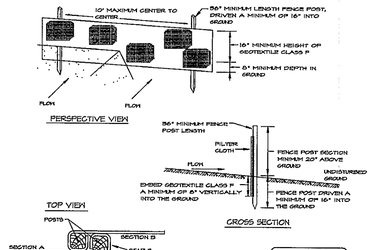
DETAIL 22 - SILT FENCE



Construction Specifications

1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1.5" x 1.5" square (minimum) cut, or 1.75" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot.
2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft²/ minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
4. 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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SILT FENCE

Silt Fence Design Criteria

Slope Steepness	(Maximum) Slope Length	(Maximum) 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 areas a silt fence may be the only perimeter control required.

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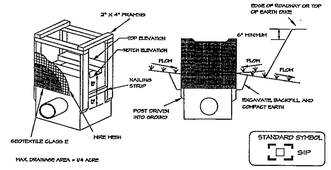
DETAIL 23A - STANDARD INLET PROTECTION



Construction Specifications

1. Excavate completely around the inlet to a depth of 16" below the notch elevation.
2. Drive the 2" x 4" construction grade timber posts 1' into the ground at each corner of the inlet. Place nail strips between the posts on the ends of the inlet. Assemble the top portion of the 2" x 4" frame using the overlap joint shown on Detail 23A. The top of the frame (weir) must be 6" below adjacent roadways where flooding and safety issues may arise.
3. Stretch the 1/2" x 1/2" wire mesh tightly around the frame and fasten securely. The ends must meet and overlap at a post.
4. Stretch the Geotextile Class E tightly over the wire mesh with the geotextile extending from the top of the frame to 16" below the inlet notch elevation. Fasten the geotextile firmly to the frame. The ends of the geotextile must meet at a post, be overlapped and folded, then fastened down.
5. Backfill around the inlet in compacted 6" layers until the layer of earth is level with the notch elevation on the ends and top elevation on the sides.
6. If the inlet is not in a sump, construct a compacted earth dike across the slope line directly behind the inlet. The top of the earth dike should be at least 6" higher than the top of the frame.
7. The structure must be inspected periodically and after each rain and the geotextile replaced when it becomes clogged.

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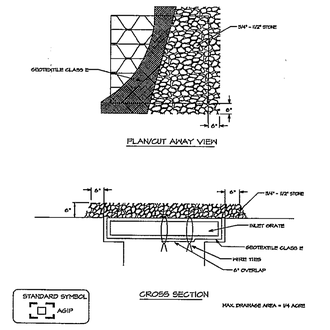
DETAIL 23B - AT GRADE INLET PROTECTION



Construction Specifications

1. Lift grate and prop with Geotextile Class E to completely cover all openings, then set grate back in place.
2. Place 3/4" to 1.1/2" stone, 4"-6" thick on the grate to secure the fabric and provide additional filtration.

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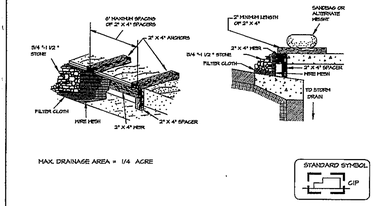
DETAIL 23C - CURB INLET PROTECTION (COG OR COG INLETS)



Construction Specifications

1. Attach a continuous piece of wire mesh (50" minimum width by throat length plus 4") to the 2" x 4" weir (measuring throat length plus 2") as shown on the standard drawing.
2. Place a continuous piece of Geotextile Class E the same dimensions as the wire mesh over the wire mesh and securely attach it to the 2" x 4" weir.
3. Securely nail the 2" X 4" weir to a 4" long vertical spacer to be located between the weir and the inlet face (max. 4" apart).
4. Place the assembly against the inlet throat and nail (minimum 2" lengths of 2" x 4" to the top of the weir at spacer locations). These 2" x 4" anchors shall extend across the inlet top and be held in place by sandbags or alternate weight.
5. The assembly shall be placed so that the end spacers are a minimum 1' beyond both ends of the throat opening.
6. Form the 1/2 " x 1/2 " wire mesh and the geotextile fabric to the concrete gutter and against the face of the curb on both sides of the inlet. Place clean 3/4 " x 1 1/2 " stone over the wire mesh and geotextile in such a manner to prevent water from entering the inlet under or around the geotextile.
7. This type of protection must be inspected frequently and the filter cloth and stone replaced when clogged with sediment.
8. Assure that storm flow does not bypass the inlet by installing a temporary earth or asphalt dike to direct the flow to the inlet.

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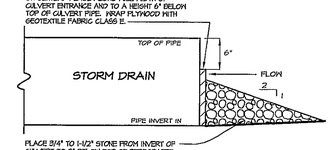
PERFORATE 3/4" PLYWOOD WITH 1" DIA. HOLES @ 4" ON CENTER. PLACE ALONG FULL WIDTH OF GUTTER ENTRANCE AND TO A HEIGHT 4" BELOW TOP OF GUTTER PIPE. WRAP PLYWOOD WITH GEOTEXTILE FABRIC CLASS E.



PLACE 3/4" TO 1-1/2" STONE FROM INVERT OF GUTTER TO 2" BELOW TOP OF PERFORATED PLYWOOD. STONE SHALL BE PLACED ALONG THE FULL WIDTH OF THE GUTTER.

ELEVATION

CLEAN SEDIMENT FROM STONE ONCE IT HAS ACCUMULATED TO 1/2 THE DEPTH OF THE PLYWOOD FILTER.

CONTRACTOR TO INSTALL PIPE INLET PROTECTION PRIOR TO BEGINNING DISTURBANCE IN WORK AREA #2. UPON REMOVAL OF INLET PROTECTION, CONTRACTOR SHALL CONTINUE EXTENSION OF STORM DRAIN TO ITS FULL DESIGN LENGTH.

PIPE INLET PROTECTION (P.I.P)

NOT TO SCALE

19.0 STANDARDS AND SPECIFICATIONS FOR LAND GRADING

Definition:
Reshaping of the existing land surface in accordance with a plan as determined by engineering survey and layout.

Purposes:
The purpose of a land grading specification is to provide for erosion control and vegetative establishment on those areas where the existing land surface is to be reshaped by grading according to plan.

Design Criteria:
The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surroundings to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operations related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal and vegetative treatment etc.

Many counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed. The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely conduct surface runoff to storm drains, protected outlets or to stable water courses to insure that surface runoff will not damage slopes or other graded areas.
2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1 slope (exceeds 20 feet), for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to stable outlet. Soils, seeps, rock outcrops, etc. shall also be taken into consideration when designing benches.
3. Reverse benches shall be provided whenever the vertical (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.
   a. Benches shall be a minimum of six-feet wide to provide for ease of maintenance.
   b. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 % and 5 %, unless accompanied by appropriate design and computations.
   c. The flow length within a bench shall not exceed 800' unless accompanied by appropriate design and computations. For flow channel stabilization see temporary swale.
4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of earth dikes, ditches and swales or conveyed downslope by the use of a designed structure, except where:
   a. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.
   b. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded swales, down spouts, etc.
   c. The face of the slope will be protected by special erosion control materials, to include, but not limited to: approved vegetative stabilization practices (see Section 6), rip-rap or other approved stabilization methods.
5. Cut slopes occurring in ripable rock shall be serrated as shown on the following diagram. These serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at normal two-foot intervals with normal three foot horizontal shelfs. These steps will vary depending on the slope ratio or the cut slope. The normal slope line is ½. These steps will weather and act to hold moisture, lime, fertilizer and seed thus producing much quicker and longer lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.
6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.
7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence or other related damages.
8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over 8" (12) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.
9. Stockpiles, borrow areas and spoil shall be shown on the plans and shall be subjected to the provisions of this Standard and Specifications.
10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with 20.0 Standards and Specifications for Vegetative Stabilization.

21.0 STANDARD AND SPECIFICATIONS FOR TOPSOIL

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

Purposes:
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:

I. 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.

II. 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:

I. Topsoil salvaged from the existing site may be used provided that it meets the standards as set forth in the 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 Experimental Station.

II. Topsoil Specifications – Soil to be used as topsoil must meet the following:
   a. 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 approving authority. Regardless, topsoil shall not contain a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1 1/2" in diameter.
   b. Topsoil must be free of plants or plant parts such as Bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.
   c. 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 s.f.) 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:

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

For sites having disturbed areas over 5 acres:

I. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
   i. pH for topsoil shall be between 6.0 and 7.5. If tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.
   ii. Organic content of topsoil shall be not less than 1.5% by weight.
   iii. Topsoil having soluble salt content greater than 500 parts per million shall not be used.
   iv. 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 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 I – Vegetative Stabilization Methods and Materials.

Topsoil Application:

I. 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.

II. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.

III. 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 sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoil or other operations shall be corrected in order to prevent the formation of depressions or water pockets.

IV. 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 seedbed preparation.

V. Alternative for Permanent Seeding – Instead of applying the full amounts of lime and inorganic fertilizer, composted sludge and amendments may be applied as specified below:
   I. Composted Sludge Material for use as a soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:
   a. Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of application of the compost) by the Maryland Department of Environment under COMAR 26.04.06)
   b. Composted sludge shall contain at least 1% nitrogen, 1.5% phosphorus, and 0.2% potassium and have a pH of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
   c. Composted sludge shall be applied at a rate of 1 ton/1,000 s.f.

VI. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 s.f., and 1/3 the normal lime application rate.

References:
Guideline Specifications, Soil Preparation and Sodding. MD-VA, Pub #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institute. Revised 1973.

CHARLES SOIL CONSERVATION DISTRICT
DETAILS AND SPECIFICATIONS FOR VEGETATIVE ESTABLISHMENT

Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within seven (7) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1), and fourteen days (14) as to all other disturbed or graded areas on the project site. Once vegetation is established, the site shall have 90% groundcover to be considered adequately stabilized.

I. Permanent Seeding:

A. Soil Tests: Lime and fertilizer will be applied per soil tests results for sites greater than 5 acres. Soil tests will be done at completion of initial rough grading or as recommended by the sediment control inspector. Rates and analysis will be provided to the grading inspector as well as the contractor.

The minimum soil conditions required for permanent vegetative establishment are:
   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 40% clay but enough fine grained material (> 30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass or sericea lespedeza is to be planted, then a sandy soil (< 30% silt plus clay) would be acceptable.
   d. Soil shall contain 1.5% minimum organic matter by weight.
   e. Soil must contain sufficient pore space to permit adequate root penetration.
   f. If these conditions cannot be met by soils on site, adding topsoil is required in accordance with Section 21 Standard and Specification for Topsoil or amendments made as recommended by a certified agronomist.

B. Seedbed Preparation: Area to be seeded shall be loose and friable to a depth of at least 3 inches. The top layer shall be loosened by raking, disking or other acceptable means before seeding occurs. For sites less than 5 acres, apply 100 pounds dolomitic limestone and 21 pounds of 10-10-10 fertilizer per 1,000 square feet. Harrow or disk lime and fertilizer into the soil to a depth of at least 3 inches on slopes flatter than 3:1.

C. Seeding: Apply 5-6 pounds per 1,000 square feet of tall fescue between March 1 and May 15 or between August 15 and October 15. Apply seed uniformly on a moist firm seedbed with a cyclone seeder, cultipacker seeder or hydroseeder (slurry includes seeds and fertilizer, recommended on steep slopes only). Maximum seed depth should be 1/4 inch in clayey soils and 1/2 inch in sandy soils when using other than the hydroseeder method. Irrigate where necessary to support adequate growth until vegetation is firmly established. If other seed mixes are to be used, select from Table 28, entitled "Permanent Seeding For Low Maintenance Areas" from the current Standards and Specifications for Soil Erosion and Sediment Control. Mixes suitable for this are 1, 3 and 5-7. Mixes 5-7 are suitable in non-mowable situations.

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

Mulch shall be unrotted, undapped, small grain straw applied at a rate of 2 tons per acre or 90 pounds per 1,000 square feet (2 bales), if a mulch-anchoring tool is used, apply 2.5 tons per acre. Mulch materials shall be relatively free of all kinds of weeds and shall be completely free of prohibited noxious weeds. Spread mulch uniformly mechanically or by hand, to a depth of 1-2 inches.

E. Securing Straw Mulch: Straw mulch shall be secured immediately following mulch application to minimize movement by wind or water. The following methods are permitted:
   (i) Use a mulch-anchoring tool which is designed to punch and anchor mulch into the soil surface to a minimum depth of 2 inches. This is the most effective method for securing mulch, however, it is limited to relatively flat areas where equipment can operate safely.
   (ii) Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. If mixed with water, use 500 pounds of wood cellulose fiber per 100 gallons of water.
   (iii) Liquid binders may be used. Apply at higher rates at the edges where wind catches mulch, such as in valleys and on crests of slopes. The remainder of the area should appear uniform after binder application. Binders listed in the 1994 Standards and Specifications for Soil Erosion and Sediment Control or approved equal shall be applied at rates recommended by the manufacturers.
   (iv) Lightweight plastic netting may be used to secure mulch. The netting will be stapled to the ground according to manufacturer's recommendations.

2. Temporary Seeding:
   Lime: 100 pounds of dolomitic limestone per 1,000 square feet.
   Fertilizer: 15 pounds of 10-10-10 per 1,000 square feet.
   Seed: Perennial rye – 0.92 pounds per 1,000 square feet (February through April 30 or August 15 through November 1).
   Millet – 0.92 pounds per 1,000 square feet (May 1 through August 15).
   Mulch: Same as I D and E above.

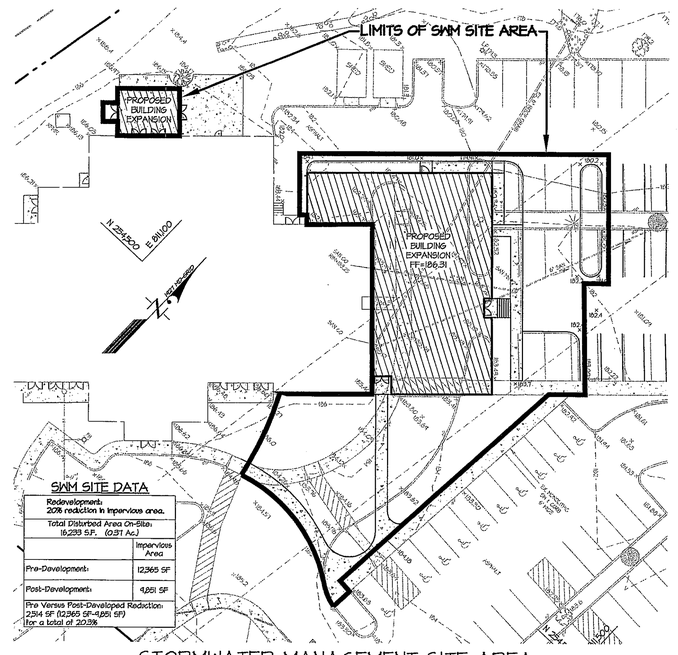
3. No fills may be placed on frozen ground. All fill to be placed in approximately horizontal layers, each layer having a loose thickness of not more than 8 inches. All fill in roadways and parking areas are to be classified as per Charles County requirements. Any fill within the building area is to be compacted to a minimum of 95% density. Fills for pond embankments shall be compacted as per MD-378 Construction Specifications. All other fills shall be compacted sufficiently so as to be stable and prevent erosion and slippage.

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

5. Mining Operations:
   Sediment control plans for mining operations must include the following seeding dates and mixtures:
   For seeding dates of February 1 through April 30 and August 15 through October 31, use seed mixture of tall fescue at the rate of 2 pounds per 1,000 square feet and sericea lespedeza at the minimum rate of 0.15 pounds per 1,000 square feet.

6. Topsoil shall be applied as per the Standard and Specifications for Topsoil from the current Maryland Standards and Specifications for Soil Erosion and Sediment Control.

NOTE: Use of this information does not preclude meeting all of the requirements of the current Maryland Standards and Specifications for Soil Erosion and Sediment Control.



STORMWATER MANAGEMENT SITE AREA

SCALE: 1"=30'

SEDIMENT & EROSION CONTROL & SWM DETAILS & SPECIFICATIONS
RICHARD R. CLARK SENIOR CENTER

TOWN OF LA PLATA
1ST ELECTION DISTRICT
CHARLES COUNTY, MARYLAND

33

SHEET 4 OF 4

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.

ERIC L. SANTEC, PE
LICENSE NO. 24501
EXPIRATION DATE: 12/30/09

DATE	DESCRIPTION	BY
12/5/08	REVISED PER SCD COMMENTS	ELS
11/12/08	REVISED PER SCD COMMENTS	ELS
DATE	REVISIONS	

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P.O. BOX 2727, LA PLATA, MARYLAND 20646
BEN DYER ASSOCIATES, INC.
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RECORD NO. B-02542

SCALE: AS SHOWN

DATE: SEPTEMBER, 2008

DRWG. NO. 06.00.04-Y

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