



Department of the Environment
Welcomes you to the State's



**Soil Erosion and Sediment Control
Responsible Personnel Training Program**



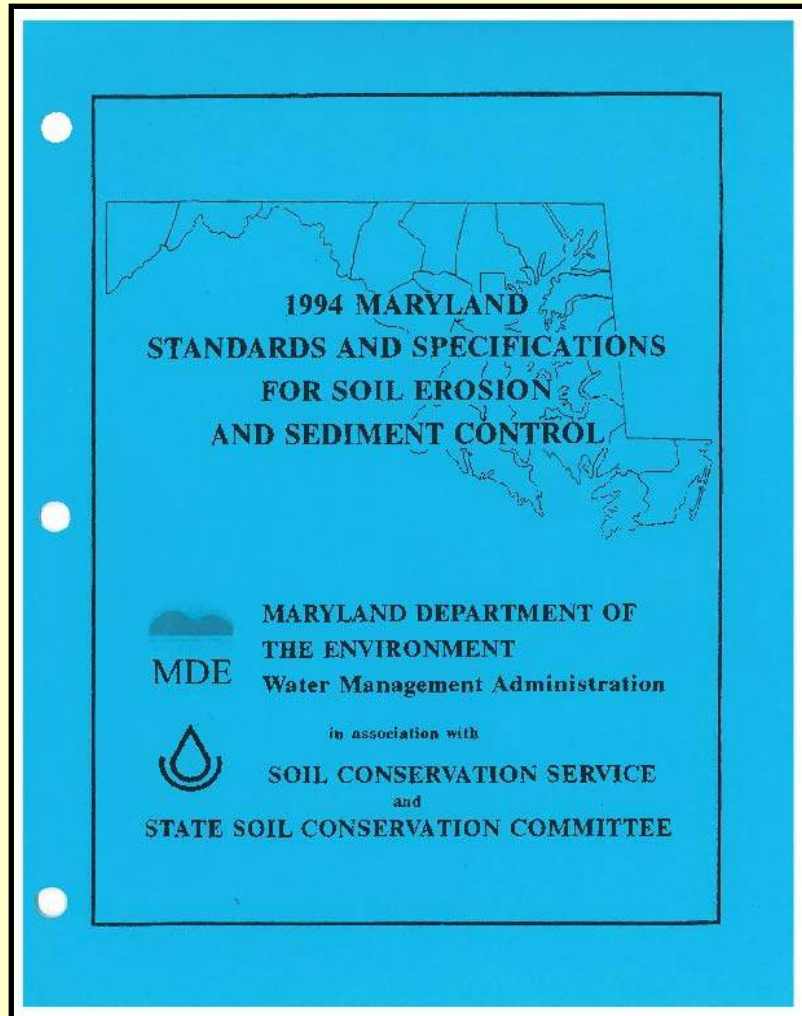


Responsible Personnel Training

- Environment Article, Section 4-104 requires that any foreman, superintendent, or project engineer who is in charge of on-site clearing and grading operations or sediment control has attended an MDE approved training program.
- Maryland Code of Regulations (COMAR) 26.17.01.06 establishes the content and procedural elements of the training program.



2011 Regulation Update





What's New in the Regulations

- 20 acre grading unit
- 3 to 7 day stabilization requirements
- Protection of natural resource areas
 - Standards and Specifications handbook with material and detail updates





Certification

- Upon successful completion of this training course, you will be issued a Responsible Personnel Certification Card
- Certification is valid for three years and is automatically renewed unless you are notified that additional training is required





Sediment Control Class Outline

Part I

- Maryland's Water Resources
- The Natural Erosion Process
- Construction Site Runoff
- Sediment Control Laws and Regulations
- Inspection Responsibilities

Part II

- Maryland's Standards and Specifications
 - Planning and design
 - Grading and Stabilization
 - Water Conveyance
 - Erosion Control
 - Filtering
 - Dewatering
 - Sediment trapping
 - Miscellaneous





This class is dedicated to Richard Trickett (1955-2012) who will be remembered for his remarkable knowledge and tireless quest to improve sediment control in the State of Maryland.



Sediment Control Class -- Part 1

- Maryland's Water Resources
- The Erosion Process
- Construction Site Runoff
- Laws and Regulations
- Inspection Responsibilities



The Earth's Water Balance



Two-thirds of the Earth's surface



is covered by water





97% of the Earth's water is salt water
and good for recreation (Ocean City, MD)

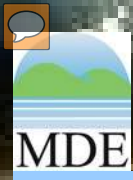




And 2% of the freshwater

is frozen in polar ice caps





And 1% is readily available for our use

simply stated,
there just isn't much of it





Maryland's Water Resources

- Domestic Water Supply
- Average use is 100 gallons/person/day
- 68% of Maryland's population is served by drinking water that comes from surface waters





Maryland's Water Resources

Provides
Wildlife
Habitat





Wetland Plants and Ecosystems





Terrestrial Animals





Waterfowl





Aquatic Animals





Maryland's Water Resources

Supports
Maryland's
Economy



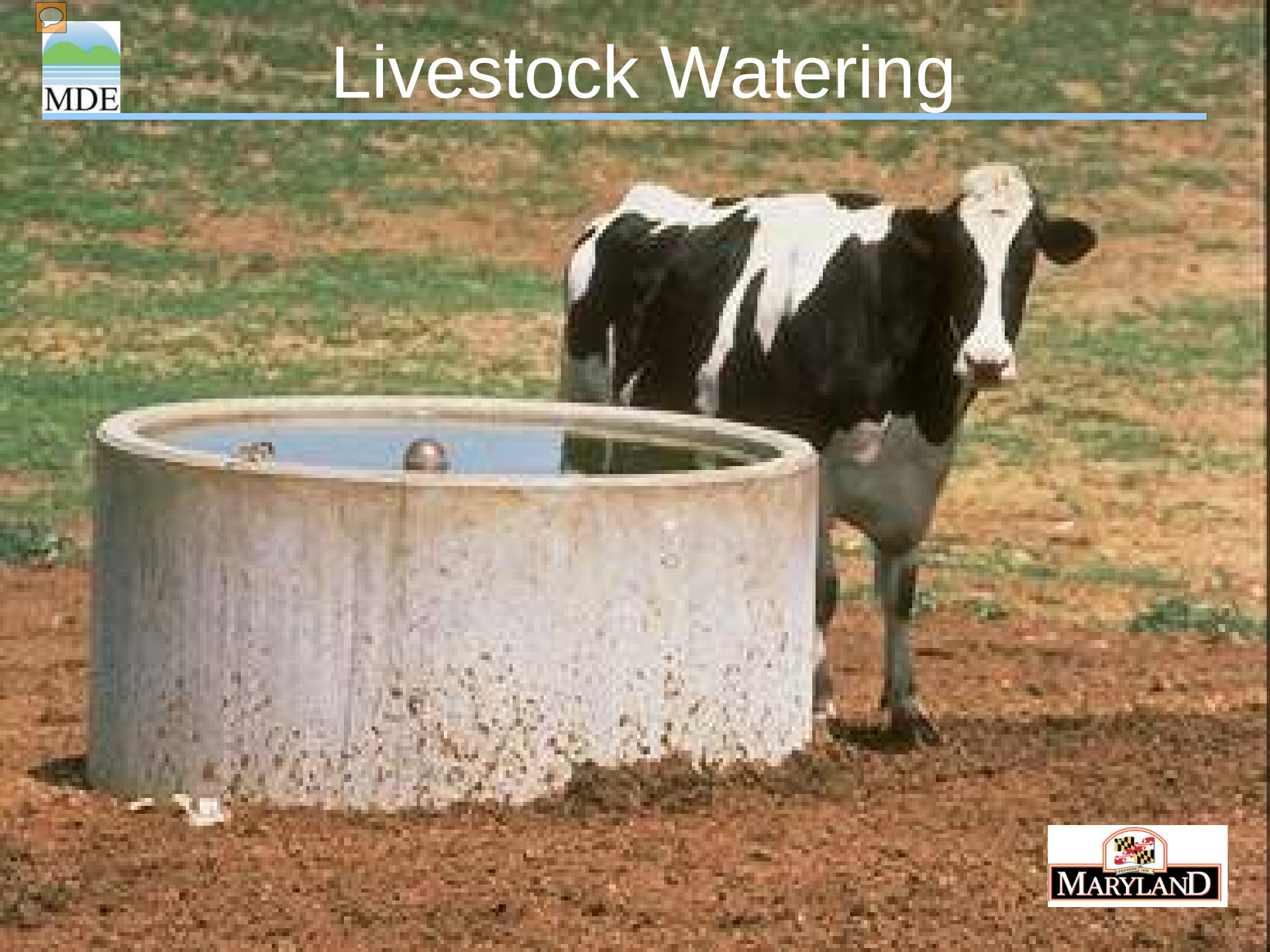
Agricultural

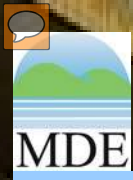


crop irrigation



Livestock Watering





Power Generation



Conowingo Dam





Commercial



Maintenance
of shipping channels





Chesapeake Bay





Maryland's Water Resources

Recreational Uses



Fishing





Boating





Scenic Landscapes





The Natural Erosion Process

The wearing away of
the land
by the action of
water, wind, ice, and
gravity.



Water





Wind



Glaciers





Gravity

Calvert Cliffs, Maryland





Land Development

Accelerates the natural erosion process and can cause significant harm to Maryland's water resources



Construction Site Runoff





Splash Erosion



Soil Saturation





Gully Erosion





Overland Flow





Sediment Transport





Sedimentation





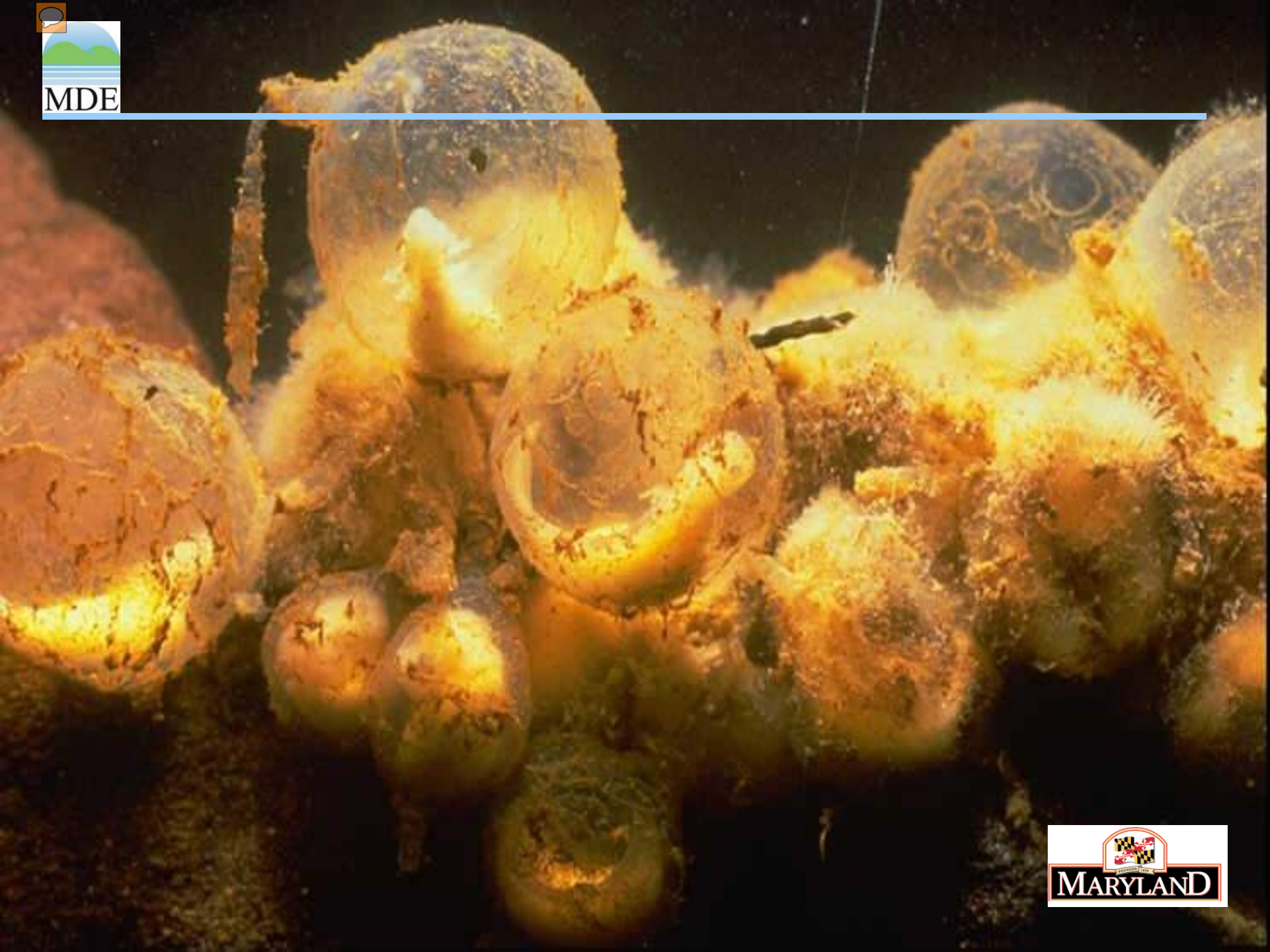
Sedimentation Impacts

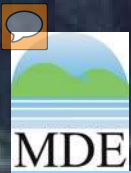
- **Water Quality**
- **Flooding**
- **Navigation**
- **Eutrophication**
- **Public Health**



Water Quality







Flooding





Navigation



Sediment Control Measures

Maryland's standards and specifications provide a variety of measures to control sediment-related water quality problems caused by earth disturbance



Vegetative Cover



Filtering



Trapping





Maryland Law and Regulation

- An erosion and sediment control plan is required for all grading activities that disturb:
 - 5,000 square feet or more of land area
 - 100 cubic yards of earth or more
- It is unlawful to add, introduce, leak, spill, or otherwise emit soil or sediment into waters of the State or place soil or sediment in a position or location likely to be washed into waters of the State





State Legislative History

- 1965 -- Montgomery County develops the first sediment control program in the country
- 1968 -- Baltimore County develops a sediment control program
- 1970 – Maryland mandates that all counties and municipalities establish sediment control programs





State Legislative History

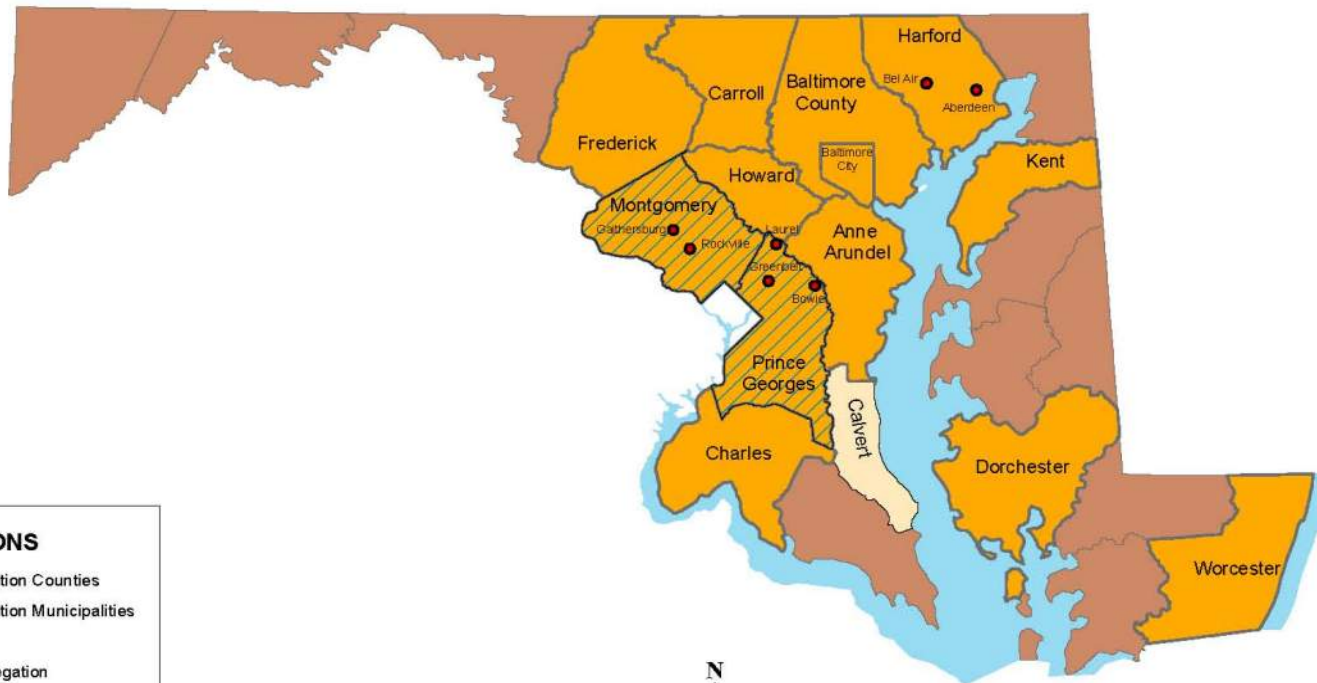
- 1973 – Grading and building permits are tied to sediment control plan approval
- 1980 – Training and responsible personnel certification required
- 1984 – The State is responsible for enforcing the law unless delegated to a local jurisdiction



STATE OF MARYLAND

EROSION AND SEDIMENT CONTROL

DELEGATED JURISDICTIONS



JURISDICTIONS

-  Full Delegation Counties
-  Full Delegation Municipalities
-  WSSC
-  Partial Delegation



260,000 130,000 0 260,000 Feet

Map Date - 17 April 2013



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
Robert M. Summers, Ph.D., Sec.





Federal Requirements

- 1992 -- National Pollutant Discharge Elimination System (NPDES) General Permit regulates earth disturbance of 5 acres or more
- 2004 -- NPDES now regulates earth disturbance of 1 acre or more
- A notice of intent (NOI) must be submitted to MDE to comply with the provisions of a statewide General Permit
- Projects that will disturb 150 acres or more and which discharge to a water listed as impaired on Maryland's 303(d) list must apply for an individual permit

MDE NOI Form

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
APPLICATION FOR INDIVIDUAL OR GENERAL PERMIT FOR STORMWATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY

STATE OF MARYLAND APPLICATION FORM/NOTICE OF INTENT

MDE USE ONLY	Permit Number:	
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Projects that will disturb 150 acres or more and which discharge to a water listed as impaired on Maryland's 303(d) list must apply for an individual permit. All other projects may apply for a general permit. The Maryland Department of the Environment (MDE) may later determine that an individual permit is required for some projects.

Applicant Information	
This application is for (check one):	A General Permit for Stormwater Associated with Construction Activity ☐ An Individual Permit for Stormwater Associated with Construction Activity ☐
Name of site/project:	
Phase (if applicable):	
Name of Owner or Organization Responsible for site/project:	
Street Address of Owner or Organization (not site/project)	Street: City: County: State: Zip Code:
Mailing Address of Owner or Organization (not site/project), if different from street address	Street/P.O. Box: City: County: State: Zip Code:
Required Tax Information	For an organization, Federal Tax Identification Number: For an individual, Social Security Number:



Public Participation

- In order to better accommodate public participation, MDE posts NOI applications and related data into a database that is available on MDE's website
- There is a minimum 45-day public participation period for sites of 3 acres or more of disturbed area and a 30-day period for disturbances of less than 3 acres
- During this time, citizens may ask to review the available erosion and sediment control and stormwater management plans, which can be found at the authorized approval authority's location



On-Site Personnel



Self-Inspection

Additional Federal NOI Requirements



Fuel Storage
Containment



Concrete Wash-Out

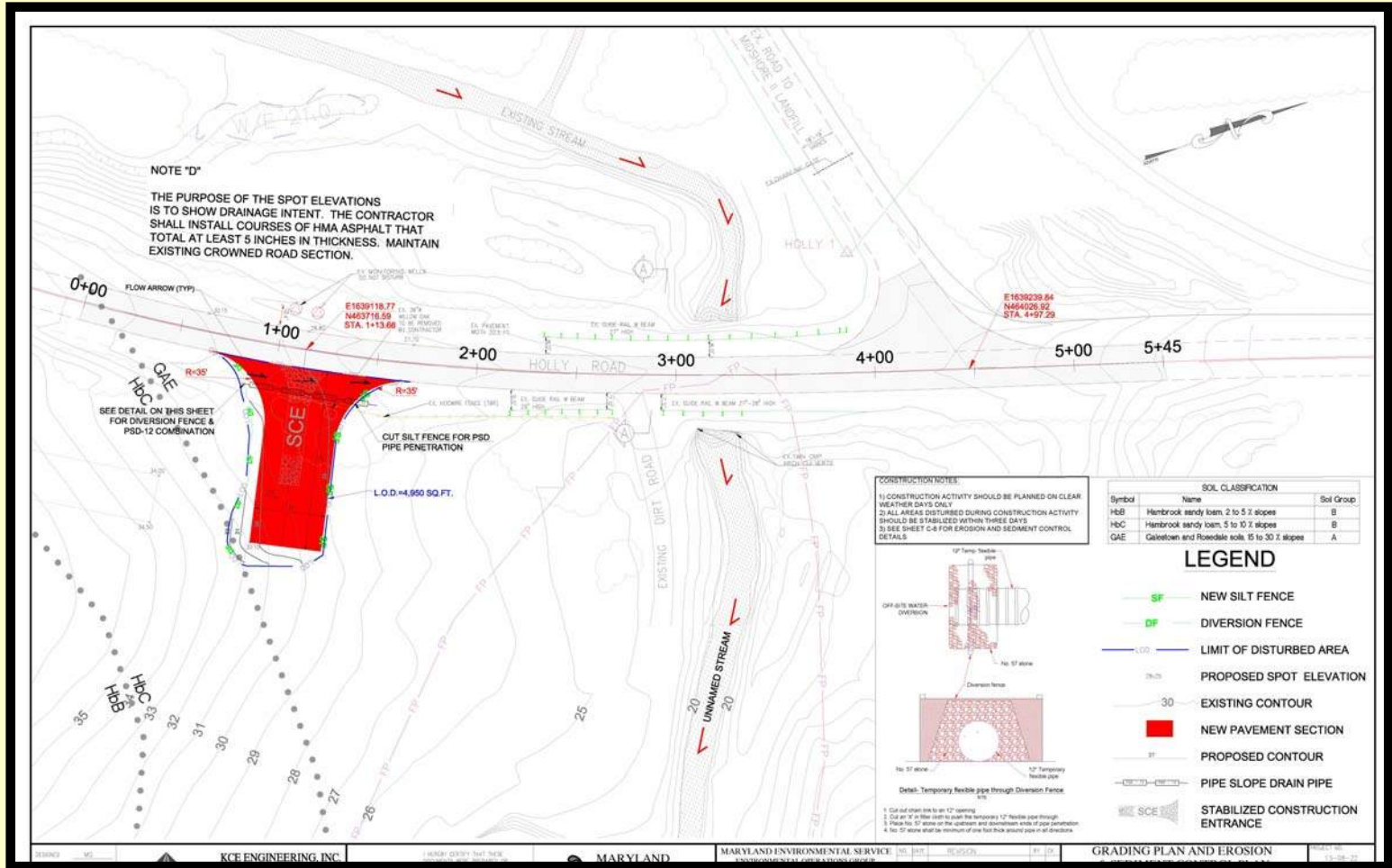


MDE Standard Inspection Form

STANDARD INSPECTION FORM GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

General Information			
Project Name			
Permittee			
NOI #		Date of Inspection	
Start Time		End Time	
Inspector's Name(s)			
Green Card Certification #			
Inspector's Contact Information			
Describe present phase of construction	☐ Clearing/Grubbing ☐ Rough Grading ☐ Infrastructure ☐ Demolition ☐ Building Construction ☐ Final Grading ☐ Final Stabilization		
Notes:			
Type of Inspection: ☐ Weekly routine ☐ Pre-storm event ☐ During storm event ☐ Post-storm event ☐ Due to a discharge of significant amounts of sediment			
Has there been a storm event since the last inspection? ☐ Yes ☐ No			
If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			

Plan Basics





Plan Basics Cont'd

- Areas of special concern (wetlands, streams, buffers, highly erodible soils, steep slopes)
- Existing and proposed topography
- Stormwater drainage patterns and proposed stormwater management
- Proposed grading and earth disturbance
- Limits of disturbance and grading units





Plan Basics Cont'd

- Proposed practices
- Sequence of construction
- Temporary and permanent stabilization requirements
- Inspection requirements and notification
- Plan approval stamp, signature, and date
- Owner/developer certification





Developer's Responsibilities

- Have Certified Responsible Personnel on-site
- Maintain permits and approved plans on-site
- Request inspection prior to starting
 - Pre-construction meeting
- Implement controls per sequence of construction and approved plans
 - Limit initial clearing and grubbing
- Contact the local enforcement authority for modifications when the approved erosion and sediment control plan is not working effectively





Developer's Responsibilities Cont'd

- Maintain controls continually
- Meet stabilization requirements
 - 3 days for perimeter controls and steep slopes
 - 7 days stabilization for all other areas
- Complete self-inspection requirements
 - Weekly and next day after a rain event



Enforcement Agency

- Conduct pre-construction meeting
- Perform on-site inspection with developer's responsible personnel



- Make a complete inspection of the approved plan and controls
- Determine compliance with implementation and maintenance requirements



Enforcement Agency Cont'd

- Write a report of the general findings
- Note any specific violations found
- Indicate enforcement action taken
- Conduct routine and follow-up inspections
- Inspect at least once every two weeks (average)





Inspection Reports

Person Contacted: E. RABO/ E. LLOYD/ D. FARINA/ M. SCHAFER

Type of Site: Residential

Installation ☐ Maintenance ☒ Reinspection ☐ Complaint ☐ Final ☐

A - ADEQUATE I - INADEQUATE

Dikes/Swales - Required	A	I	Silt Fence - Required	A	I	Super Silt Fence - Required	A	I
Location	☒	☐	Location	☒	☐	Location	☐	☒
Compaction	☐	☒	Keyed In	☐	☒	Keyed In	☐	☒
Stabilization	☐	☒	Staked In	☐	☒	Staked In	☐	☒
Maintenance	☐	☒	Maintenance	☐	☒	Maintenance	☐	☒
Storm Drain - Not Required	A	I	#2 Stone Drive - Required	A	I	Stabilization - Required	A	I
Inlet Protection	☐	☐	Size	☐	☒	3 Days	☐	☒
Outlet Protection	☐	☐	Filter Fabric	☐	☒	7 Days	☐	☒
			Maintenance	☐	☒			
Sediment Traps - Not Required	A	I	TSOS / TGOS - Not Required	A	I	Sediment - Required	A	I
Stabilization	☐	☐	Baffle Board	☐	☐	Stabilization	☒	☐
Outfall Protection	☐	☐	Weir Crest	☐	☐	Outfall Protection	☒	☐
Inflow Protection	☐	☐	Maintenance	☐	☐	Inflow Protection	☒	☐
Clean Out	☐	☐	Filter Fabric	☐	☐	Clean Out	☒	☐
Trap Size	☐	☐				Basin Size	☒	☐
Outlet/Crest Size	☐	☐				Dewatering	☐	☒
Maintenance	☐	☐				Maintenance	☒	☐

DETAILS:

- 1.) BASIN #1 : DEWATERING DEVICE IS CLOGGED, REPAIR AS IS REQUIRED TO DEWATER TO ELEVATION 159.20
- 2.) STABILIZE LOTS 353-365, AREA DISTURBED BY UTILITY INSTALLATION AND INSTALL A LENGTH OF S.S.F. TO PREVENT RUNOFF FROM ENTERING PAVED SURFACES ALONG EXISTING BUILDING LOTS.
- 3.) CLEAN THE PUBLIC ROADWAYS OF TRACKING AND INSTALL / IMPROVE SCE'S TO PREVENT TRACKING ONTO THE PUBLIC ROADS. ROADS SHOULD BE KEPT CLEAN TO PREVENT TRACKING OF SEDIMENT AT ALL TIMES

Corrections must be completed by 1/23/2013 or a STOP WORK ORDER will be issued and you could be subject to Civil Penalties.

Inspection Date: 1/16/2013 Reinspection Date: 1/23/2013 Mailed ☐ Emailed ☒ Received By ☐





Cause for Enforcement

- Direct acts of pollution
- Starting construction without an approved erosion and sediment control plans
- Substantial noncompliance with approved plan
- Failure to make corrections
- Recurring minor violations
- Working outside approved limits of disturbance





Progressive Enforcement

- Field investigation report
- Violation notice
- Administrative fine
- Stop work order
- Initiate bond default
- Civil or criminal penalty
- Any action can be taken at any time in the enforcement process

OFFICIAL NOTICE

IT IS THE DEVELOPERS/BUILDERS RESPONSIBILITY TO PREVENT THE FOLLOWING ENVIRONMENTAL VIOLATIONS:

NOTICE

THE TRACKING AND DEPOSITION OF SOIL, GRAVEL, MUD, ETC. ONTO ROADS IS A VIOLATION OF THE MONTGOMERY COUNTY CODE, SECTION 19-16(a).

VEHICLE OPERATORS WHO VIOLATE THIS PROVISION ARE SUBJECT TO PERSONAL SERVICE OF A

\$500 FINE
WITHOUT WARNING.

IT IS THE DEVELOPER/BUILDER'S RESPONSIBILITY TO INSTALL AND MAINTAIN AN EFFECTIVE STONE CONSTRUCTION ENTRANCE AT REQUIRED POINTS OF INGRESS AND EGRESS.

ANY VEHICLE THAT TRAVELS ONTO A ROADWAY FROM AN UNSTABILIZED, GRADED AREA MUST CROSS A STONE CONSTRUCTION ENTRANCE. VEHICLE OPERATORS MUST BE CERTAIN THAT THE VEHICLE'S TIRES ARE CLEANED ADEQUATELY TO PREVENT TRACKING AND DEPOSITION OF SOIL OR OTHER MATERIAL ONTO ROADWAYS.

*** POST AT CONSTRUCTION OFFICES/TRAILERS ***

THE SUBCONTRACTOR(S).

THIS NOTICE IS THE ONLY WARNING YOU WILL RECEIVE.

Violations* to prevent particulate emissions. Reasonable precautions are

STOP WORK

FOR THE FOLLOWING VIOLATION(S)

Failure To Observe This Order - Defacing Or The Removal Of This Sign By Any Person Or Persons Will Be Prosecuted To The Full Extent Of The Law.

litter at all times.

REGULATIONS WILL RESULT IN THE GENERAL CONTRACTOR AND





Progressive Penalties

- Administrative (\$1,000 per violation)
 - Sediment Control Law
- Bond default and mitigation
 - provided for in local ordinances
- Civil (\$10,000 and 1 year prison term)
 - Sediment Control Law
- Criminal (\$50,000 and 1 year prison term)
 - Sediment Pollution Law





Course Outline -- Part 2

- Maryland's Standards and Specifications
 - Planning and design
 - Grading and Stabilization
 - Water Conveyance
 - Erosion Control
 - Filtering
 - Dewatering
 - Sediment trapping
 - Miscellaneous



Environmental Site Design



- The Stormwater Management Act of 2007 defines Environmental Site Design (ESD) as using small-scale stormwater management practices, non-structural techniques, and site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources.



Planning Principles

- Plan the development to fit the site
- Protect natural resources
- Avoid steep slopes and highly erodible soils
- Minimize disturbed area
- Stabilized exposed soils as soon as practicable
- Control and manage all runoff
- Protect perimeter areas and retain sediment on-site
- Make provisions for inspecting and maintaining sediment controls





Design Steps

- Identify existing drainage patterns, drainage boundaries, and slopes
- Identify areas of special concern
- Fingerprint site and layout development
- Determine phasing requirements and select initial erosion and sediment controls
- Identify interim and final drainage patterns as the project proceeds and select appropriate controls
- Prepare the sequence of construction



Grading Unit

- A grading unit is the maximum contiguous area allowed to be graded at a given time and is limited to 20 acres
- A Project is to be sequenced so that grading activities begin on one grading unit at a time



Grading Unit Cont'd

- Work may proceed to a subsequent grading unit when at least 50 percent of the disturbed area in the preceding grading unit has been stabilized and approved by the enforcement authority
- No more than 30 acres cumulatively may be disturbed at a given time



The Sequence of Construction

RESIDENTIAL PLANNED UNIT DEVELOPMENT
BOULEVARD - ROAD FRONTAGE IMPROVEMENTS
FINAL GRADING PLANS

SEQUENCE OF CONSTRUCTION

PHASE I

1. CONDUCT PRE-CONSTRUCTION MEETING. NOTIFY THE DEPARTMENT OF INSPECTIONS AT LEAST 48 HOURS BEFORE COMMENCING WORK AT (410) 222-7780. WORK MAY NOT COMMENCE UNTIL THE PERMITEE OR THE RESPONSIBLE PERSONNEL HAVE MET ON SITE WITH THE SEDIMENT AND EROSION CONTROL INSPECTOR TO REVIEW PLANS. 1 DAY
2. PRIOR TO DISTURBANCE OR CONSTRUCTION, THE LIMIT OF DISTURBANCE SHALL BE STAKED IN AREAS DIRECTED BY THE INSPECTOR. SEE "UTILITY CONSTRUCTION OUTSIDE SEDIMENT CONTROL PRACTICES" NOTE THIS SHEET FOR AREAS OF UTILITIES. STAKES ARE TO BE LEFT IN PLACE FOR THE DURATION OF CONSTRUCTION OUTSIDE OF SEDIMENT CONTROL MEASURES. 3 DAY
3. INSTALL STABILIZED CONSTRUCTION ENTRANCES, REINFORCED SILT FENCE, TREE PROTECTION DEVICES, AND MULCH BED CONSTRUCTION. 5 DAY
4. AFTER INSTALLATION OF SEDIMENT CONTROL MEASURES, CONTRACTOR TO NOTIFY ENGINEER TO OBTAIN CERTIFICATION OF SEDIMENT CONTROL MEASURES. UPON APPROVAL BY ANNE ARUNDEL COUNTY INSPECTOR AND AASCD OF PHASE I SEDIMENT CONTROL MEASURES, CONTRACTOR MAY PROCEED TO PHASE II. SEDIMENT CONTROLS MAY BE ADJUSTED THROUGHOUT THE PROGRESS OF CONSTRUCTION WITH THE COORDINATION AND APPROVAL OF THE COUNTY INSPECTOR AND AASCD. 2 DAY

PHASE II

1. INSTALL TRAFFIC CONTROL DEVICES. 2 DAYS
2. INSTALL THE PROPOSED WATER AND SEWER MAINS. ONLY DISTURB THAT AREA WHICH CAN BE BACKFILLED AND STABILIZED IN ONE WORK DAY. 4 WEEKS
3. CONSTRUCT THE OF PROPOSED ROAD WIDENING, PROPOSED STORM DRAINS, AND ROADSIDE SWALE. STABILIZE SWALE WITH SEED AND EROSION CONTROL MATTING. INSTALL STONE CHECK DAMS IN SWALE AND STABILIZE DISTURBED AREAS IMMEDIATELY AS WORK PROGRESSES. 4 WEEKS
4. INSTALL SIDEWALK AND LANDSCAPING. 2 WEEKS
5. STABILIZE DISTURBED AREAS IN ACCORDANCE WITH AASCD DETAILS AND SPECIFICATIONS FOR VEGETATIVE ESTABLISHMENT. 2 DAYS
6. WITH APPROVAL FROM THE GRADING INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES. 2 DAYS

NOTE:

1. THE CONTRACTOR MAY WORK ON STEPS 2 & 3 OF PHASE II SIMULTANEOUSLY.
2. EXCAVATED TRENCH MATERIAL SHALL BE PLACED ON UPHILL SIDE OF TRENCH.
3. MECHANICALLY STABILIZE HEAVY USE AREAS AT THE END OF EACH WORK DAY (STAGING AREAS, LAY-DOWN AREAS AND TRAVEL LANES.) ALL AREAS BEING PERMANENTLY STABILIZED WITH VEGETATION SHALL BE PER AASCD DETAILS FOR VEGETATIVE ESTABLISHMENT.
4. IMMEDIATELY FOLLOWING PIPE INSTALLATION THE TRENCH SHALL BE BACKFILLED, COMPACTED, AND STABILIZED (MULCH, SEEDED, SODDED, AND/OR MECHANICAL STABILIZATION) AT THE END OF EACH WORK DAY.
5. ALL SLOPES GREATER THAN 3:1 SHALL BE STABILIZED IMMEDIATELY WITH CURLEX OR EQUIVALENT. NO SLOPES SHALL EXCEED 2:1.
6. CONTRACTOR SHALL MINIMIZE DISTURBED AREA AS MUCH AS PRACTICAL APPLYING TEMPORARY STABILIZATION TO AREAS THAT ARE LEFT UNTOUCHED FOR (7) CALENDAR DAYS.
7. CONTRACTOR SHALL INSPECT AND MAINTAIN SEDIMENT CONTROL MEASURES, AS NECESSARY, AFTER EACH RAIN EVENT.
8. ALL SEDIMENT AND EROSION CONTROL PRACTICES AND VEGETATIVE STABILIZATION SHALL BE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
9. CONTRACTOR SHALL NOT GRADE OR CLEAR OUTSIDE THE LIMIT OF DISTURBANCE AS SHOWN ON THESE PLANS.

GENERAL

1. TOTAL
2. PROPER
3. PUBLIC
4. PUBLIC
5. PREDI
6. SEDIM
7. PLACE
8. ALL
9. COUR
10. STA
11. DAT
12. SH
13. DE
14. EN
15. DI
16. F

STATEMENT

PERMITS IS 8,100 CUBIC FEET. THE CSO REQUIREMENTS FOR



Sequence of Construction (typical)

1. Contact enforcement authority for a pre-construction meeting
2. Limit clearing and grubbing to only that area necessary for initial implementation of perimeter sediment controls
3. Install and stabilize perimeter controls
4. Request inspection of controls
5. Clear and grub within installed perimeter controls
6. Install and stabilize remaining sediment controls
7. Request inspection of controls





Sequence of Construction Cont'd

8. Install utilities
9. Grade site
10. Construct buildings and roads
11. Complete grading, landscaping, and stabilization
12. Request inspection prior to removal of controls
13. With approval, remove sediment controls
14. Stabilize areas disturbed by removal of sediment controls
15. Repeat sequence for subsequent grading units/phases



Maintenance

- **Example #1 silt fence:** Accumulated sediment and debris must be removed when bulges develop in the silt fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torn. If undermining occurs, reinstall fence.



Maintenance Cont'd

- **Example # 2 earth dike:** The line, grade, and cross section must be maintained. Accumulated sediment and debris must be removed and positive drainage maintained. The earth dike and point of discharge must be kept free of erosion and continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization.



Maintenance Cont'd



- **Example # 3 inlet protection:** Storm drain inlet protection requires frequent maintenance. To maintain function and avoid premature clogging, accumulated sediment needs to be removed after each rain event. If the inlet protection does not completely drain within 24 hours after a storm event, it is clogged. When this occurs, remove accumulated sediment and clean, or replace the geotextile and stone.

