

Erosion and Sediment Control Training for Contractors
May 30, 2013
Newport News Waterworks

12:00 Check-in and lunch

12:30 Welcome and Introduction to E and S – Noah Hill, DCR

1:00 Local Inspector Perspectives - Common Violations and Remedies.

Seamus McCarthy, City of Norfolk

- construction entrance
- inlet protection
- silt fence
- dewatering
- street sweeping

Erin Belt, Isle of Wight County

- sediment trap basins
- diversions

2:15 Break

2:30 E and S on State and linear projects – Ian Edwards, DCR

3:00 Local Perspectives Continued

Jason Trimyer, City of Suffolk

- tree protection
- topsoiling and seeding

3:30 Revised Stormwater Regulations – Noah Hill, DCR

4:00 Wrap-up

Introduction to the Virginia Erosion & Sediment Control Program

**Noah M. Hill,
Regional Manager**

History of the E&S Program



Geologic Erosion-The natural process



Water,



.....*wind,*



..... *ice,*

Freezing and thawing action results in detachment of soil particles



and by gravity.



Accelerated Erosion (Human Induced Process 70%)

- *Geologic rate increased by man's intervention*
- *70% all erosion*



Major “Activities” that cause Accelerated Erosion

- *Surface Mining*



Major “Activities” that cause Accelerated Erosion

- *Forestry*



Major “Activities” that cause Accelerated Erosion

- *Agriculture*



Major “Activities” that cause Accelerated Erosion

- *Urban Construction*



Sediment Production

- *Rate of erosion is greater per acre on urban construction projects.*

Sediment Volume

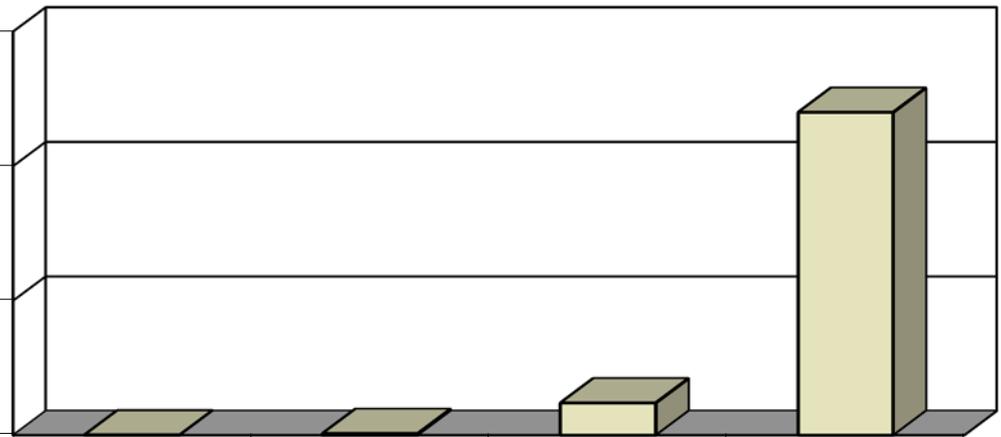
□ T/SqMi/Y

60000

40000

20000

0



□ T/SqMi/Y

Forest

Grass

Crop

Const

24

240

4,800

48,000

Law History

- **Public Law 46-Established the Soil Conservation Service**
- **Soil & Water Conservation Districts (SWCD) were established under the Franklin D. Roosevelt administration.**
- **VA Soil and Water Conservation District Law (Title 21) 1938**
- **Mainly concerned with agricultural practices**
- **Voluntary programs were not very effective**

Law History

- **Urban areas began to adopt local E&S ordinances to control erosion on construction sites. - Fairfax County was the first.**
- **1973 - VA Erosion and Sediment Control Law as addendum to the 1938 Law - was re-codified to Title 10 of the Code of Virginia**

1973 E&S Law

- **The Law required the Soil & Water Conservation Commission to establish criteria to control erosion**
- **Localities/districts had to develop local E&S programs (164)**
- **Counties, Towns, Cities**

Mid-1980's

- **General Assembly (GA)- was given evidence of the need to improve the structure & implementation of the local and state programs**
- **Results - 1986 Appropriations Act**

1986 Appropriations Act

- **Required DSWC to conduct a review of local compliance with the E&S Law**
- **The Department produced a report which became House Document 15 and was presented to the GA in 1987**
- **1988 Law change required the SWC Board to promulgate regulations for controlling erosion**

1993- E&S Law

- **General Assembly strengthened the Law**
- **The Soil and Water Conservation Board could decertify the local program if deficient**

1995- E&S Law

- **New regulations**
- **Added certification program**
- **Better outlined the enforcement process**

2001 Amendment

Effective July 1, 2001

A Certified Responsible Land Disturber (RLD) must be named as a prerequisite to plan approval. The RLD is the person who is in charge of and responsible for carrying out the land disturbing activity.

2003 Amendment

Effective July 1, 2003

A Certified Responsible Land Disturber (RLD) must be named as a prerequisite to engaging in land disturbing activities. The RLD is the person who is in charge of and responsible for carrying out the land disturbing activity in accordance with the approved E&S plan.

2003 Amendment

Effective July 1, 2003

Plan-approving authorities have the option to waive the RLD requirement for an agreement in lieu of a plan for construction of a single family residence provided that no erosion and sediment control violation occurs. If a violation occurs, then the person responsible for carrying out the agreement in lieu of a plan shall correct the violation and provide the name of an RLD.

2012 Integration Bill (House Bill 1065)

- **Amends and Reenacts:**
 - (1) The Erosion and Sediment Control Act;**
 - (2) The Chesapeake Bay Preservation Act; and**
 - (3) The Stormwater Management Act**
- **The amendments remove contradictions between the three acts and provides a definitions section that is applicable to all three acts.**

Basic Program Concept

- **Anyone wishing to disturb land must prepare an erosion and sediment control plan that satisfies certain minimum standards.**
- **The plan must be submitted and approved.**
- **Compliance with the approved plan and Minimum Standards must be adhered to.**

State and Local Program Implementation

- ***Virginia delegates powers to localities through the Virginia Constitution.***
- ***Localities can only exercise powers and authority granted to them by state law.***
- ***Localities must carry out duties and responsibilities mandated to them.***
- ***This legal approach is known as “Dillon’s Rule”.***

State and Local Program Implementation

- ***All local programs must be approved by the Virginia Soil & Water Conservation Board and have been designated as a Virginia Erosion and Sediment Control Program (VESCP)***
- ***Each local program must meet minimum requirements set forth by the law and the Virginia Erosion and Sediment Control Regulations.***

State and Local Program Implementation

- ***The Department of Conservation & Recreation periodically evaluates each local E&S program for effectiveness and consistency with the law and regulations.***
- ***This process is known as a Program Review.***

Four components of a local program

- 1) Administration***
- 2) Plan Review***
- 3) Inspection***
- 4) Enforcement***

Local E&S Programs Enforcement

10.1-562-1

- ***Allows local programs to adopt an ordinance providing for Civil penalties in lieu of criminal sanctions for violations.***
 - ***Civil penalty for any one violation with an approved plan shall be \$100 to 1,000 per day , with a max. total of \$ 10,000***

Regulated Activities & Overview of the E&S Law

- ***Intent of the law is to regulate most construction-related land-disturbing activities exceeding 10,000 square feet in area***
- ***Localities may choose to make this more restrictive (ex. Chesapeake Bay Act requirements)***

..... clearing



..... grading,



..... excavating,



.....transporting,



.....and filling of land.



But shall not include:

Minor land-disturbing activities such as home gardens, landscaping, repairs and maintenance work.

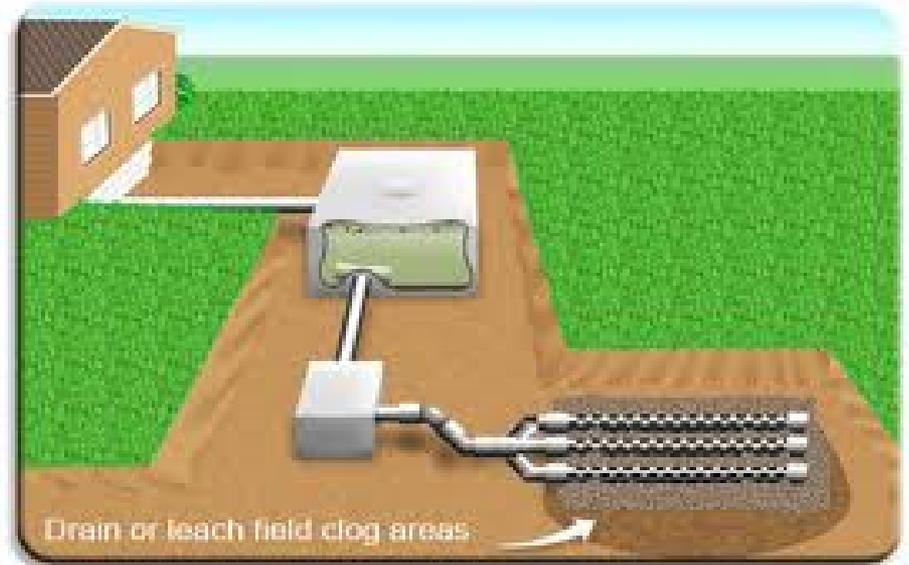


Individual Service Connections



– Installation, maintenance or repair of any underground public utility lines on an existing hard surface road, street or sidewalk confined to that area

–Septic tank or drainage field lines unless included in an overall plan



Permitted Surface or deep mining*



***Permitted* exploration or drilling for oil or gas
including the well site, roads, feeder lines
and off site disposal***



Tilling, planting, or harvesting of agricultural or horticultural, or forest crops, feeder lot operations; engineering operations, or as additionally set forth by the Board in regulation*



Repairing or rebuilding of tracks, right-of-ways, bridges, etc. of a railroad company



Agricultural engineering operations- "terraces, de-silting basins, contour cultivating, irrigation ponds..."



Disturbed land of less than 10,000 square feet, or 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation government authority may reduce this amount



Installation of fence or sign posts



Shore erosion control projects on tidal waters – when within the regulatory authority of local wetlands boards, COE, VMRC; but outside of exempted area – activity subject to ESC law



***Emergency work to protect life, limb, or property -
other approval***



State Agency Projects

- ***State agencies are required to submit E&SC (and Stormwater) plans to DCR for approval.***
- ***If federal entities submit plans, work can not start before the plans have been reviewed and approved.***
- ***Department 60 days for plan review***

State Agency Projects

- ***State agency are responsible for compliance with approved plans.***
- ***DCR is responsible for inspections and enforcement.***
- ❖ ***State and federal agencies are required to comply with more stringent local program standards.***

Annual Standards and Specifications

- ***Allows state & federal agencies, gas and utility companies to review plans and conduct inspections***
- ***DCR provides oversight, enforcement, compliance review and evaluation.***
- ***Must be approved by the SWCB***
- ❖ ***Submission of AS&S DOES NOT eliminate the need for project specific erosion and sediment control plans – VAC50-30-30B***

Questions?



Contact Information

Noah M. Hill

Regional Manager

DCR-DSWM

Noah.hill@dcr.virginia.gov

757-925-2392

Bureau of Environmental Services



Overview of Regulatory Programs

Seamus McCarthy – Environmental Engineer
Odell Glenn – Construction Inspector II



Regulatory Programs

- Wetlands & Sand Dunes/Beaches
- Chesapeake Bay Preservation
- Erosion & Sediment Control

What is a Wetland?

- ▶ Wetlands Vegetation
- ▶ Wetlands Hydrology
- ▶ Wetland Soils



Why Are Wetlands Important?



Tidal Wetlands: intertidal zone



Spartina alterniflora
(saltmarsh cordgrass)

Tidal Wetlands: high marsh



Tidal Wetlands: high marsh vegetation



01/11/2007

Tidal Wetlands: Forested Ditch



Typical "Landscape" Violations

Mowing



Typical "Landscape" Violations Fill



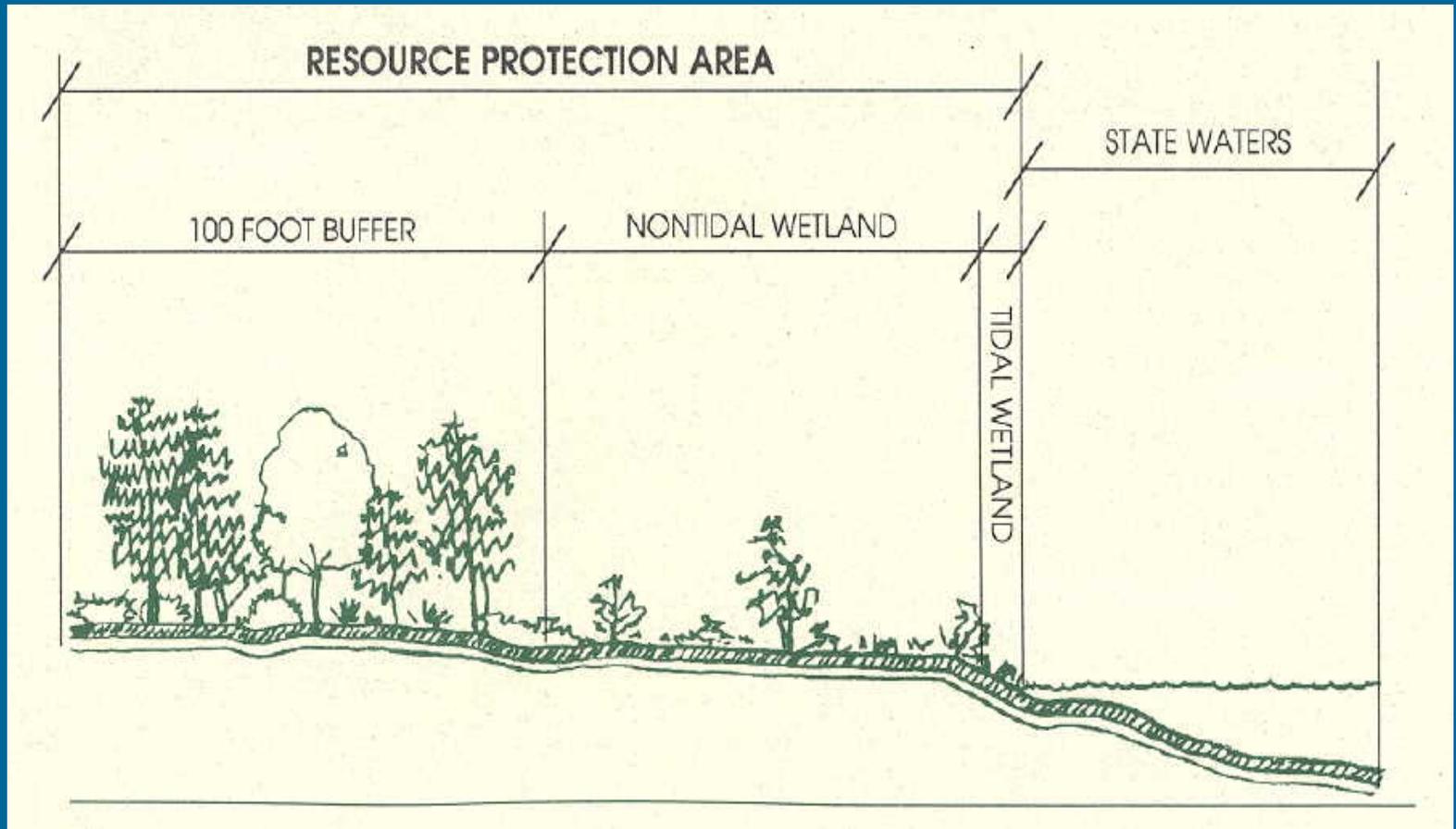
Chesapeake Bay Preservation Areas Program



- State-mandated program
- Goal – To protect water quality
- Regulates new development & redevelopment
- Protects wetlands & buffers



Chesapeake Bay Preservation Area (CBPA)



CBPA 100' BUFFER



CBPA BUFFER



CBPA Features



Buffer Area

CBPA RPA Buffer Violations



CBPA RPA Buffer Violations



Erosion & Sediment Control Program



- State-mandated program
- Goal – To prevent erosion of land and degradation of state waters
- Regulates land disturbances greater than 2,500 sq. ft.
- Program applies city-wide

No Erosion Control



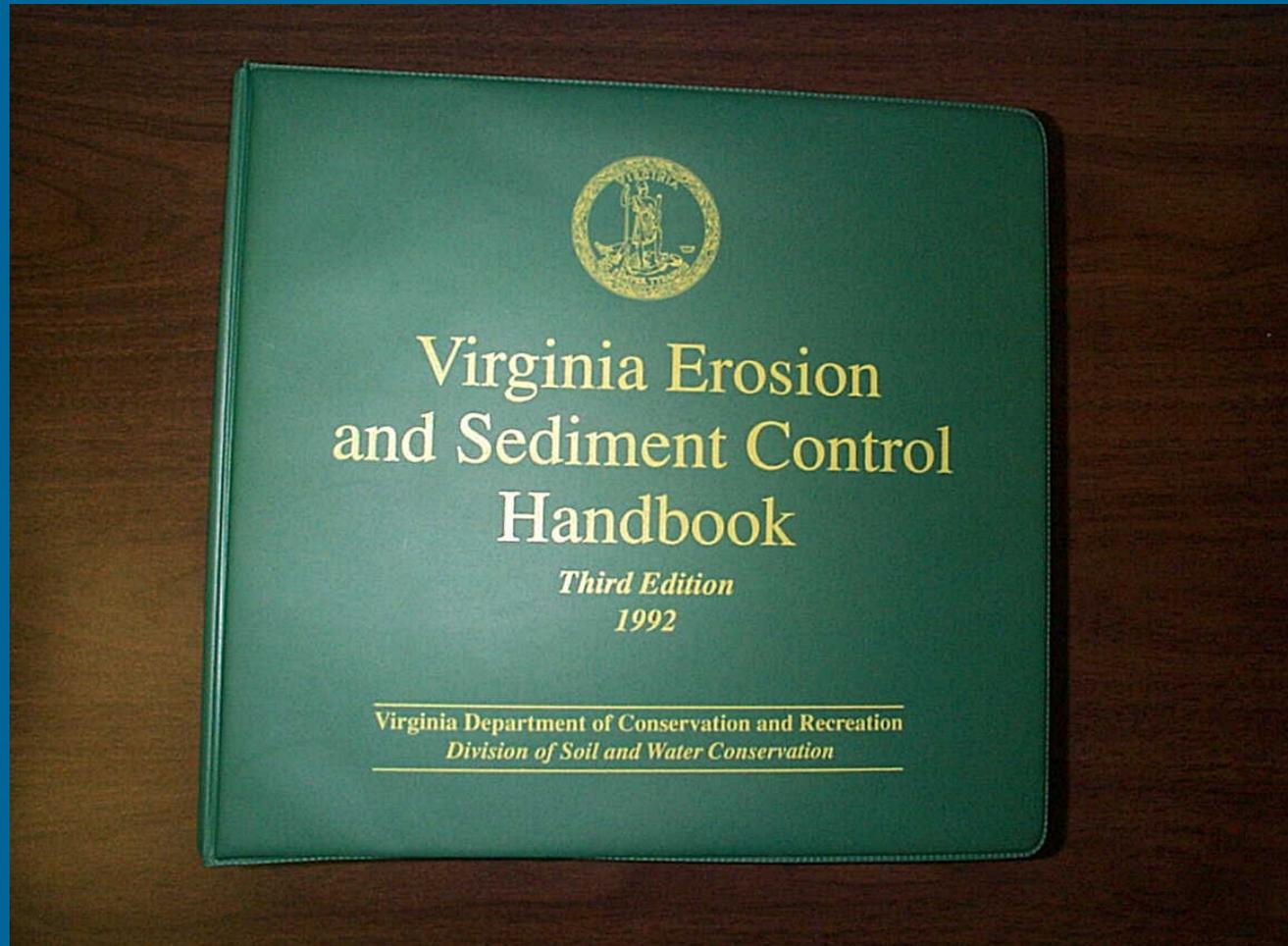
Sediment Entering Storm Drain System



Sediment Entering Creek



Erosion & Sediment Control Handbook



City of Norfolk E&S



City of Norfolk Standard Erosion & Sediment Control Notes

1. Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook (3rd Edition, 1992) and the City of Norfolk erosion and sediment control ordinance.
2. The contractor shall contact the City of Norfolk, Bureau of Environmental Services (664-4368) at least 48 hours prior to any land disturbing activity (including demolition) so that a preconstruction conference can be scheduled.
3. The contractor shall apply permanent or temporary soil stabilization to all denuded or disturbed areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded or disturbed areas which may not be at final grade but which will remain undisturbed for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
4. All erosion and sediment control measures are to be placed prior to or as the first step in construction.
5. The contractor shall inspect all erosion control measures periodically and after each runoff producing rainfall event. Any necessary repairs to maintain the effectiveness of the erosion control devices and cleanup of sedimentation are the responsibility of the contractor and shall be made immediately.
6. The contractor shall limit site access by construction vehicles to entrances protected by a stone construction entrance (VESCH Std. & Spec. 3.02) or an approved comparable control measure. Sediment shall be removed from paved areas on a daily basis.
7. Stock piles of soil and other erodible materials shall be stabilized or protected with sediment trapping measures. The contractor is responsible for the temporary protection and permanent stabilization for stockpiles on site as well as for materials transported from the project site.
8. The contractor shall monitor and take precautions to control dust including (but not limited to) use of water, mulch, or chemical dust adhesives and control of construction site traffic.
9. Effluent from de-watering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect adjacent properties, wetlands, waterways or the storm drainage system.
10. The contractor is responsible for installation and maintenance of any additional control measures necessary to prevent erosion and sedimentation as determined necessary by the plan approving authority.
11. Temporary erosion and sediment control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.

EPA Fines

Local developer agrees to pay \$9,700 in EPA settlement

BY SCOTT HARPER
THE VIRGINIAN-PILOT

VIRGINIA BEACH — A local developer, Bishard Development Corp., has agreed to pay \$9,700 to settle federal environmental violations discovered last year at a Virginia Beach site where the Coastal Walk Condominiums were being built.

According to a settlement released Wednesday by the U.S. Environmental Protection Agency, contractors hired by Bishard Development did

not follow anti-pollution plans for keeping dirt, mud, oil and debris from washing off the site and tainting a small creek feeding Linkhorn Bay.

The agreement does not say whether any environmental damage resulted from the violations, only that multiple infractions of storm water and sediment-control rules were noted during an August 2004 inspection of the site on Old Virginia Beach Road.

Acting on a complaint, EPA officials found inadequate silt fences that are supposed to

EPA officials found inadequate silt fences that are supposed to block muddy runoff, unprotected piles of dirt, a poorly maintained sediment trap and no proof that required self-inspections had been done.

block muddy runoff, unprotected piles of dirt, a poorly maintained sediment trap and no proof that required self-inspections had been done, according to the settlement.

Bishard Development has 180 days to pay the \$9,700 penalty, which the company

will do in six installments, the settlement said.

The company's president, Steven Bishard, signed the settlement last month. He did not return phone messages seeking comment Wednesday.

The EPA said the company "fully cooperated" and took

"prompt action" to comply with the Clean Water Act once the violations were outlined.

Regulating sediment and storm water pollution from construction sites used to fall to the Virginia Department of Environmental Quality. That changed last year, when the task was shifted to the Virginia Department of Conservation and Recreation, as directed by state lawmakers.

The EPA got involved in this case because the federal agency was contacted directly by the complainant. The agency

then contacted the state, and the two entities jointly visited the property, officials said.

Sediment can make waterways more shallow and smother aquatic life. Storm water carries such mud to public waters, as well as any fertilizers, oils, chemicals and nutrients on the land. The two pollutants are considered major obstacles to a healthier Chesapeake Bay.

■ Reach Scott Harper at (757) 446-2340 or at scott.harper@pilotonline.com.

EPA Fines

Friday Hampton Roads | 10.14.11 | THE VIRGINIAN-PILOT | PAGE 5

SANCTIONS

Company to pay \$51K fine for environmental errors

By Scott Harper
The Virginian-Pilot

CHESAPEAKE

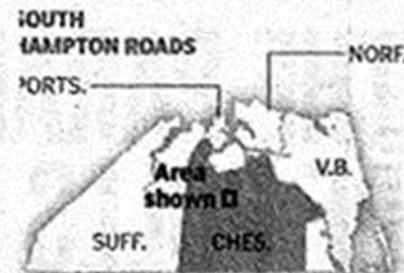
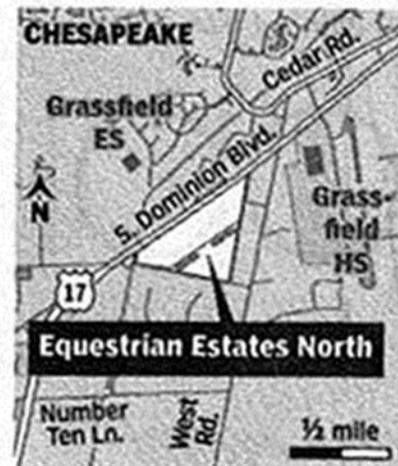
A development company has agreed to pay a federal fine of \$51,000 for various environmental violations at a new-housing site near New Mill Creek, a branch of the Elizabeth River.

Dominion Boulevard Partners LLC, based in Virginia Beach, is paying the fine, sought by the U.S. Environmental Protection Agency, because "it was either pay

ply omitted by the company.

EPA inspectors last year discovered problems at the site, known as Equestrian Estates North, on West Road off Dominion Boulevard, chiefly in how stormwater was being handled in a man-made pond and how required fencing was not adequate to block dirt and sand from washing into a nearby canal.

In one instance, a big stockpile of sand was supposed to be surrounded with a silt fence, but according to records, no fencing existed.



SOURCES: ESRI, Tele Atlas

VP

Before Land Disturbance



1. Must have an **approved site plan** or a **land disturbing permit**.
2. If lay down area is not shown on approved plan contractor must contact Environmental Services to identify E&S controls to be utilized and obtain land disturbing permit.
3. Preconstruction conference at the site with Environmental services. All E&S controls must be in place. Responsible land disturber must be identified.
4. VSMP permit required if land disturbance is over an acre or greater than 2500 sq ft in CBPA (look at cover sheet).

Preconstruction Conference

- Look at installed E&S plan to make sure it complies with approved plan
- Identify Responsible Land disturber
- Go over City E&S policy & expectations during construction

Responsible Land Disturber



Construction Site Information Form

Project name: _____ Date: _____

Project Address: _____

Site Plan Number: _____ Land Disturbance: _____

Responsible Land Disturber (R.L.D.) Notification

The following person _____ (print),

_____ (sign), is identified as responsible for carrying out the land disturbing activity associated with the above-referenced project. This person meets the applicable requirements of Virginia Code Section 10.1 - 563 and 10.1 - 566 by virtue of the following:

Check the category that applies

_____ Responsible Land Disturber Certificate

OR

_____ DCR Certification for Combined Administrator,

OR

_____ Administrator, Plan Reviewer, Inspector, or Contractor

_____ VA Professional Engineer, Land Surveyor, Landscape Architect, or Architect.

R.L.D. contact information:

Company Name: _____

Address: _____

City / State / Zip: _____

Phone #: _____ Cell #: _____

Fax #: _____ Email: _____

VSMP Approval Letter

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-1712
December 21, 2011

W.F. Magann Corporation
c/o Chris Donnelly
3220 Mariner Ave
Portsmouth, VA 23703

RE: VSMP Construction Stormwater General Permit No. VAR10-12-100887, BAE Systems Norfolk Ship Repair - Commercial - 750 West Berkley Ave. - Norfolk

Dear Christopher E. Donnelly:

The staff has received your registration statement for the proposed land-disturbing project under the VSMP General Permit for Discharges of Stormwater from Construction Activities (VAR10) on 12/19/2011. The project's date of coverage is either the date in which you receive this letter or fifteen business days after the postmark date of the project's complete registration packet submittal to DCR.

By submission of the registration statement, you acknowledge that the proposed project is eligible for coverage under the General Permit and you have agreed to the conditions in the General Permit including any applicable conditions regarding Total Maximum Daily Loads and impaired waters. Please be aware that § 10.1-603.8:1 of the Code of Virginia and the General Permit contain additional requirements if nonpoint nutrient offsets are chosen to meet the post-development nonpoint nutrient runoff compliance requirements. Section § 10.1-603.8:1 I requires that the permit issuing authority require that nonpoint nutrient offsets or other off-site options achieve the necessary nutrient reductions **PRIOR TO THE COMMENCEMENT OF THE PERMITTEE'S LAND DISTURBING ACTIVITY.**

A copy of the General Permit is available on the DCR web page at http://www.dcr.virginia.gov/soil_and_water/documents/vsmgpermvar10.pdf. Print the VAR10 permit and read it carefully as you are responsible for meeting all the permit conditions. The General Permit will expire on June 30, 2014.

Your project specific permit registration number is **VAR10-12-100887**. A copy of this permit coverage letter, registration statement, copy of the VAR10 permit, and the project's stormwater pollution prevention plan (SWPPP) must be at the construction site from the date of commencement of the construction activity to final stabilization. In addition, DCR staff conducts periodic site inspections for compliance with the permit.

Additional information on the permit and DCR staff contact information are available at http://www.dcr.virginia.gov/soil_and_water/vsmg.shtml on the DCR web page.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Douglas Fritz".

J. Douglas Fritz
Stormwater Permits Manager

E&S Compliance

- Perimeter control – Silt Fence containing limits of disturbance
- Construction Entrance at job site and lay down Areas
- Street Sweeping
- Inlet protection
- All dewatering must be filtered
- Stockpile area- separate perimeter control
- Site Stabilization

Dewatering



No Filter bag



No Filter bag



Extended Dewatering - No check dams



Wrong Size Filter bag



Dewatering causing erosion



Filter bag in Stone



Ineffective Filter bag



Dewatering through stockpile



Dewatering to nearest inlet



Dewatering to nearest inlet



No Filter bag



01/31/2012

No Filter bag



01/31/2012

Dewatering in Creek



Dewatering in Creek



Filter bag in Creek



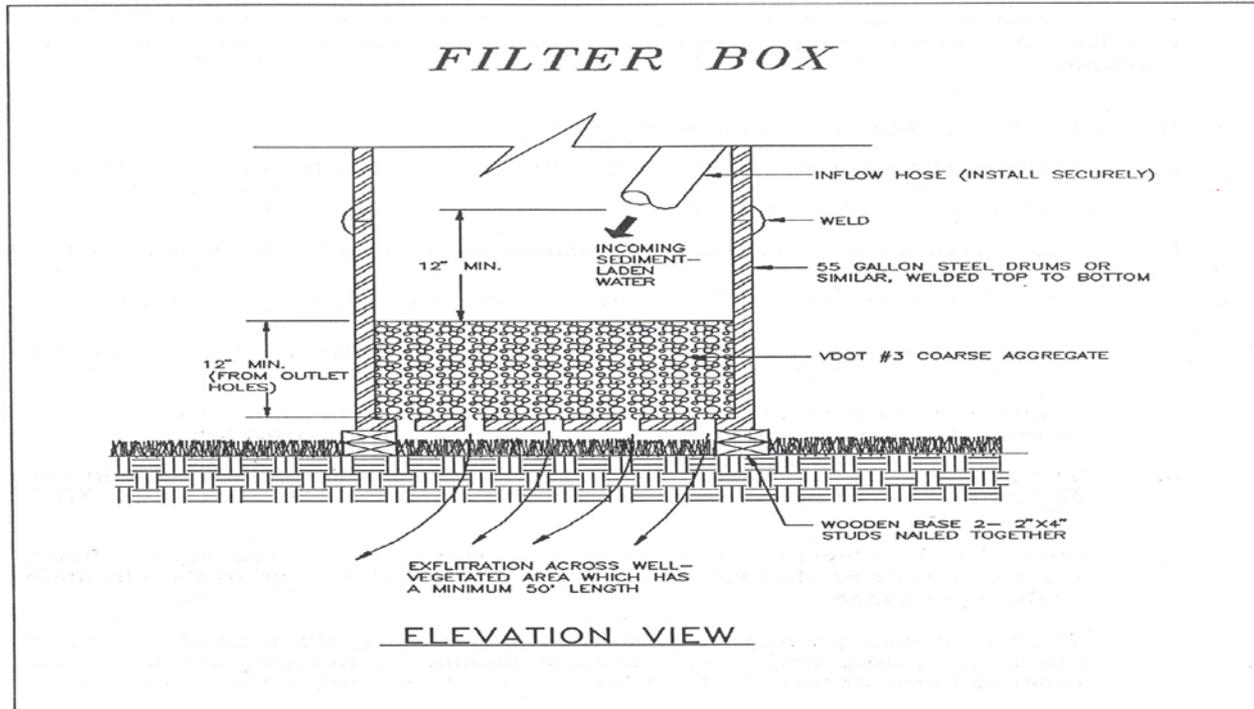
Filter bag in Creek



Filter Box

1992

3.26



Source: Va. DSWC

Plate 3.26-2

- h. Clean-out of the box is required once one-third of the original capacity is depleted due to sediment accumulation. The tank shall be clearly marked showing the clean-out point.
- i. If the stone filter does become clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and replaced.

Settling tanks



Settling tanks



Settling tanks



Silt Fence



E&S Good Example



Properly Installed Silt Fence

Silt Fence Installed incorrectly



Stakes on wrong side of silt fence

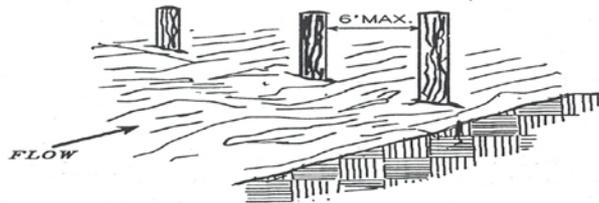
Installing Silt Fence

1992

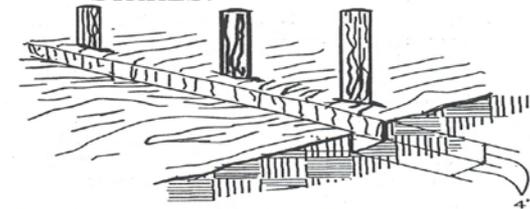
3.05

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

1. SET THE STAKES.



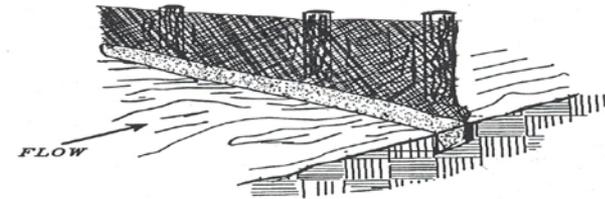
2. EXCAVATE A 4" X 4" TRENCH
UPSLOPE ALONG THE LINE OF
STAKES.



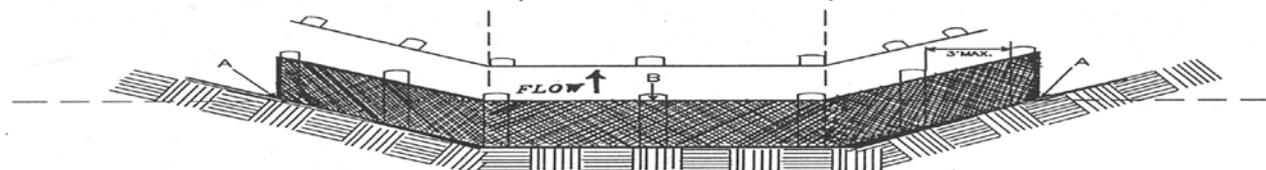
3. STAPLE FILTER MATERIAL
TO STAKES AND EXTEND
IT INTO THE TRENCH.



4. BACKFILL AND COMPACT
THE EXCAVATED SOIL.



SHEET FLOW INSTALLATION (PERSPECTIVE VIEW)



POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant

Plate 3.05-2

Improperly Installed Silt Fence



No Silt Fence



No Silt Fence



Ineffective Silt Fence



E&S Bad Example



Controlling Vehicle Access

E&S Good Example



04 04 2005

Properly Installed Silt Fence



Properly Installed Silt Fence



Properly Installed Silt Fence

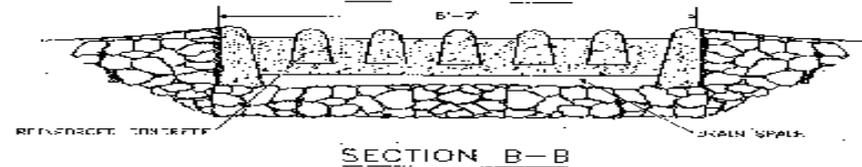
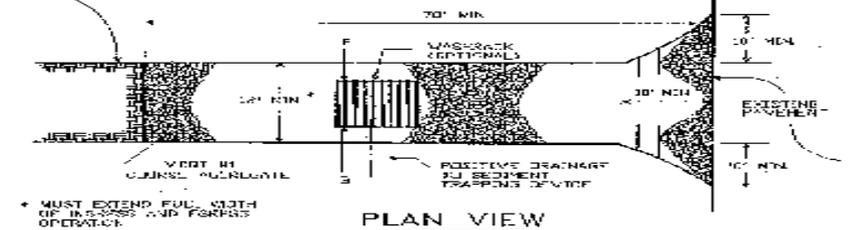


Construction Entrance

1992

3.02

STONE CONSTRUCTION ENTRANCE



Source: Adapted from 1983 Maryland Standards for Soil Erosion and Sediment Control, and Va. DSWC

Plate 3.02-1

Construction Entrance



Construction Entrance



Stone in gutterpan
vs. soil

04/04/2011

Ineffective Construction Entrance



05/04/2012

Ineffective Construction Entrance



Ineffective Construction Entrance



Construction Entrance



Construction Entrance



Construction Entrance



Construction Entrance



Construction Entrance



Loading on pavement to prevent tracking

Sediment Tracking Onto Street



Sediment Tracking onto City Streets



- **Sediment must be swept on a daily basis**
- **State minimum Standard and City E&S Code**

Tracking

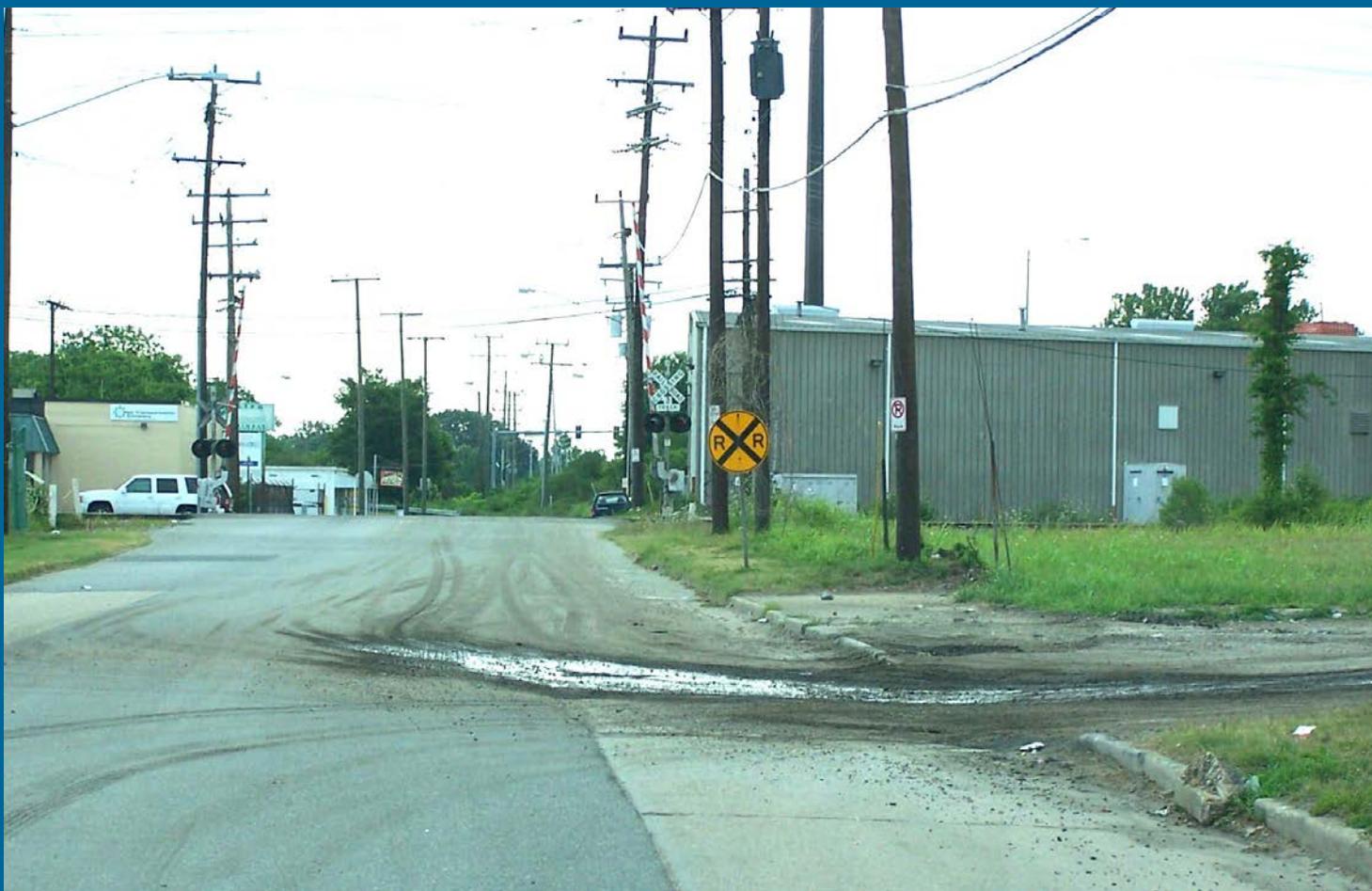


Tracking



07/12/2012

Tracking



Tracking



Tracking



06/25/2012

Tracking



07/19/2012

Tracking



Tracking



Sweeping Street



E&S Good Example



Street Sweeper

E&S Good Example



Street Sweeper with collection attachment

Inlet Protection

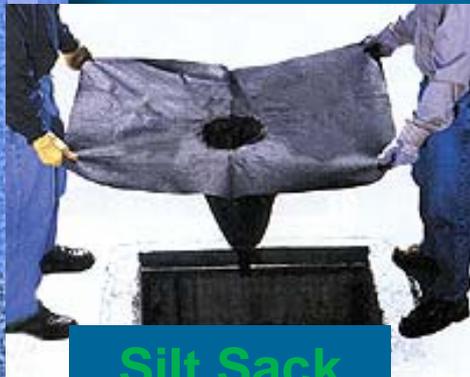




Dandy Curb Bag



Grate Gator



Silt Sack



Blocksom Filter Fabric



Dandy Pop



Gutter Gator



Ultratech Inlet Guard

Maintenance Issues



Wire mesh and stone

Maintenance Issues



Weekly Maintenance

Gutter Buddy



Inlet Protection



No Inlet Protection



No Inlet Protection



Gutter Buddy



Fill pouch with
stone

08/17/2007

Gutter Buddy Installed Incorrectly



10/11/2011

Ineffective Inlet Protection



05/04/2012

Ineffective Inlet Protection



Inlet Protection



No Inlet Protection



07/24/2008

Inlet Protection Moved



12/21/2011

Reinforced Inlet Protection



Reinforced Inlet Protection



Reinforced Inlet Protection



Reinforced Inlet Protection



Inlet Protection



Required along construction vehicle routes

Inlet Protection



04/14/2010

Incorrect Inlet Protection



No drop inlet protection

Correct Inlet Protection



Incorrect Inlet Protection



09/22/2009

Inlet Protection



1 foot overlap

1 foot overlap

RAISE
Holes
horizontal

12/21/2011

Contact Information



Somebody call
Environmental Services!!
Odell 705-5198
Seamus 377-1882





Diversion

VESCH STD & SPEC 3.12

Contractor E&S Training – NN Waterworks

May 30, 2013

What is a diversion?

- **Definition:** a channel constructed across a slope with a supporting earthen ridge on the lower side.
- **Purpose:** to reduce slope length and to intercept and divert stormwater runoff to stabilized outlets at non-erosive velocities.

What's wrong with this diversion?









How do I fix the diversion?

- Follow the final approved plan:
 - Grading
 - Stabilization: Seeding/Matting/Straw
- If it still doesn't work – call the engineer.



Questions?



Temp. Sediment Basin

VESCH STD & SPEC 3.14

Contractor E&S Training – NN Waterworks

May 30, 2013

What is a temporary sediment basin?

- **Definition:** a temporary barrier or dam with a controlled stormwater release structure formed by constructing an embankment of compacted soil across a drainageway.
- **Purpose:** to detain sediment-laden runoff from disturbed areas in “wet” and “dry” storage long enough for the majority of the sediment to settle out.

What's wrong with this basin?







06/13/2008







06/13/2008



04/25/2013

How do I fix the basin?

- Follow the sequence of construction on the final approved plan.
- Do not disturb the entire property BEFORE installing the temporary sediment basin.
- IMMEDIATELY stabilize disturbance upstream.
- If it doesn't work, call the engineer!



Questions?

Erosion and Sediment Control on State and Linear Projects and Construction General Permit Violations

Ian Edwards

DCR Stormwater Compliance
Specialist

Construction General Permit & Erosion and Sediment control inspections

- Erosion & Sediment Control
- Land disturbing activities 10,000 sq. ft. or greater or 2,500 sq. ft. or greater if in designated Chesapeake Bay Preservation Act area.
- If locality has more stringent threshold than 10,000 sq.ft.
- Construction General Permit (VSMP permit)
- Land disturbing activities 1 acre or greater or 2,500 sq. ft. if located in a designated Chesapeake Bay Preservation Act area.

Chesapeake Bay Preservation Act (CBPA)

- Designated Areas are Resource Management Areas (RMAs), Resource Protection Areas (RPAs), Intensely Developed Areas (IDAs)
- Check with local Planning or Zoning Dept. to find out if land disturbance is located in area with CBPA designation.
- Some cities and counties have the CBPA areas overlaid on GIS maps available on the locality website.

Virginia Stormwater Management Program General Permit for Stormwater Discharges from Construction Activities

- Known as VSMP permit, VAR 10 permit or Construction General Permit.
- Applies to all land disturbing activities over 1 acre unless exempt.
- Requires a Stormwater Pollution Prevention Plan (SWPPP, pronounced SWiPP)
- Locally approved erosion and sediment control plans incorporated into SWPPP are enforceable under the provisions of the VAR10 permit.

Department of Conservation & Recreation (DCR) /
Department of Environmental Quality (DEQ) Inspection
responsibilities

- State agency land disturbing activities.
- Linear land disturbing projects operating under approved Annual Standards and Specifications e.g. VDOT, railroads, linear utilities such as gas, electric and telephone.
- All land disturbing activities covered under VAR10 permit. Ranges from single family homes to nuclear power stations.

Common Violations



Lack of VAR10 permit coverage

No erosion and sediment controls installed prior to land disturbance.
Each of the SFHs in this development require VAR10 permit coverage as they are part of a common plan of development or sale.



Inadequate temporary or permanent stabilization of denuded areas

Shoreline project where denuded areas had not been stabilized. Site was abandoned without any form of stabilization being installed.



Stormwater pond not adequately stabilized

Pond being used as a sediment basin during construction

Banks not graded or stabilized

Upslope areas not stabilized



Downstream result of lack of stabilization



Same pond after anionic polyacrylamide added.



Lack of maintenance of controls

Turbidity curtain damaged during construction.

Water main damaged during construction.

Resulting flooding of site led to sediment discharge into river.



Lack of Maintenance of Controls

Sediment in trap not removed as required allowing volume to be reduced and sediment to escape into downstream channel.

Area around sediment trap not stabilized.



Improperly / inadequately installed controls

Silt fence check dam not properly installed. Silt fence should extend up sides of channel.

Rock check dam should have been used in this size channel. Erosion occurring due to 'end running'.



Silt fence installed backwards and not entrenched



Inadequately sized aggregate for rock check dam

Stormwater velocities too great for rock check dam. Check dam should have been constructed using class 1 rip-rap and VDOT #1 .

EPA indicated \$100,000 consent order for violations on this site.



Inadequate concrete wash out

Washing out of concrete into stormwater channels or inlets is prohibited.

Washing out in areas where runoff may enter channels or inlets is prohibited.



Poorly maintained washout area

Washout area should be lined with impervious cover to prevent contamination of ground water.

If storm occurred this washout area would overflow.



Inadequate mortar mixing area

Cement mortar wash out being deposited directly onto ground surface.



Satisfactory concrete wash out area

Impermeable liner on pit

Signage to indicate wash out area

Dumpster located nearby to dispose of dried waste



Inadequate storage of construction chemicals

Chemicals have leaked onto ground surface.

Poor housekeeping on site. Trash and litter deposited on ground surface



Windblown construction waste that has become a stormwater pollutant

Inadequate waste storage on site prior to collection for legal disposal.



Disposing of paint washout into stormwater inlet

Fuel Storage and refueling

Spilled fuel on ground surface



Well maintained fueling area



Oil / fuel leaks from equipment

Leaking Oil from Pump

Spill kit readily available





Lined pit to capture leaking oil or fluids

Mechanical pump being used for dewatering. Excavated area lined with impervious material used as control.

Portable sanitary facilities

Consideration of location



Consideration of spillages



Waste material handling

Leaking dumpster



Poor management of waste



Construction Chemical Storage

Open paint containers adjacent to inlet



Potential contaminant covered with impermeable cover



Co-mingling of discharges is not permitted

Masonry Washing



Masonry wash chemical



Construction General Permit and SWPPP requirements

- Self inspections are required to be conducted by the site operator. Every 14 days and within 48 hours of 0.5 inches of rain or more, or every 7 days.
- All areas of the site are required to be inspected including lay down, storage, office and off site areas (borrow, disposal etc.)
- Inspection reports are to be completed and form part of the SWPPP document.

Linear / utility land disturbing projects



Approved Annual Standards and Specifications. What are they?

- Documents that indicate how an agency / company will comply with the requirements of the Virginia Erosion and Sediment Control Law and regulations.
- The documents are reviewed and approved by DCR / DEQ.
- Annual standards and specifications are typically utilized by land disturbing projects that are linear in nature.

Who submits annual ESC standards and specifications? (note E&S only)

- Electric , natural gas and telephone utility companies, interstate and intrastate natural gas pipeline companies, and railroad companies SHALL submit Annual Standards & Specifications
- Authorities created pursuant to 15.2-5102 MAY submit Annual Standards & Specifications e.g. Hampton Roads Sanitation District (HRSD)
- VDOT
- Other State and Federal Agencies MAY submit.
- State owned Universities & Colleges e.g. TCC, MAY choose. If not then plans are required to be submitted to local government for review and approval.
- Individuals engaged in the construction of multi-jurisdictional wetland mitigation and stream restoration bank(s) MAY choose to submit.

What is required?

- Erosion & Sediment Control Plan reviewed and approved by certified plan reviewer.
- Erosion and sediment controls to be installed in accordance with approved plan.
- Inspections carried out every 14 days and within 48 hours of a runoff producing event. Inspections are required to be conducted by certified inspector or Responsible Land Disturber.
- Advise DCR / DEQ 2 weeks prior to land disturbance starting.

Standards & specifications

- Submission of land disturbing plans for review by locality, if operating under approved standards & specifications, is not required.
- May still need to obtain land disturbing permit from locality. Requirement for land disturbing permits is established by local ordinance (not a State requirement).
- May need to obtain VSMP Construction General Permit if land disturbing thresholds are met.

Standards & Specifications

- Sub-contractors working for the utility operating under annual standards and specifications are held to the approved standards for land disturbing activities.
- Some utility annual standard and specifications deviate from what would normally be required of other land disturbing activities. (see below)

- **Third Party Agreement**

Projects done for a third party include new service to residential and commercial developments. **The Company's standard agreement for these projects recognizes the third party as the responsible party for erosion and sediment control.** The method of control to be as required by the locally approved E&S plan for that development. (*Dominion Virginia Power Distribution Annual Standards & Specifications 2012*). This means that it is the holder of the locally issued land disturbance permit or approved plan is responsible for stabilization of disturbed areas from utility installation.

Questions?

Ian Edwards

DCR Stormwater Compliance Specialist

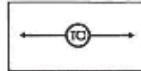
757-925-2467

ian.edwards@dcr.virginia.gov

Topsoiling

Jason Trimyer, City of Suffolk

STD & SPEC 3.30



TOPSOILING

Definition

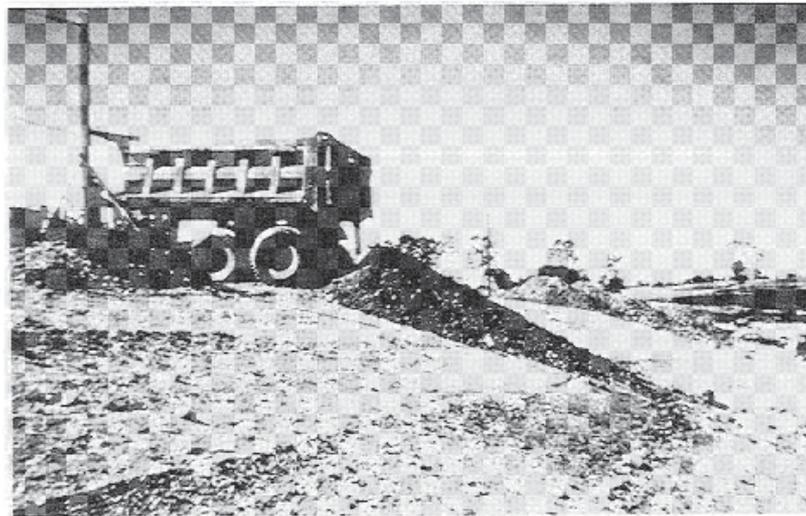
Methods of preserving and using the surface layer of undisturbed soil, often enriched in organic matter, in order to obtain a more desirable planting and growth medium.

Purpose

To provide a suitable growth medium for final site stabilization with vegetation.

Conditions Where Practice Applies

1. Where the preservation or importation of topsoil is determined to be the most effective method of providing a suitable growth medium.

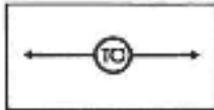


1992

3.30

STD & SPEC 3.30

TOPSOILING



Definition

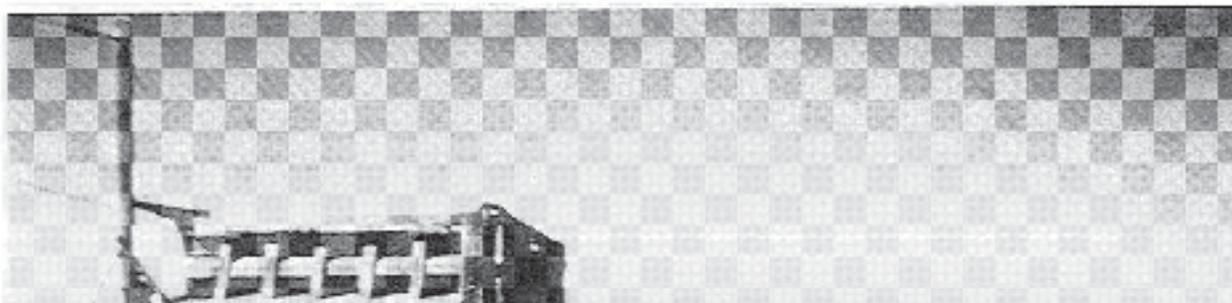
Methods of preserving and using the surface layer of undisturbed soil, often enriched in organic matter, in order to obtain a more desirable planting and growth medium.

Purpose

To provide a suitable growth medium for final site stabilization with vegetation.

Conditions Where Practice Applies

1. Where the preservation or importation of topsoil is determined to be the most effective method of providing a suitable growth medium.



Topsoiling

Definition

- Methods of preserving and using surface layer of undisturbed soil, often enriched in organic matter, in order to obtain a more desirable planting and growth medium.

Topsoiling

Purpose

- To provide suitable growth medium for final site stabilization with vegetation.

but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.

Stockpiling

Topsoil shall be stockpiled in such a manner that natural drainage is not obstructed and no off-site sediment damage shall result. Stabilize or protect stockpiles in accordance with MS #2.

Side slopes of the stockpile shall not exceed 2:1.

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 30 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling

Before topsoiling, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.



Stockpiling

but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.

Stockpiling

Topsoil shall be stockpiled in such a manner that natural drainage is not obstructed and no off-site sediment damage shall result. Stabilize or protect stockpiles in accordance with MS #2.

Side slopes of the stockpile shall not exceed 2:1.

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 30 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling

Before topsoiling, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.

1992 3.30
but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.

Stockpiling

Topsoil shall be stockpiled in such a manner that natural drainage is not obstructed and no off-site sediment damage shall result. Stabilize or protect stockpiles in accordance with MS #2.

Side slopes of the stockpile shall not exceed 2:1.

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 30 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling

Before topsoiling, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.

Applying Topsoil

Topsoil shall not be placed while in a frozen or muddy condition, when topsoil or subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding. The topsoil shall be uniformly distributed to a minimum

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 30 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling

Before topsoiling, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.

Applying Topsoil

Topsoil shall not be placed while in a frozen or muddy condition, when topsoil or subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding. The topsoil shall be uniformly distributed to a minimum compacted depth of 2 inches on 3:1 or steeper slopes and 4 inches on flatter slopes. (See Table 3.30-A to determine volume of topsoil required for application to various depths). Any irregularities in the surface, resulting from topsoiling or other operations, shall be corrected in order to prevent the formation of depressions or water pockets.

It is necessary to compact the topsoil enough to ensure good contact with the underlying soil and to obtain a level seedbed for the establishment of high maintenance turf. However, undue compaction is to be avoided as it increases runoff velocity and volume, and deters



Example of area that needs “surface roughening” prior to topsoiling

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 30 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling

Before topsoiling, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.

Applying Topsoil

Topsoil shall not be placed while in a frozen or muddy condition, when topsoil or subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding. The topsoil shall be uniformly distributed to a minimum compacted depth of 2 inches on 3:1 or steeper slopes and 4 inches on flatter slopes. (See Table 3.30-A to determine volume of topsoil required for application to various depths). Any irregularities in the surface, resulting from topsoiling or other operations, shall be corrected in order to prevent the formation of depressions or water pockets.

It is necessary to compact the topsoil enough to ensure good contact with the underlying soil and to obtain a level seedbed for the establishment of high maintenance turf. However, undue compaction is to be avoided as it increases runoff velocity and volume, and deters



Topsoil on a riverfront embankment

seed germination. Special consideration should be given to the types of equipment used to place topsoil in areas to receive fine turf. Avoid unnecessary compaction by heavy machinery whenever possible. In areas which are not going to be mowed, the surface should be left rough in accordance with SURFACE ROUGHENING (Std. & Spec. 3.29).

Soil Sterilants

No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

TABLE 3.30-A

**CUBIC YARDS OF TOPSOIL REQUIRED
FOR APPLICATION TO VARIOUS DEPTHS**

<u>Depth (inches)</u>	<u>Per 1,000 Square Feet</u>	<u>Per Acre</u>
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806

Source: Va. DSWC



Sparse Vegetation due to inadequate topsoil



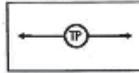


Root matter in the topsoil

Tree Protection

Jason Trimyer, City of Suffolk

STD & SPEC 3.38

TREE PRESERVATION
& PROTECTIONDefinition

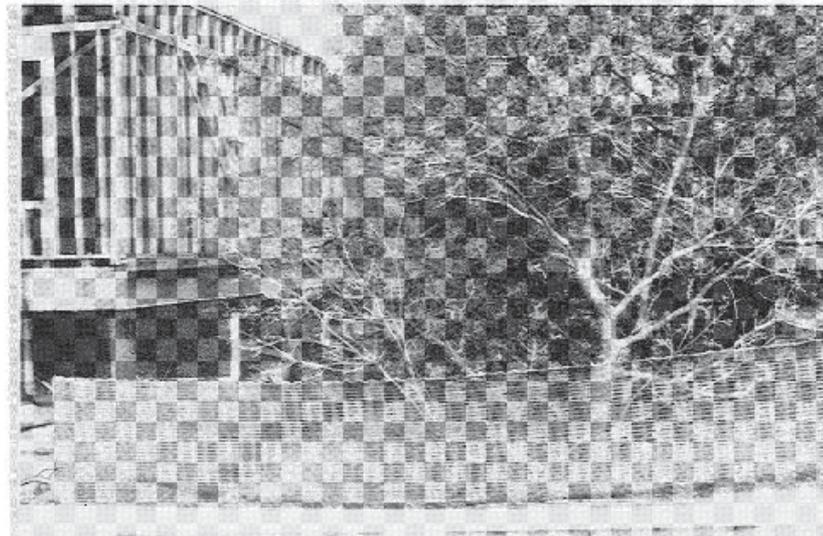
Protection of desirable trees from mechanical and other injury during land disturbing and construction activity.

Purpose

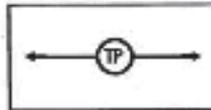
To ensure the survival of desirable trees where they will be effective for erosion and sediment control, watershed protection, landscape beautification, dust and pollution control, noise reduction, shade and other environmental benefits while the land is being converted from forest to urban-type uses.

Conditions Where Practice Applies

Tree-inhabited areas subject to land disturbing activities.



STD & SPEC 3.38

TREE PRESERVATION
& PROTECTIONDefinition

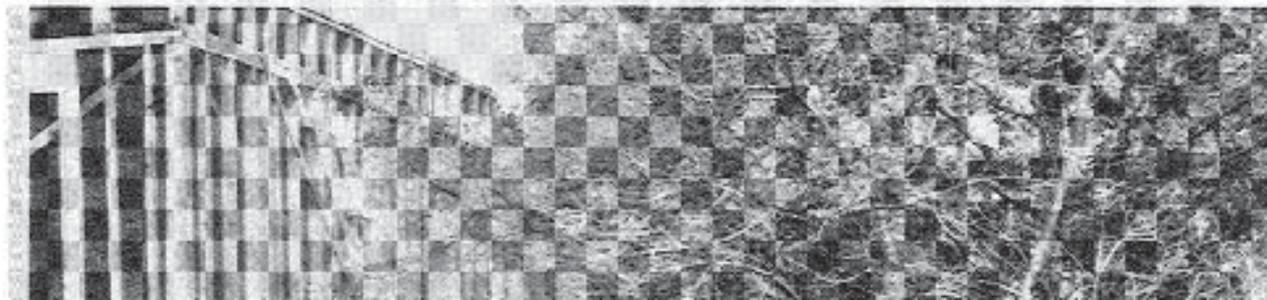
Protection of desirable trees from mechanical and other injury during land disturbing and construction activity.

Purpose

To ensure the survival of desirable trees where they will be effective for erosion and sediment control, watershed protection, landscape beautification, dust and pollution control, noise reduction, shade and other environmental benefits while the land is being converted from forest to urban-type uses.

Conditions Where Practice Applies

Tree-inhabited areas subject to land disturbing activities.



Tree Protection

Definition

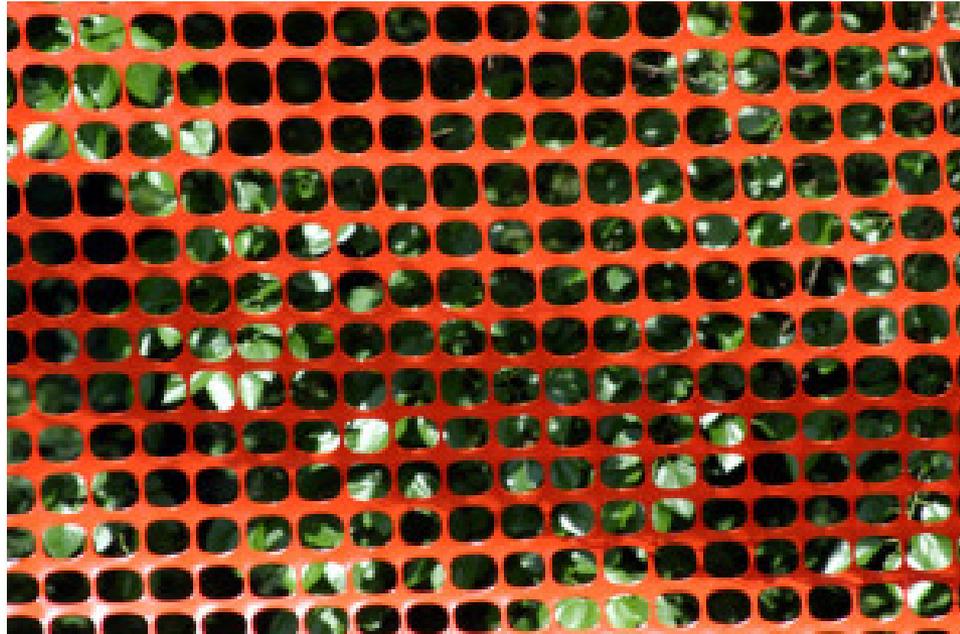
- Protection of desirable trees from mechanical and other injury during land disturbance and construction activity.

Tree Protection

Purpose

- To ensure the survival of desirable trees where they will be effective for erosion and sediment control, watershed protection, landscape beautification, dust and pollution control, noise reduction, shade, and other environmental benefits while the land is being converted from forest to urban-type uses.

Tree Protection Examples



8 **Fencing and Armoring** (Plate 3.38-2): Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.

- a. **Snow Fence** - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.
- b. **Board Fence** - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.
- c. **Cord Fence** - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.
- d. **Plastic Fencing** - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield: Average 2,000 lbs. per 4-foot width (ASTM D638)

Ultimate

8. **Fencing and Armoring** (Plate 3.38-2): Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.

a. **Snow Fence** - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.

b. **Board Fence** - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.

c. **Cord Fence** - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.

d. **Plastic Fencing** - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield: Average 2,000 lbs. per 4-foot width (ASTM D638)

Ultimate

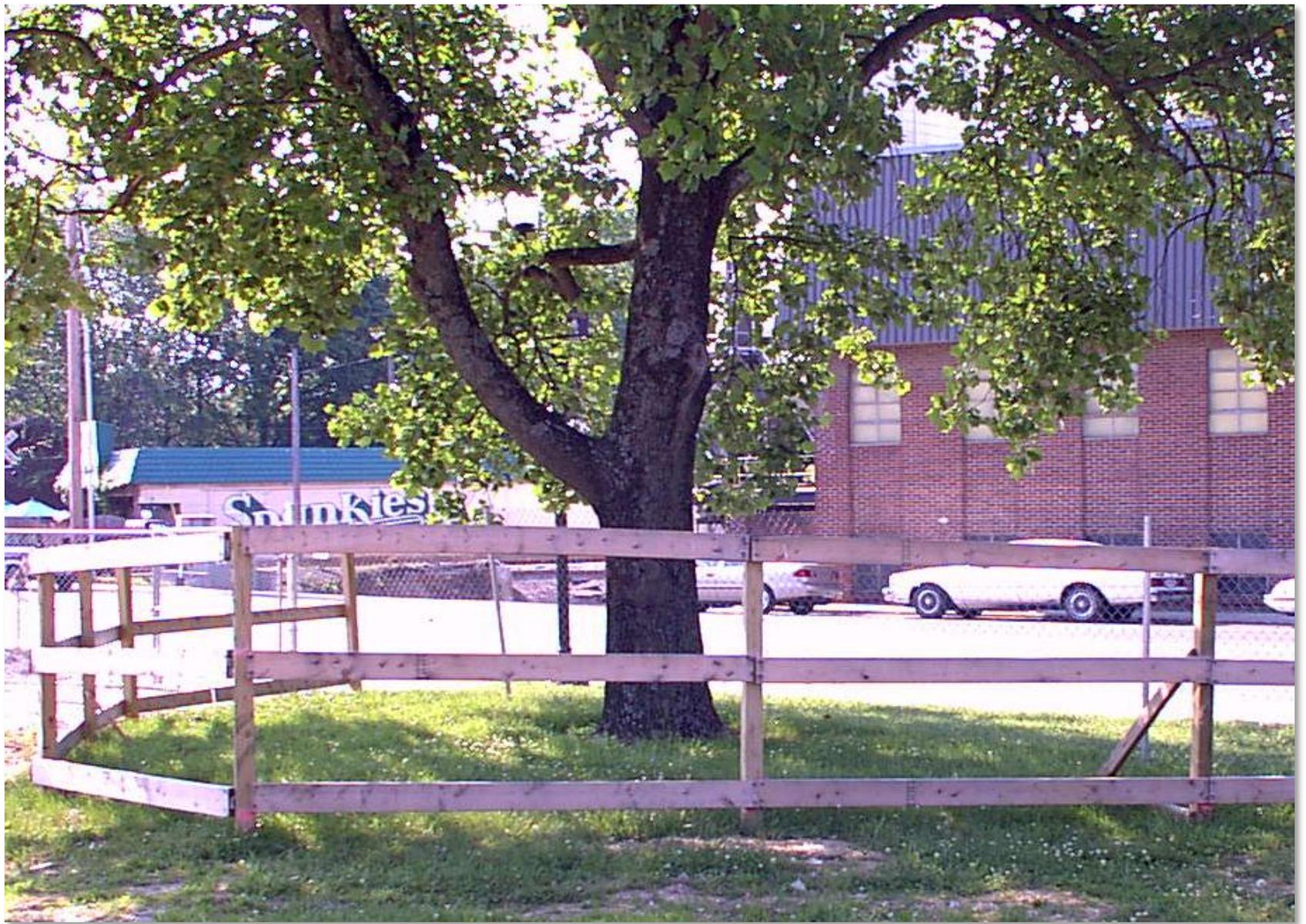


Snow Fencing

8. **Fencing and Armoring** (Plate 3.38-2): Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.
- a. **Snow Fence** - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.
 - b. **Board Fence** - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.
 - c. **Cord Fence** - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.
 - d. **Plastic Fencing** - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield: Average 2,000 lbs. per 4-foot width (ASTM D638)

Ultimate



Board Fencing

8. **Fencing and Armoring** (Plate 3.38-2): Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.
- a. **Snow Fence** - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.
 - b. **Board Fence** - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.
 - c. **Cord Fence** - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.
 - d. **Plastic Fencing** - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield: Average 2,000 lbs. per 4-foot width (ASTM D638)

Ultimate



Plastic Fencing

- f. Additional Trees - Additional trees may be left standing as protection between the trunks of the trees to be retained and the limits of clearing. However, in order for this alternative to be used, the trunks of the trees in the buffer must be no more than 6 feet apart to prevent passage of equipment and material through the buffer. These additional trees shall be reexamined prior to the completion of construction and either be given sufficient treatment to ensure survival or be removed.

- g. Trunk Armoring - As a last resort, a tree trunk can be armored with burlap wrapping and 2-inch studs wired vertically no more than 2 inches apart to a height of 5 feet encircling the trunk. If this alternative is used, the root zone within the drip line will still require protection. Nothing should ever be nailed to a tree.

Fencing and armoring devices shall be in place before any excavation or grading is begun, shall be kept in good repair for the duration of construction activities, and shall be the last items removed during the final cleanup after the completion of the project.

9. Raising the grade: When the ground level must be raised around an existing tree or tree group, the following considerations shall be made and steps taken to adequately care for the affected tree.
- a. A well may be created around the tree(s) slightly beyond the drip line to retain the natural soil in the area of the feeder roots (Plate 3.38-3).

TREE WELL





Trunk Armoring

Root Zone Impact

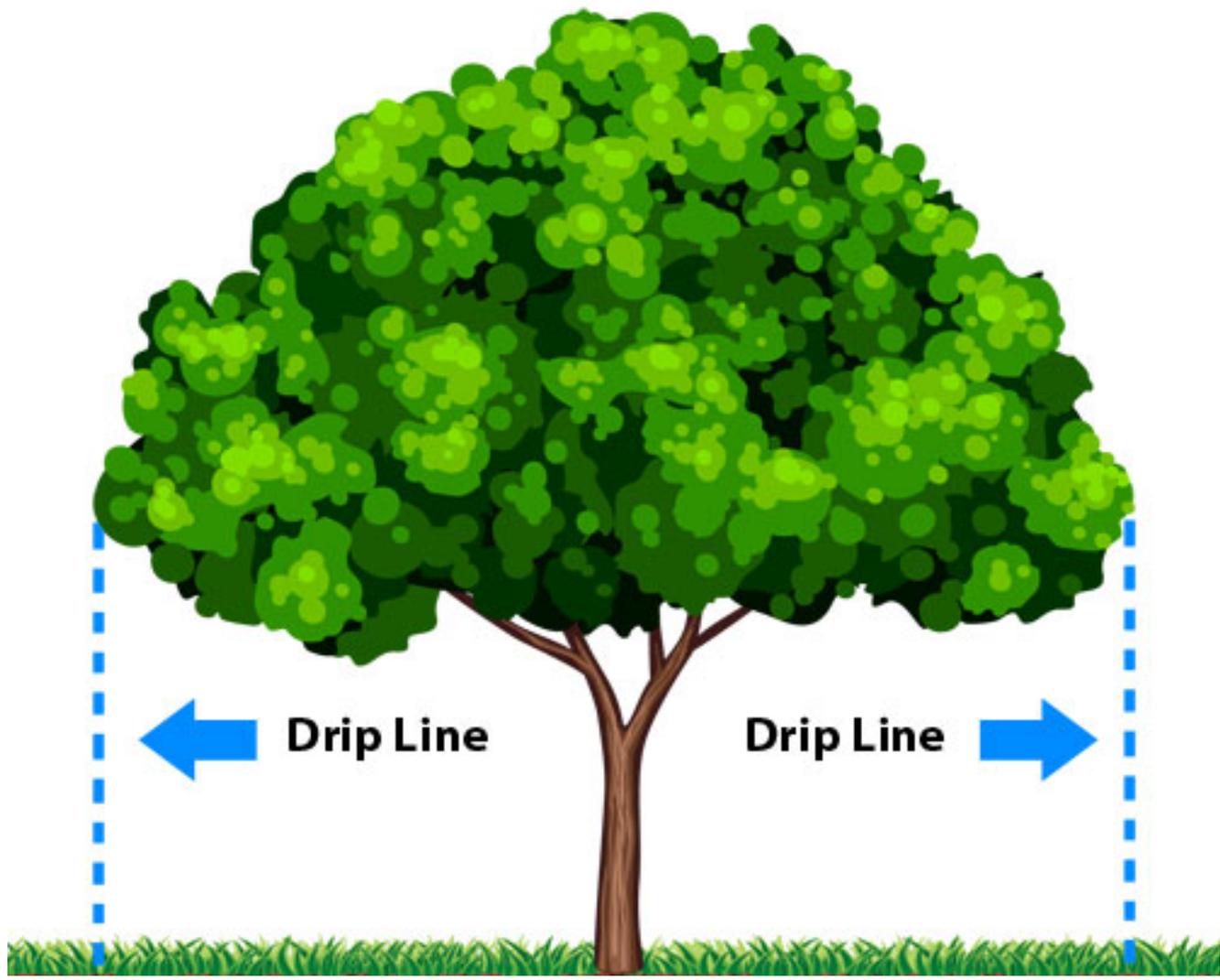


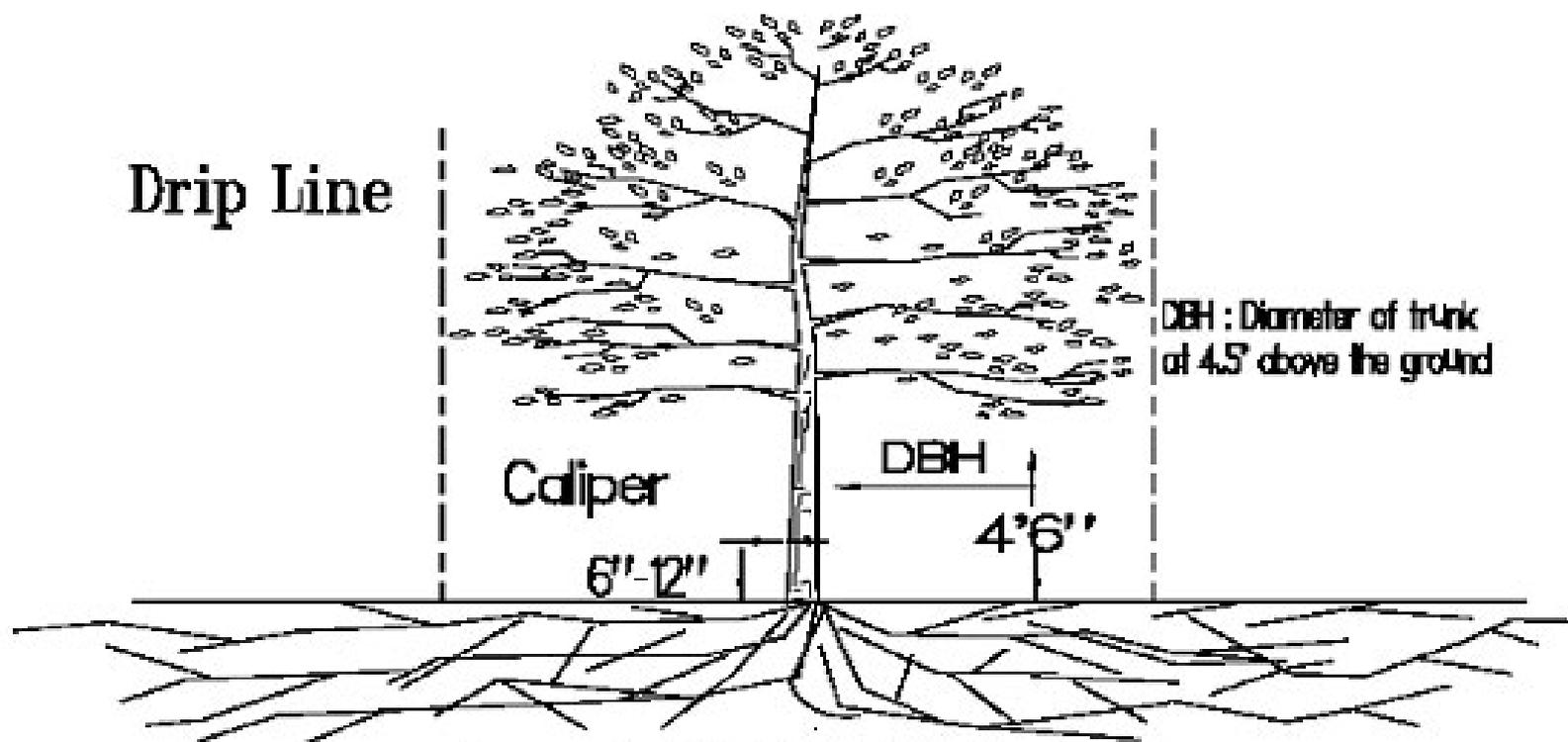
c. Trunk damage - Tree trunks are often nicked or scarred by trucks and construction equipment. Such superficial wounds provide access to insects and disease.

2. Root Zone Impacts: Disturbing and delicate relationship between soil, roots, and the rest of the tree can damage or kill a tree. The roots of an existing tree are established in an area where essential materials (water, oxygen, and nutrients) are present. The mass of the root system is the correct size to balance the intake of water from the soil with the transpiration of water from the leaves.
- a. Raising the grade as little as 6 inches can retard the normal exchange of air and gases. Roots may suffocate due to lack of oxygen, or be damaged by toxic gases and chemicals released by soil bacteria.
 - b. Raising the grade may also elevate the water table. This can cause drowning of the deeper roots.
 - c. Lowering the grade is not usually as damaging as raising it. However, even shallow cuts of 6 to 8 inches will remove most of the topsoil, removing some feeder roots and exposing the rest to drying and freezing.
 - d. Deep cuts may sever a large portion of the root system, depriving the tree of water and increasing the chance of wind-throw.
 - e. Lowering the grade may lower the water table, inducing drought. This is a problem in large roadway cuts or underdrain installations.
 - f. Trenching or excavating through a tree's root zone can eliminate as much as 40 percent of the root system. Trees suffering such damage usually die within 2 to 5 years.
 - g. Compaction of the soil within the drip line (even a few feet beyond the drip line) of a tree by equipment operation, materials storage, or paving can block off air and water from roots.

- h. Construction chemicals or refuse disposed of in the soil can change soil chemistry or be toxic to trees. Most damage to trees from construction activities is due to the invisible root zone stresses.







Drip Line

DBH : Diameter of trunk
at 4.5' above the ground

Caliper

DBH

6'-12'

4'6"

Critical Root Zone

Extends out from the trunk to the drip line,
or to a distance of 1.5' per inch of DBH,
whichever is greater

Full Root Zone

Extends out 2 to 3 times beyond the Critical Root Zone



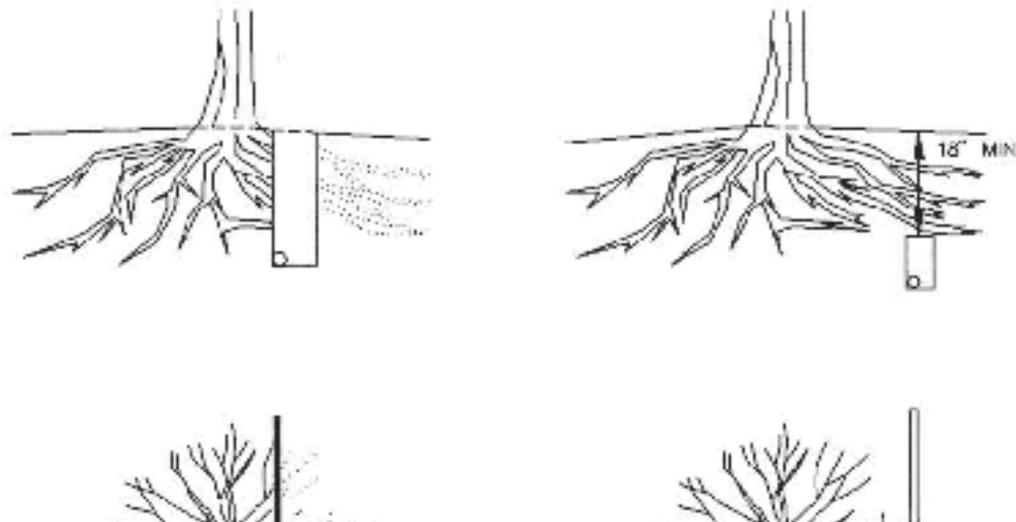


Good location to utilize “tunneling”!

11. Trenching and Tunnelling:

- a. Trenching shall be done as far away from the trunks of trees as possible, preferably outside the branches or crown spreads of trees, to reduce the amount of root area damaged, or killed by trenching activities.
- b. Wherever possible, trenches should avoid large roots or root concentrations. This can be accomplished by curving the trench or by tunnelling under large roots and areas of heavy root concentration.
- c. Tunnelling is more expensive initially, but it usually causes less soil disturbance and physiological impact on the root system (Plate 3.38-7). The extra cost may offset the potential cost of tree removal and replacement should the tree die.

TRENCHING VS. TUNNELING

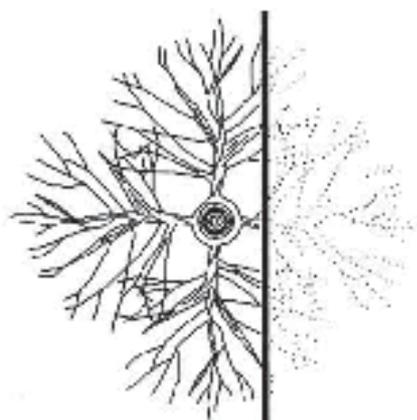
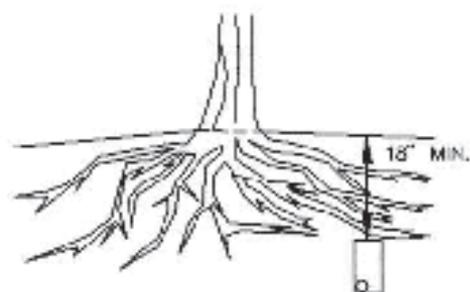
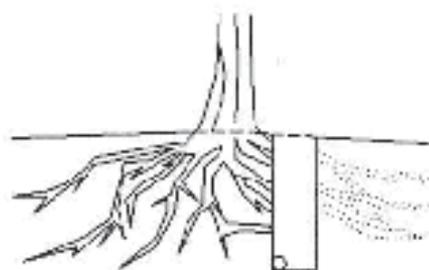


Tunnelling is almost always preferred over the trenching method. The tunnel should be 18 inches or greater below the ground surface and should not be located under the center of the tree (an off-center tunnel has the least impact on the roots).

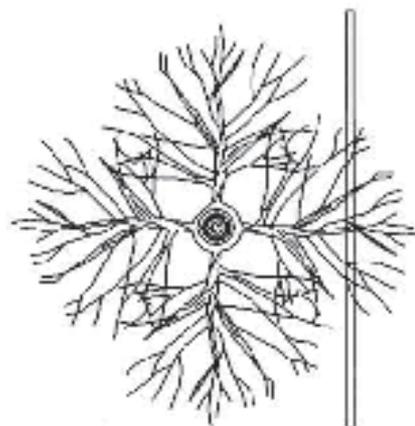
- d. Roots shall not be left exposed to the air. They shall be covered with soil as soon as possible or protected and kept moistened with wet burlap or peat moss until the trench or tunnel can be filled.
- e. The ends of damaged and cut roots shall be cut off smoothly and protected by painting promptly with a tree-wound dressing.
- f. Trenches and tunnels shall be filled as soon as possible. Air spaces in the soil shall be avoided by careful filling and tamping.
- g. Peat moss or other suitable material shall be added to the fill material as an aid to inducing and developing new root growth.
- h. The tree shall be mulched and fertilized to conserve moisture, stimulate new root growth, and enhance general tree vigor.
- i. If a large amount of the root system has been damaged and killed, the crown leaf surface shall be proportionately reduced to balance the reduced root system. This may be accomplished by pruning 20 to 30 percent of the crown foliage. If roots are cut during the winter, pruning shall be accomplished before the next growing season. If roots are cut during the growing season, pruning shall be done immediately.

12. Removal and Replacement of Damaged Trees: Should a tree intended and marked to be retained be damaged seriously enough that survival and normal growth are not possible, the tree shall be removed. If replacement is desirable and/or required, the replacement tree shall be of the same or similar species, 2-inch to 2½-inch (minimum) caliper balled and burlapped nursery stock. However, today, with the aid

TRENCHING VS. TUNNELING



DESTRUCTION OF FEEDER ROOTS
WILL PROBABLY KILL THE TREE.



TUNNELING UNDER THE TREE WILL
PRESERVE IMPORTANT FEEDER ROOTS

Source: Tree Maintenance, Pirone, 1979.

Plate 3.38-7

If a large amount of the root system has been damaged and killed, the crown leaf surface shall be proportionately reduced to balance the reduced root system. This may be accomplished by pruning 20 to 30 percent of the crown foliage. If roots are cut during the winter, pruning shall be accomplished before the next growing season. If roots are cut during the growing season, pruning shall be done immediately.

12. Removal and Replacement of Damaged Trees: Should a tree intended and marked to be retained be damaged seriously enough that survival and normal growth are not possible, the tree shall be removed. If replacement is desirable and/or required, the replacement tree shall be of the same or similar species, 2-inch to 2½-inch (minimum) caliper balled and burlapped nursery stock. However, today, with the aid of a "tree spade," the same caliper tree may be required as a replacement.
13. Clean-Up: Clean-up after a construction project can be a critical time for tree damage. Trees protected throughout the development operation are often destroyed by carelessness during the final clean-up and landscaping. Fences and barriers shall be removed last, after everything else is cleaned-up and carried away.
14. Maintenance: In spite of precautions, some damage to protected trees may occur. In such cases, the following maintenance guidelines should be followed:
 - a. Soil Aeration - If the soil has become compacted over the root zone of any tree, the ground shall be aerated by punching holes with an iron bar. The bar shall be driven 1-foot deep and then moved back and forth until the soil is

loosened. This procedure shall be repeated every 18 inches until all of the compacted soil beneath the crown of the tree has been loosened.

b. Repair of Damage

- 1) Any damage to the crown, trunk, or root system of any tree retained on the site shall be repaired immediately.
- 2) Whenever major root or bark damage occurs, remove some foliage to reduce the demand for water and nutrients.
- 3) Damaged roots shall immediately be cut off cleanly inside the exposed or damaged area. Cut surfaces shall be painted with approved tree paint, and moist peat moss, burlap, or top-soil shall be spread over the exposed area.
- 4) To treat bark damage, carefully cut away all loosened bark back into the undamaged area, taper the cut at the top and bottom, and provide drainage at the base of the wound (Plate 3.38-8).
- 5) All tree limbs damaged during construction or removed for any other reason shall be cut off above the collar at the preceding branch junction (Plate 3.38-8).
- 6) Care for serious injuries shall be prescribed by a forester or a tree specialist.

c. Fertilization: Broadleaf trees that have been stressed or damaged shall receive a heavy application of fertilizer to aid their recovery.

- 1) Trees shall be fertilized in the late fall (after October 1) or the early spring (from the time frost is out of the ground until May 1). Fall applications are preferred, as the nutrients will be made available over

- exposed area.
- 4) To treat bark damage, carefully cut away all loosened bark back into the undamaged area, taper the cut at the top and bottom, and provide drainage at the base of the wound (Plate 3.38-8).
 - 5) All tree limbs damaged during construction or removed for any other reason shall be cut off above the collar at the preceding branch junction (Plate 3.38-8).
 - 6) Care for serious injuries shall be prescribed by a forester or a tree specialist.

c. Fertilization: Broadleaf trees that have been stressed or damaged shall receive a heavy application of fertilizer to aid their recovery.

- 1) Trees shall be fertilized in the late fall (after October 1) or the early spring (from the time frost is out of the ground until May 1). Fall applications are preferred, as the nutrients will be made available over a longer period of time.
- 2) Fertilizer shall be applied to the soil over the feeder roots (see Plate 3.38-9). In no case should it be applied closer than 3 feet to the trunk.

The root system of conifers extends some distance beyond the drip line. Increase the area to be fertilized by one fourth the area of the crown.
- 3) Fertilizer shall be applied using approved fertilization methods and equipment.



Stormwater Regulations Primer

Noah Hill

Regulatory Programs

Regulation

Applicability threshold

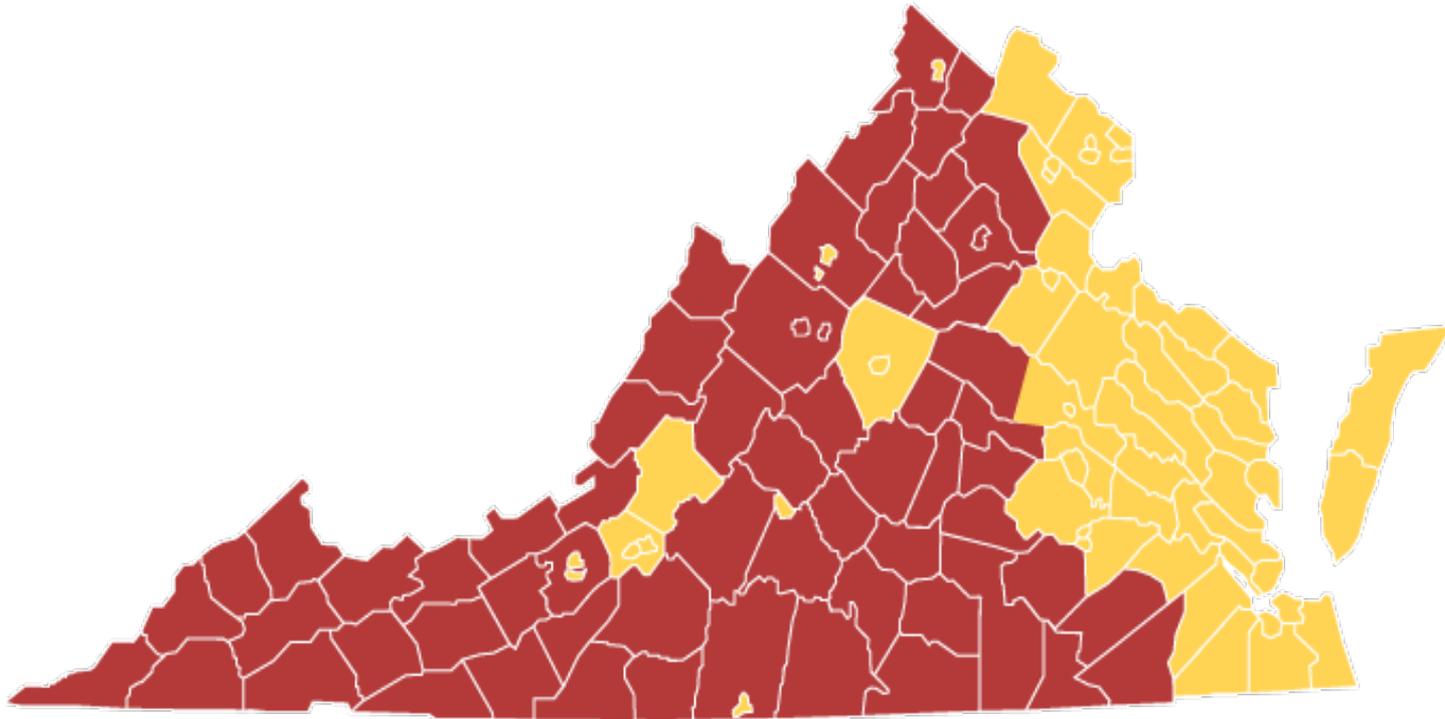
- Erosion & Sediment Control Act → 10,000 sq ft
- Chesapeake Bay Preservation Act → 2,500 sq ft
- VA SW Management Permit (VSMP) → 1 acre
 - Construction General Permit
- Municipal Separate Storm Sewer System (MS4)
 - Phase I Individual Permits
 - Phase II (Small) General Permit
- Chesapeake Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plan (WIP)

Virginia Stormwater Management Program (VSMP)

- Currently State Run
- Compliance = Water Quality
 - Current Compliance @ 40%
 - Local vs. State confusion
- *Simplification*: Local Programs = Local Control = Improved Compliance
- *Consistency*: Facilitates uniform program oversight and enforcement.



Statewide Implementation



-  Chesapeake Bay Preservation Act localities and Municipal Separate Storm Sewer System (MS4) permitted localities
-  Likely that no stormwater program exists currently (but do have E&S)

The Key Differences in Application

Existing Rules

Impervious Surface
(IC) only

0.5 inches of *Runoff*
from the IC only

Average land condition/
technology based

10% reduction TP

Simple Method

Land Use(s)

Event

New Design Criteria

**Redevelopment
Criteria**

**Compliance
Methodology**

Modified Rules

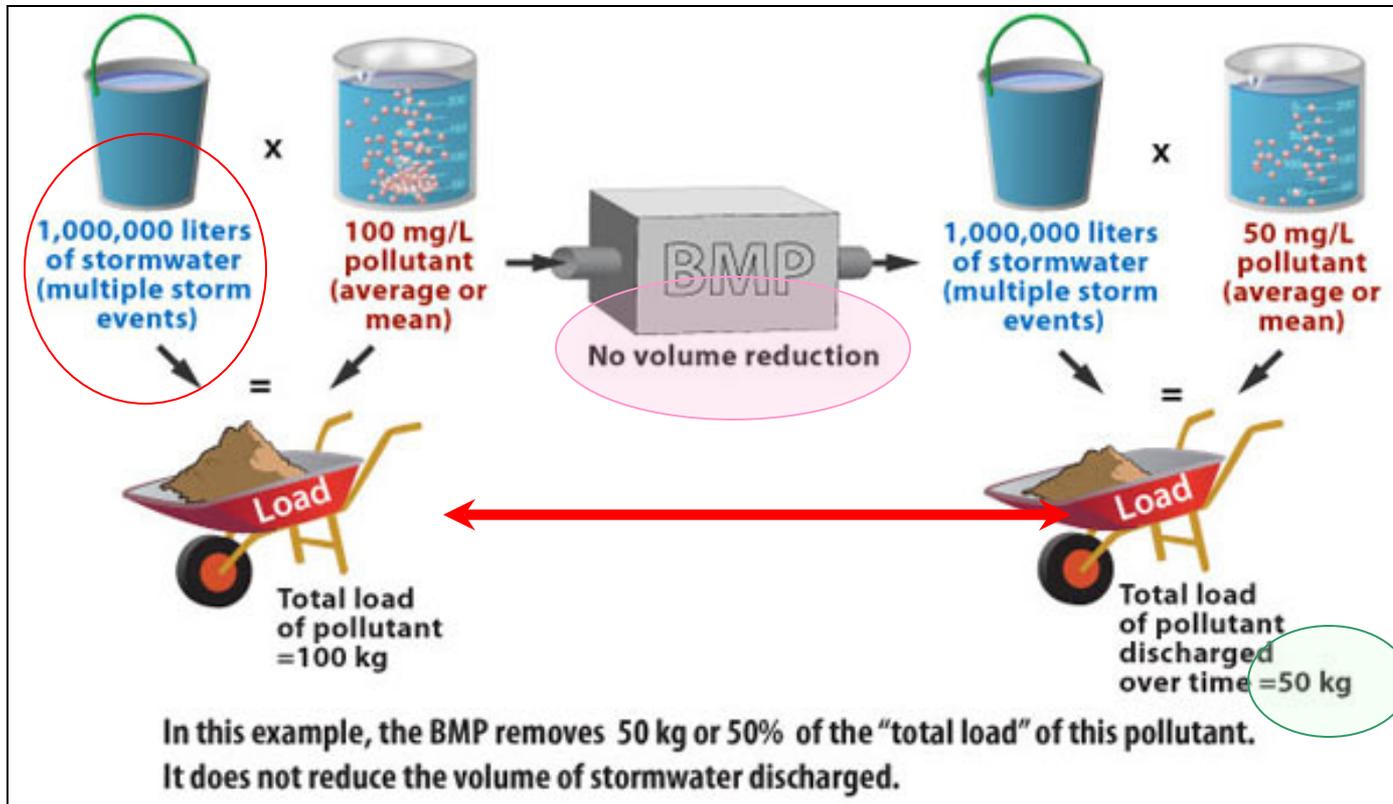
IC + Forest/Open Space
+ Managed Turf

1.0 inches of *Rainfall*
from the whole site

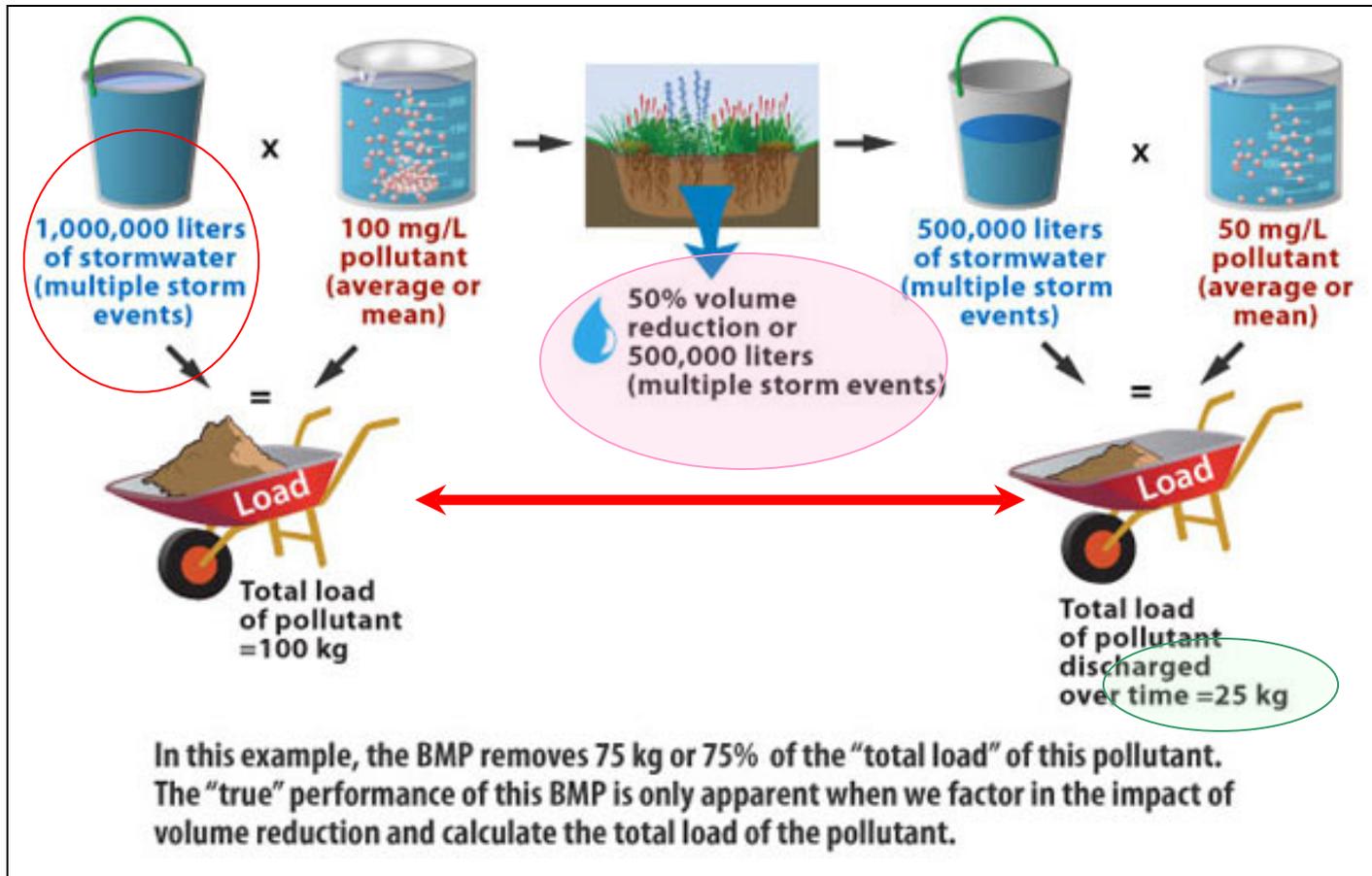
0.41 lbs./ac/yr TP

<1 acre = 10% red. TP,
>1 acre = 20% red. TP

Runoff Reduction Method



- “Traditional” BMP pollutant removal efficiencies do not take into account the removal that occurs when the runoff volume is reduced.
- Many BMPs, such as ponds and filters, do not reduce runoff volume at all.



- Using BMPs that also provide volume reduction provides greater overall pollutant (mass load) removal
- This reflects a “Mass Balance” Approach

Fees

Once local programs are approved and in operation, the following fees will apply:

		<u>Initial</u>	<u>Maintenance</u>
• 2,500 sqft < 1 acre	=	\$290	\$50
• Comm. POD < 1 acre	=	\$290	\$50
• ≥ 1 acre < 5 acres	=	\$2,700	\$400
• ≥ 5 acres < 10 acres	=	\$3,400	\$500
• ≥ 10 acres < 50 acres	=	\$4,500	\$650
• ≥ 50 acres < 100 acres	=	\$6,100	\$900
• ≥ 100 acres	=	\$9,600	\$1,400

Local governments can gain approval from the Board to have lower or higher fees; however, DCR's portion is based on 28% of the published initial fees.

VSMP Regulations Timeline

- Virginia Soil and Water Conservation Board adopted regulations May 24, 2011
- Regulations became effective September 13, 2011 and Published on DCR website



VSMP Construction General Permit

- Virginia Soil and Water Conservation Board approved on February 26, 2013
- 60 Comment Period ends June 7, 2013
- Become Effective July 1, 2014

VSMP Local Government Adoption Schedule

- **April 1, 2013** – Localities submit 12-month extension requests with draft stormwater programs demonstrating substantive progress
- **June 6, 2013** – VSWCB consideration of 12-month extension requests
- **June 13, 2013** – Final VSMP adoption date, *without* 12-month extension (21 months from the effective date of the stormwater management regulations)
- **December 15, 2013** – Localities submit *preliminary* local VSMP application packages for final review by DCR
- **April 1, 2014** – Final adopted VSMP ordinances submitted for review by DCR
- **June 2014** – Final date for Board approval of local VSMPs

One More Important Date

July 1, 2013

Stormwater, Erosion & Sediment Control and
Chesapeake Bay Act Programs

Transfer to

The Department of Environmental Quality

Questions?



Noah M. Hill
Regional Manager
VA Department of Conservation & Recreation
757-925-2392
Noah.hill@dcr.virginia.gov