSIONAL STRUCTURE.

ALL MATS SHALL BE MANUFACTURED WITH A COLORED THREAD STITCHED ALONG BOTH OUTER EDGES (APPROXIMATELY 2 - 5 INCHES (5.1 - 12.5 CM) FROM THE EDGE) AS AN OVERLAP GUIDE FOR JOINTWARD MATS.

THE COMPOSITE TURF REINFORCEMENT MAT SHALL BE THE NORTH AMERICAN GREEN C150, OR HOWARD COUNTY APPROVED EQUIVALENT. THE TURF REINFORCEMENT MAT SHALL HAVE THE FOLLOWING PHYSICAL PROPERTIES:

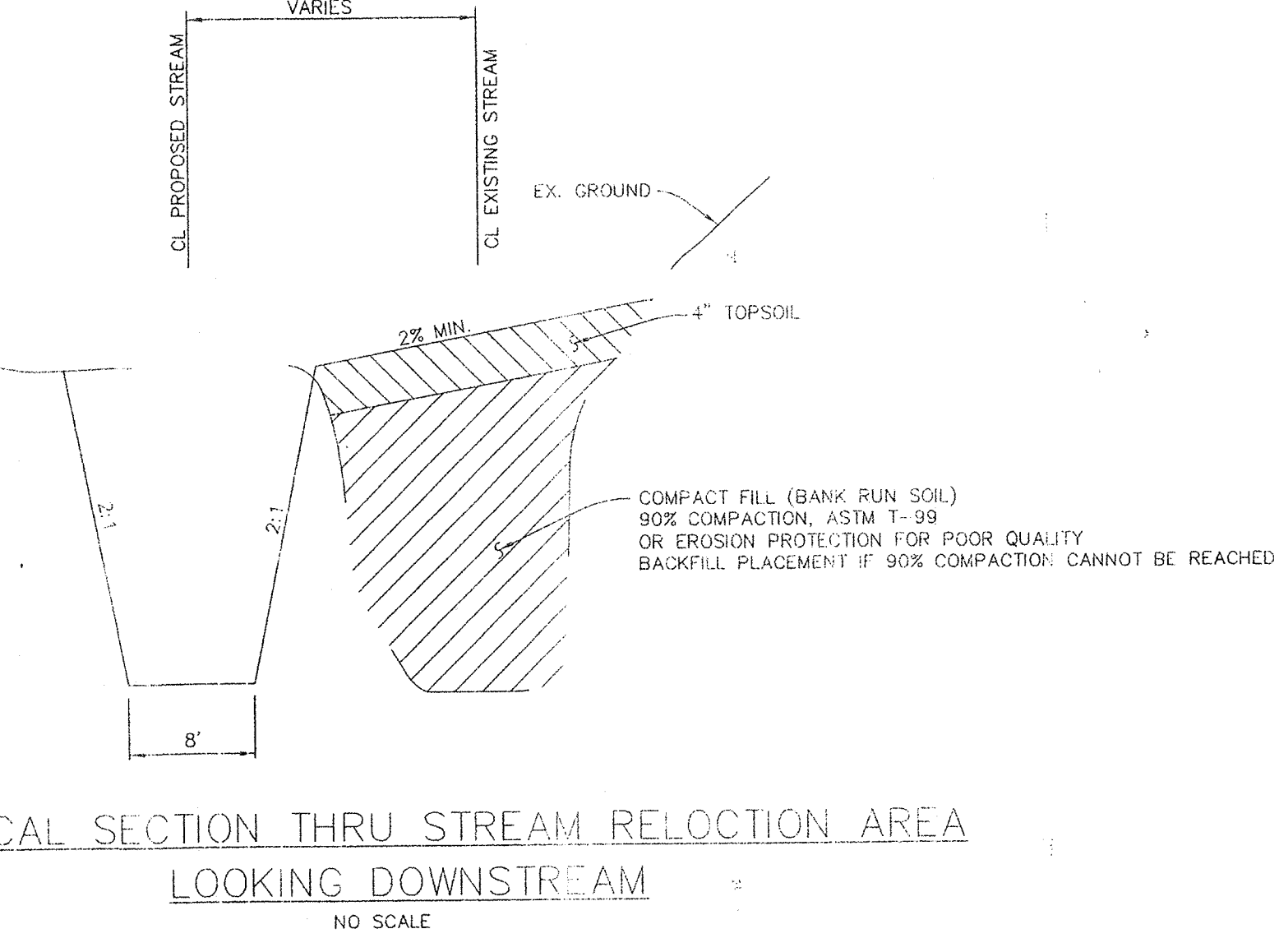
MATERIAL CONTENT

MATRIX	100% COCONUT FIBER (0.50 LB/YD <sup>2</sup> ) (1.27 KG/M <sup>2</sup> )
NETTING	TOP-HEAVY UV STABILIZED POLYPROPYLENE 8.50 LBS/1000 FT <sup>2</sup> (1.15 KG/100 M <sup>2</sup> ) MID-SUPER HEAVY UV STABILIZED POLYPROPYLENE 20 LBS/1000 FT <sup>2</sup> (2.54 KG/100 M <sup>2</sup> ) BOTTOM-HEAVY UV STABILIZED POLYPROPYLENE 8.50 LBS/1000 FT <sup>2</sup> (1.15 KG/100 M <sup>2</sup> )
TH-READ	UV STABILIZED POLYPROPYLENE
PHYSICAL SPECIFICATIONS (PER FEET)	
WIDTH	ENGLISH: 6.50 FT METRIC: 2.00 M
LENGTH	55.50 FT 16.90 M
WEIGHT	37.00 LBS (16.80 KG)
AREA	40.00 YD <sup>2</sup> 35.40 M <sup>2</sup>
STITCH SPACING	1.50 IN 3.81 CM



- NOTES:
1. BEGIN INSTALLATION AT DOWNSTREAM END, UPSTREAM MAT OVERLAPPING DOWNSTREAM MAT (SHINGLE EFFECT). INSTALL LIVE STAKES DURING DORMANT SEASON (DEC. 1 - APRIL 1).
  2. PREPARE SOIL BEFORE INSTALLING TURF REINFORCEMENT MAT (TRM). THIS INCLUDES ANY NECESSARY APPLICATION OF SEED, LIME AND FERTILIZER (NO APPLICATION NECESSARY IN STREAM BED ITSELF).
  3. ALSO SEE MANUFACTURER'S INSTALLATION RECOMMENDATIONS.
  4. BACKFILL AND COMPACT ALL TRENCHES EXCAVATED FOR STAPLING AT EDGE OF TURF REINFORCEMENT MAT (TRM).

TYPICAL SECTION THRU STREAM RELOCATION AREA NO SCALE



TYPICAL SECTION THRU STREAM RELOCATION AREA NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

DATE: 9/19/02  
DIRECTOR OF PUBLIC WORKS: [Signature]  
DATE: 5/23/02  
DIRECTOR, DEPARTMENT OF RECREATION & PARKS: [Signature]

DATE: 9/19/02  
CHIEF, STORMWATER MANAGEMENT DIVISION: [Signature]

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ARTHUR E. MUEGGE #8707

DES: CJR  
EQR: 1  
EQR REVISIONS  
DRN: MAD  
CHK:  
DATE: 11/14/00  
BY: NO.  
REVISION

9.10.02

TIMOTHY C. SCHUELER #20207

02/2002  
600' SCALE MAP NO. 30  
BLOCK NO. 4

KINGSCUP COURT  
STREAM RELOCATION  
2nd ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CAPITAL PROJECT

SCALE AS SHOWN  
SHEET 6 OF 6