Erosion and Sediment Control Awareness

Subcontractor Awareness Seminar

Georgia Soil and Water Conservation Commission

Issued August 2007

OVERVIEW

- Introduction of Erosion and Sedimentation (E&S)
  - Definitions and general stages of E&S
  - Basic processes and factors governing E&S
- Impacts of Erosion and Sedimentation (E&S)
  - Environmental impacts
  - Economic impacts
- Best Management Practices (BMPs)
  - Vegetative Practices
  - Structural Practices
- Laws Governing Erosion and Sedimentation (E&S)
  - Education/Certification Requirements
  - Inspections and required documentation
  - Regulatory agency enforcement options

EROSION - The process by which the land surface is worn away by the action of water, wind, ice and gravity





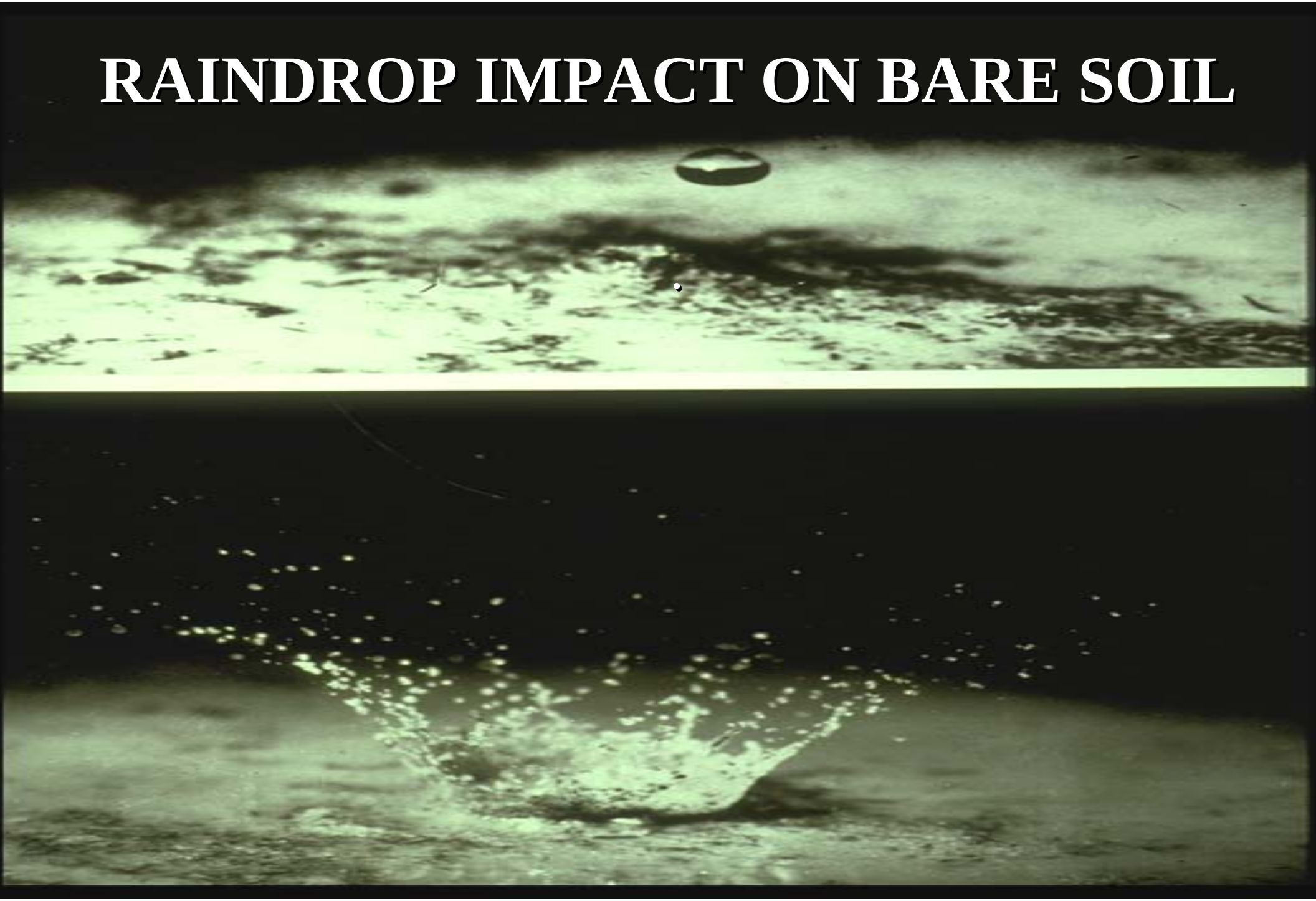


Water Erosion

Types of Water Erosion

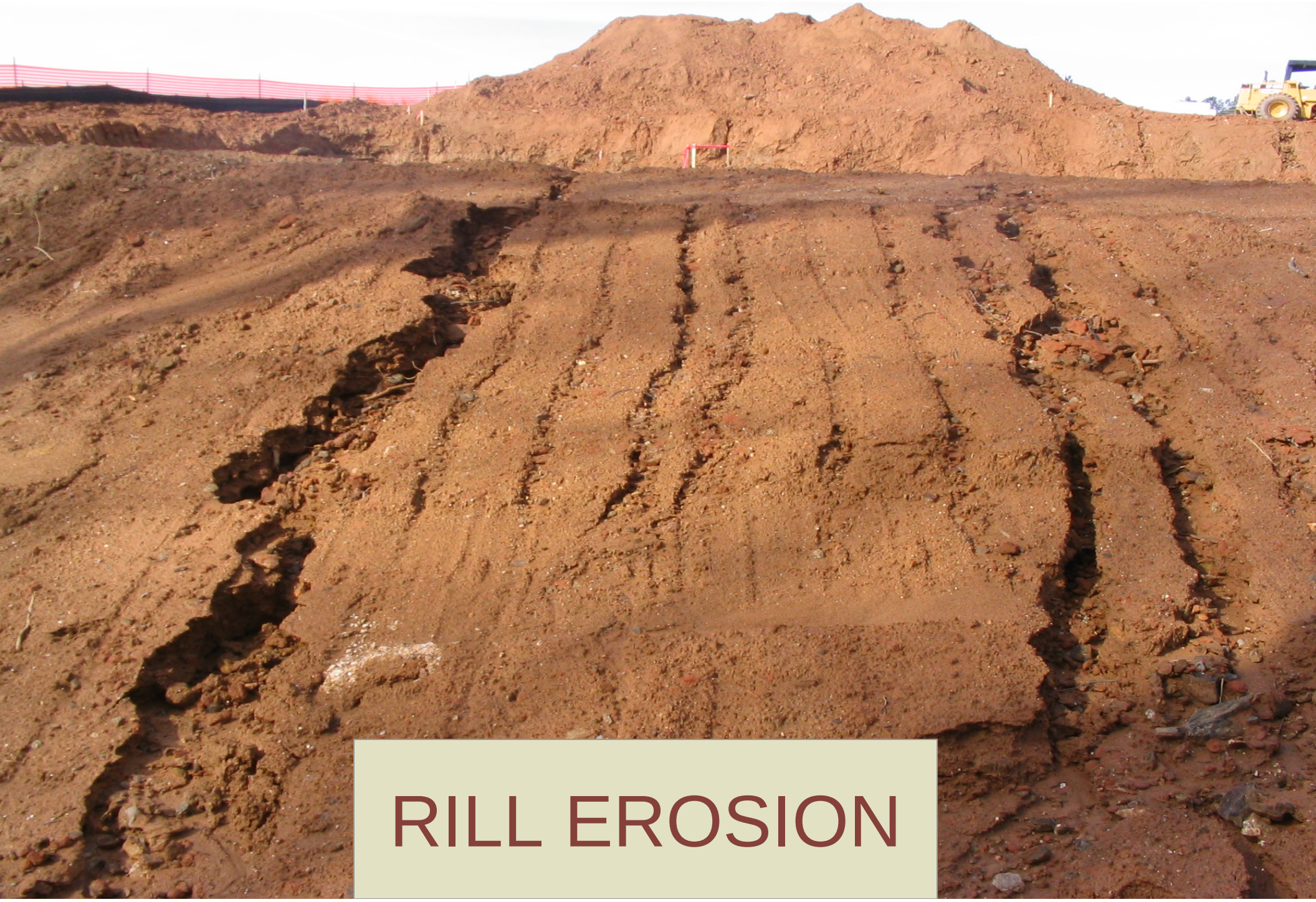
1. Splash Erosion
2. Sheet Erosion
3. Rill Erosion
4. Gully Erosion

RAINDROP IMPACT ON BARE SOIL

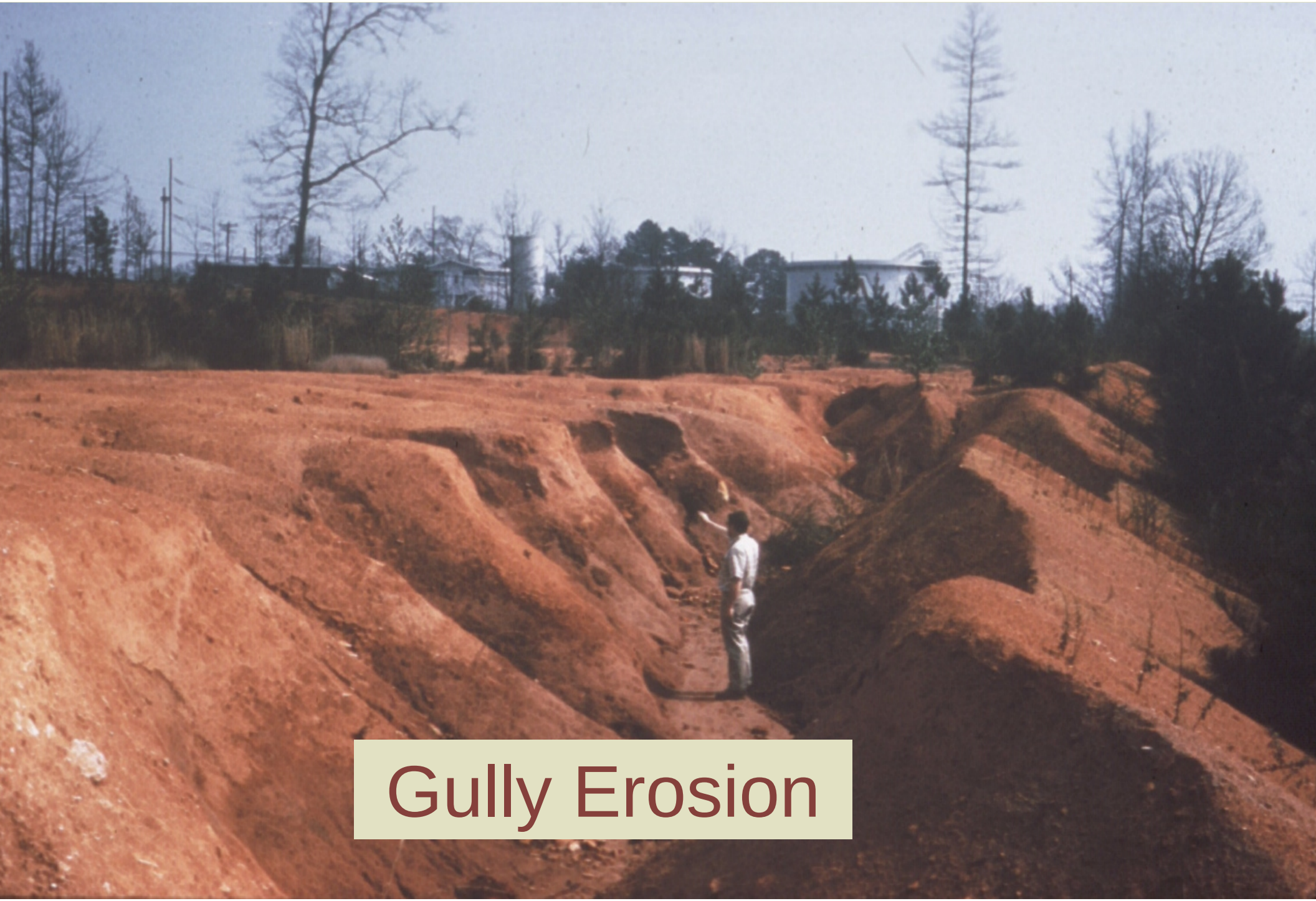


Sheet Erosion: Erosion caused by water flowing in a thin layer over the ground surface

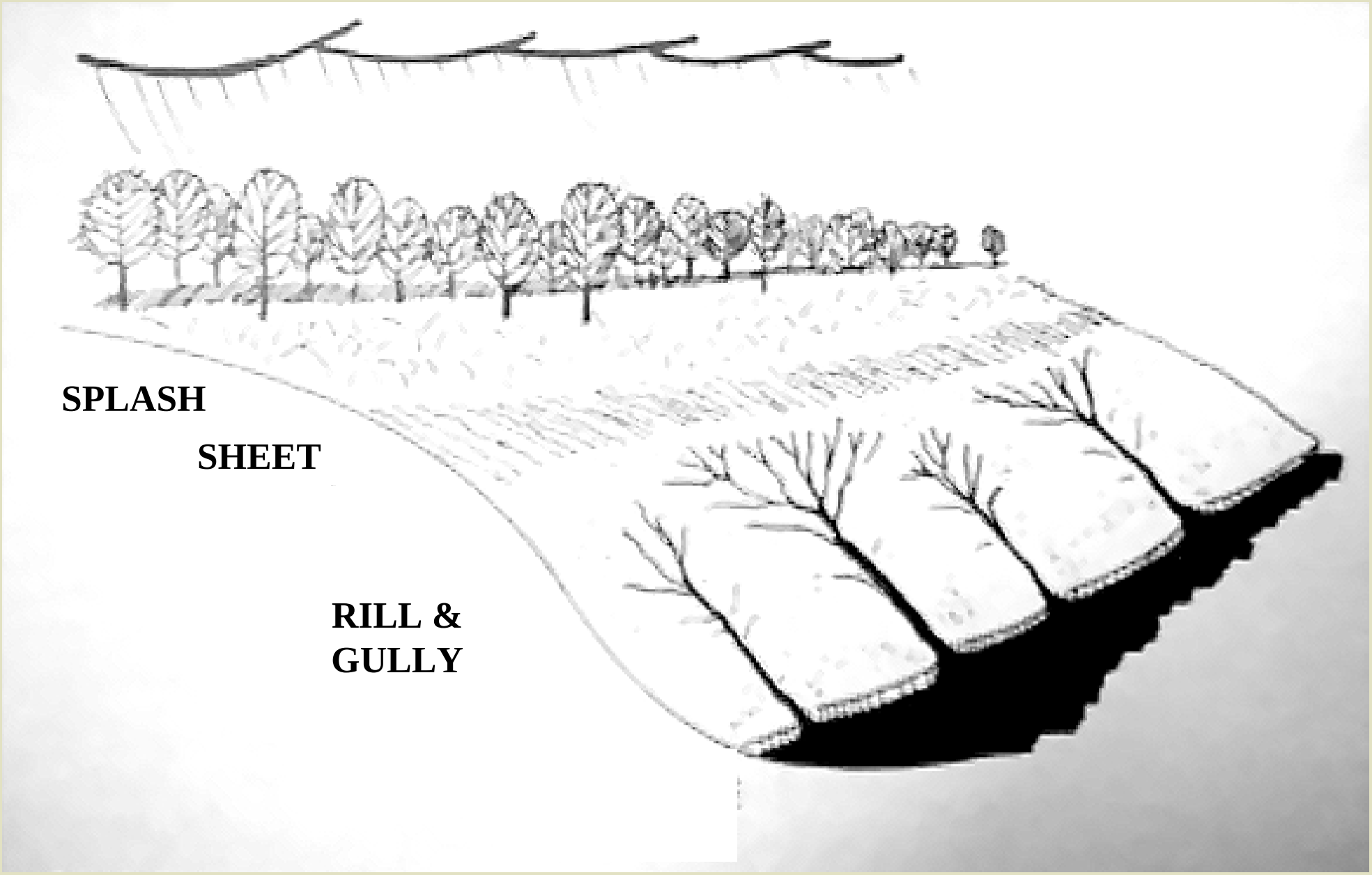
Rill Erosion: An erosion process in which numerous small channels only several inches deep are formed


RILL EROSION

GULLY EROSION: The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to a considerable depth, ranging from 1-2 feet to as high as 70-100 feet.


Gully Erosion

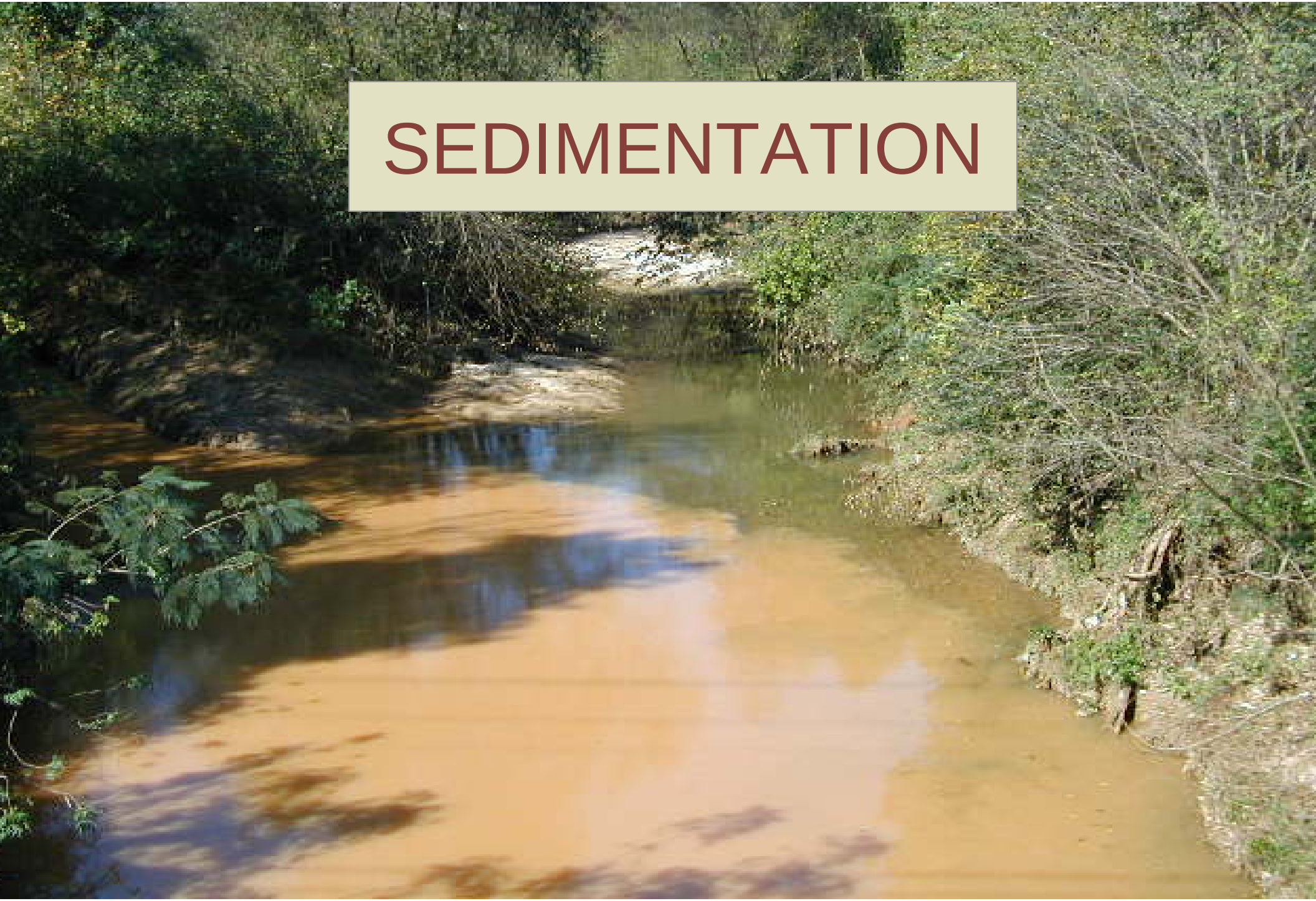
TYPES OF WATER EROSION



Sedimentation

The process by which the eroded material is transported and deposited by:

- Water
- Wind
- Ice
- Gravity


SEDIMENTATION

SEDIMENT TRANSPORT

GA stream following 1/2” of rain June 26, 2001

Erosion vs. Sedimentation

Soil Erosion

- Soil particles are detached
- Occurs on all land – Accelerated by construction activities

Sedimentation

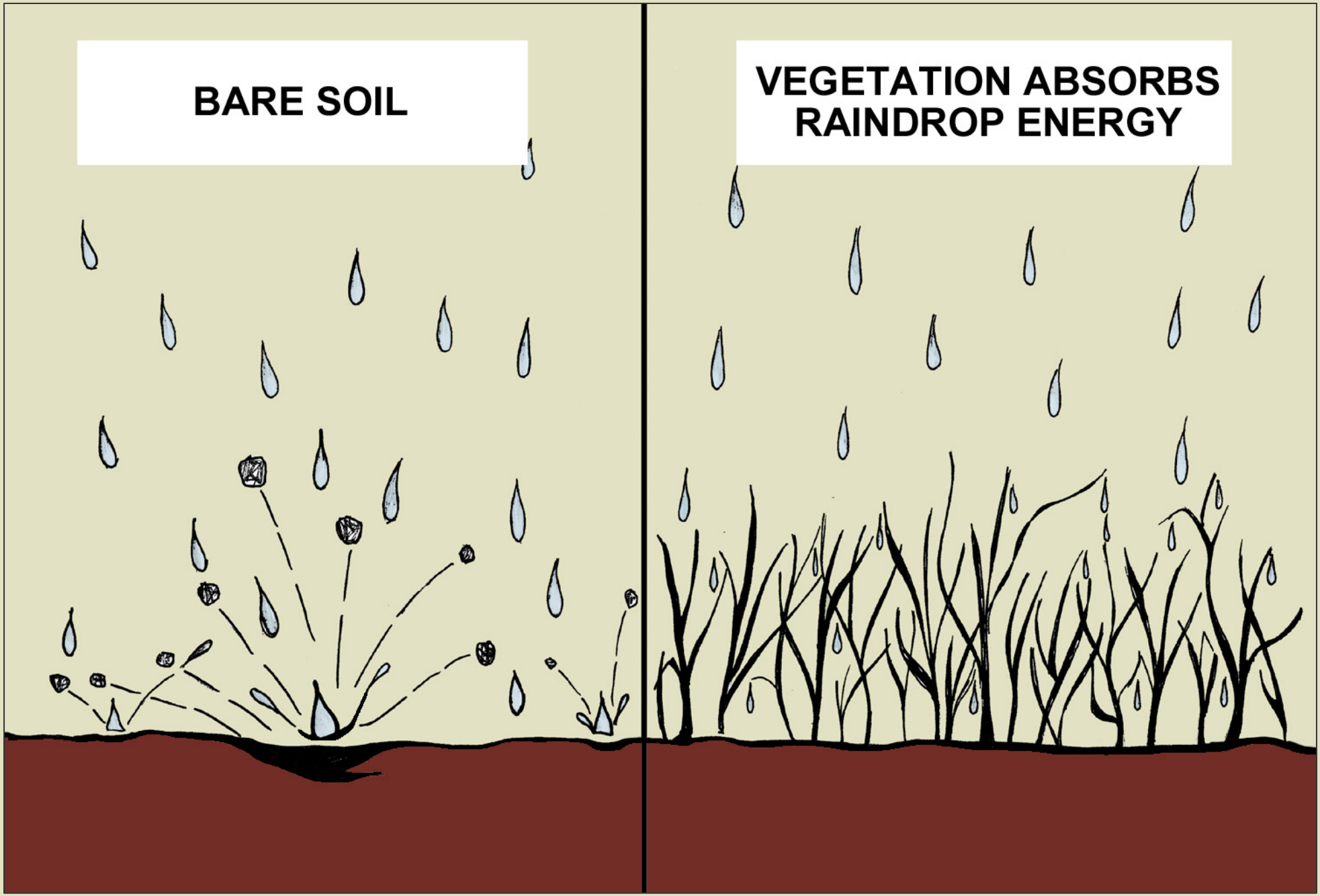
- Transportation and deposition of eroded soil
- **Sediment is #1 non-point source pollutant in U.S.**

Impacts of Construction Activities

1. **Removal of vegetation**
2. Removal of soil organic matter
3. Reshaping of ground surface contours
4. Exposure of subsoil
5. Changing the pervious ground surface to impervious

Importance of Vegetation

- Absorbs raindrop impact
- Reduces detachment
- Roots hold soil in place
- Slows water flow
- Adds organic material to the soil
- Reduces runoff
- Increases infiltration


BARE SOIL
VEGETATION ABSORBS RAINDROP ENERGY


Vegetation holds
soil in place

Impacts of Erosion and Sedimentation

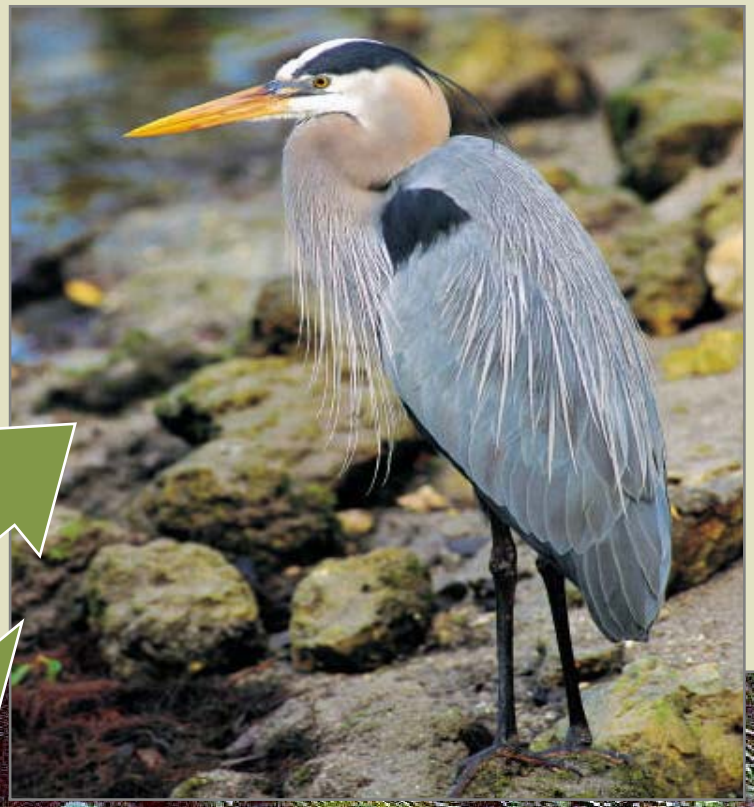
1. Loss of soil productivity
2. Adverse effects on other water resource facilities
3. Loss of reservoir storage capacity
4. Flood impacts
5. Recreational impacts
6. Deterioration of water quality

Increased maintenance costs for stormwater management systems

Taxpayer Costs for Unclogging Stormwater Culverts

Decreased Recreational Value

Screens Out Sunlight = Decline in Plant Growth



Food Chain

Sedimentation Harms Wildlife

Best Management Practices

BMPs

- Required on ‘Land Disturbing Activities’ by the Erosion and Sedimentation Control Act of 1975, as amended.

Three keys to BMPs

- Proper Design, Installation, and Maintenance
- Erosion Control versus Sediment Control

Vegetative Practices

- Control Erosion
- Treat the Source

Structural Practices

- Control Sedimentation
- Treat After Erosion Has Begun

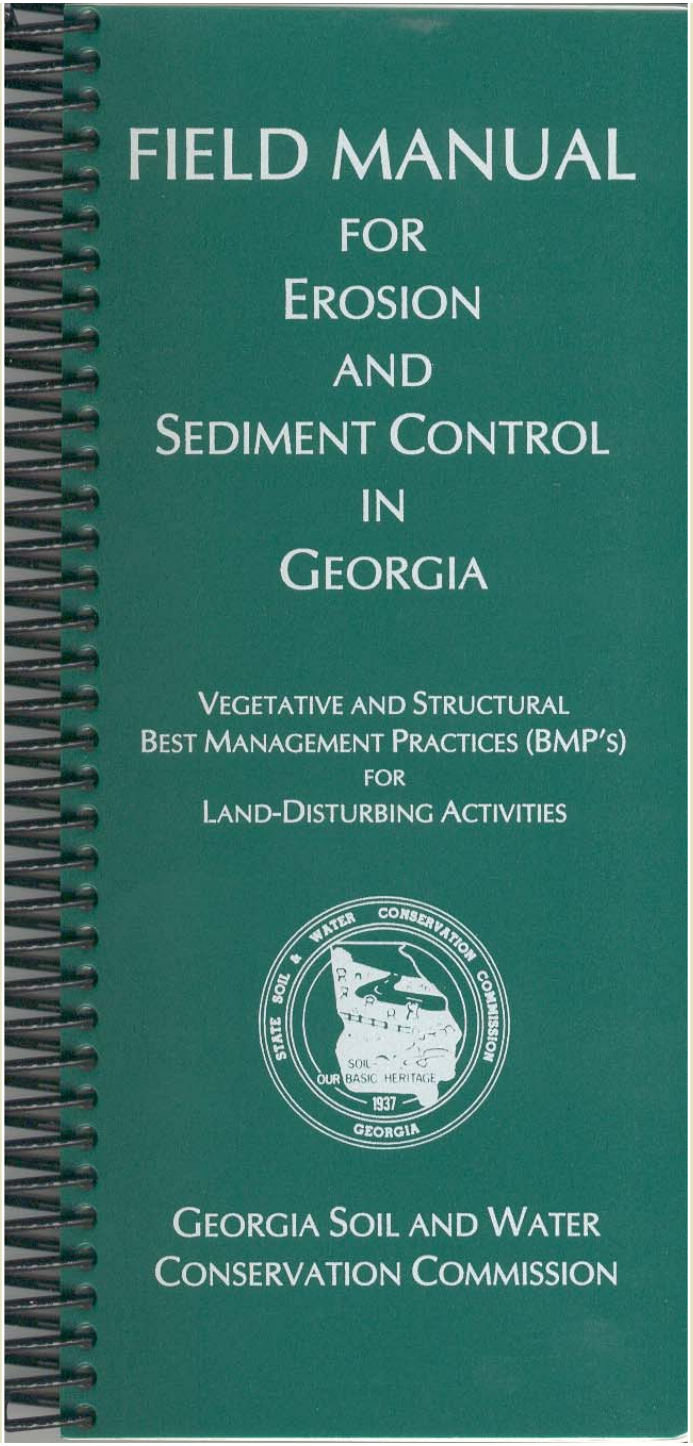
‘Land Disturbing Activity’

Activity that may result in soil erosion and movement of sediments into state waters or onto state lands

- Clearing
- Excavating
- Dredging
- Transporting
- Grading
- Filling of land

GESA 12-7-3(9)

The revised 2002 "*Field Manual For Erosion and Sediment Control In Georgia*"



Example
Vegetative Practices for Erosion and Sedimentation Control

Bf

Buffer Zone

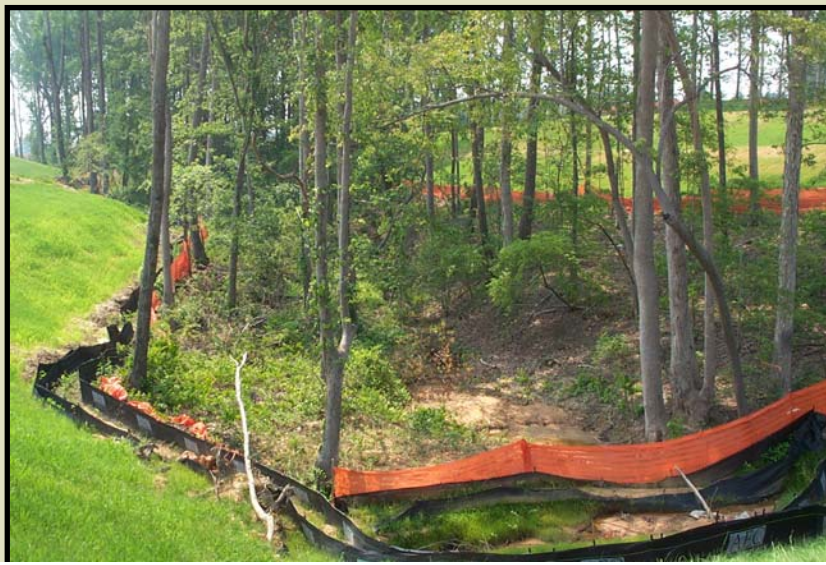
- "Buffer" means the area of land immediately adjacent to the banks of state waters in its natural state of vegetation, which facilitates the protection of water quality and aquatic habitat

(OCGA 12-7-3(2))

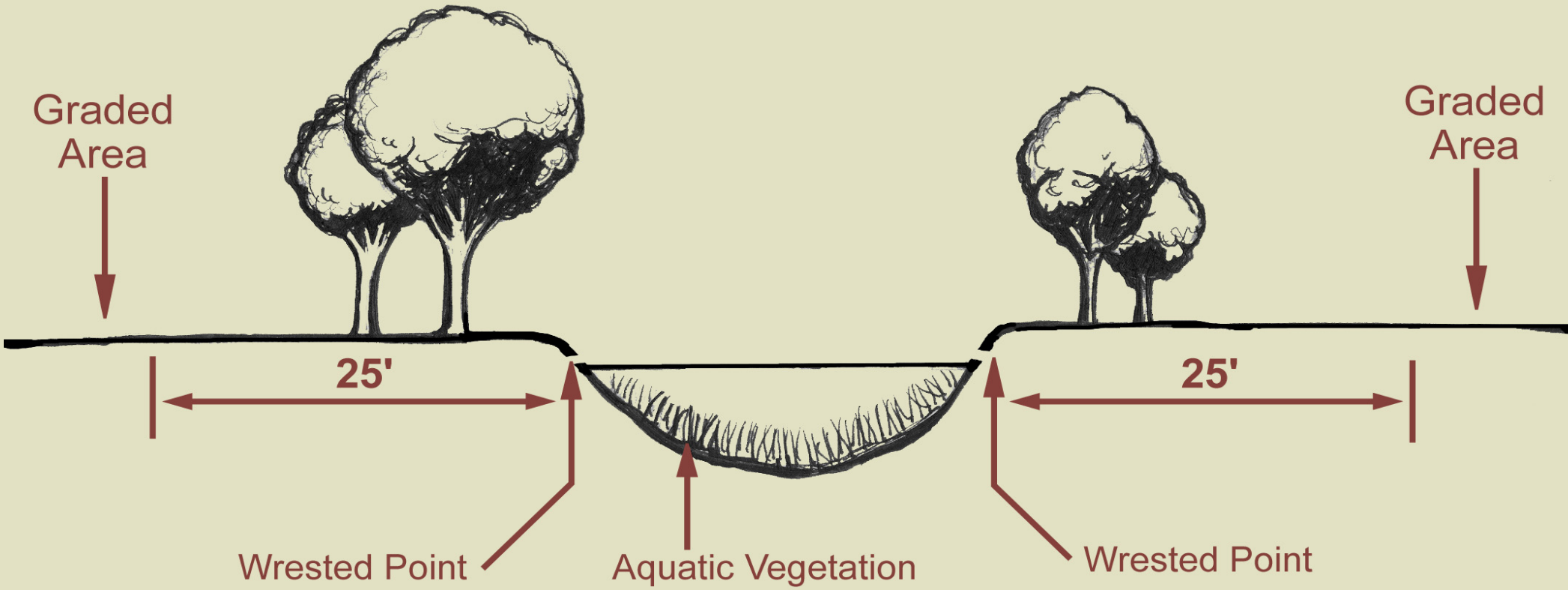
Stream Buffers Rules

- Undisturbed buffer adjacent to State Waters
- Measured horizontally from point where vegetation has been ***wrested*** by normal stream flow or wave action
- **25 Feet** - Warm Water streams*
- **50 Feet** - Trout (cold) streams*

*Local issuing authorities may require additional buffers!



"STATE WATERS"



Functions of Buffers

- Reduces storm runoff velocities
- Acts as a screen for “visual pollution”

Functions of Buffers

- Reduces construction noise
- Improves aesthetics on the disturbed land
- Filters and increases infiltration of runoff
- Cools rivers and streams by providing shade

Functions of Buffers

- Provides food and cover for wildlife and aquatic organisms
- Aids in flood protection
- Protects channel banks from scour and erosion

Ds1 Disturbed Area Stabilization (With Mulching Only)

Applying plant residues or other suitable materials to the **disturbed soil surface**

- Reduce runoff and erosion
- Conserve moisture
- Prevent surface compaction
- Control undesirable vegetation
- Modify soil temperature
- Increase biological activity in the soil

Ds1 - Mulching Only

- On exposed areas **within 14 days of disturbance**
- Apply at the **appropriate depth**
- Maintain cover on **90% or more** of the soil surface
- Can be used alone for **up to 6 months**
- Must be **anchored**

Mulching Depths

Material	Rate	Depth
Straw or hay	-	2" to 4"
Wood waste, chips, sawdust, bark	-	2" to 3"
Cutback asphalt	1200 gal./acre, 1/4 gal./sq. yd. or See manufacturer's recommendations	---
Polyethylene film	Secure with soil, anchors, weights	---
Geotextiles, jute matting, netting, etc.	See manufacturer's recommendations	---

Poor Ds1 Stabilization

Good Ds1 Stabilization

Ds2

Disturbed Area Stabilization (With Temporary Seeding)

Establishing fast growing vegetation for seasonal soil protection

- Reduce soil erosion
- Reduce runoff
- Increase infiltration
- Improve aesthetics
- Improve soil quality
- Improve wildlife habitat

Browntop millet

Per the *"Manual for E&SC in Georgia"*

Ds2 - Temporary Seeding

- On all exposed areas **within 14 days of disturbance**
- Maintain cover on **90% or more** of the soil surface
- Can be used alone for **up to 6 months**
- **Permanent vegetation** will be used if area is to be undisturbed for **more than 6 months**

Poor Ds2 Stabilization

Good Ds2 Stabilization

Ds3 Disturbed Area Stabilization (with Permanent Vegetation)

Planting perennial vegetation (grasses, legumes, vines, shrubs, and trees) on exposed areas

-Final permanent stabilization means 100% of soil surface covered by permanent vegetation at a density of 70%

-Rough graded sites >6 months

Poor Ds3 Stabilization

Good Ds3 Stabilization

Mb

Erosion Control Matting and Blankets

Protective coverings used to establish permanent vegetation

- Protects young plants
- Promotes plant establishment
- Helps reduce erosion

-Temporary and permanent blankets

-All must be approved by GDOT

Tp Topsoiling

Stripping, storing, and using topsoil as topdressing

- **Reduces lime and fertilizer needs**
- **Better plant growth**

Other Vegetative BMPs

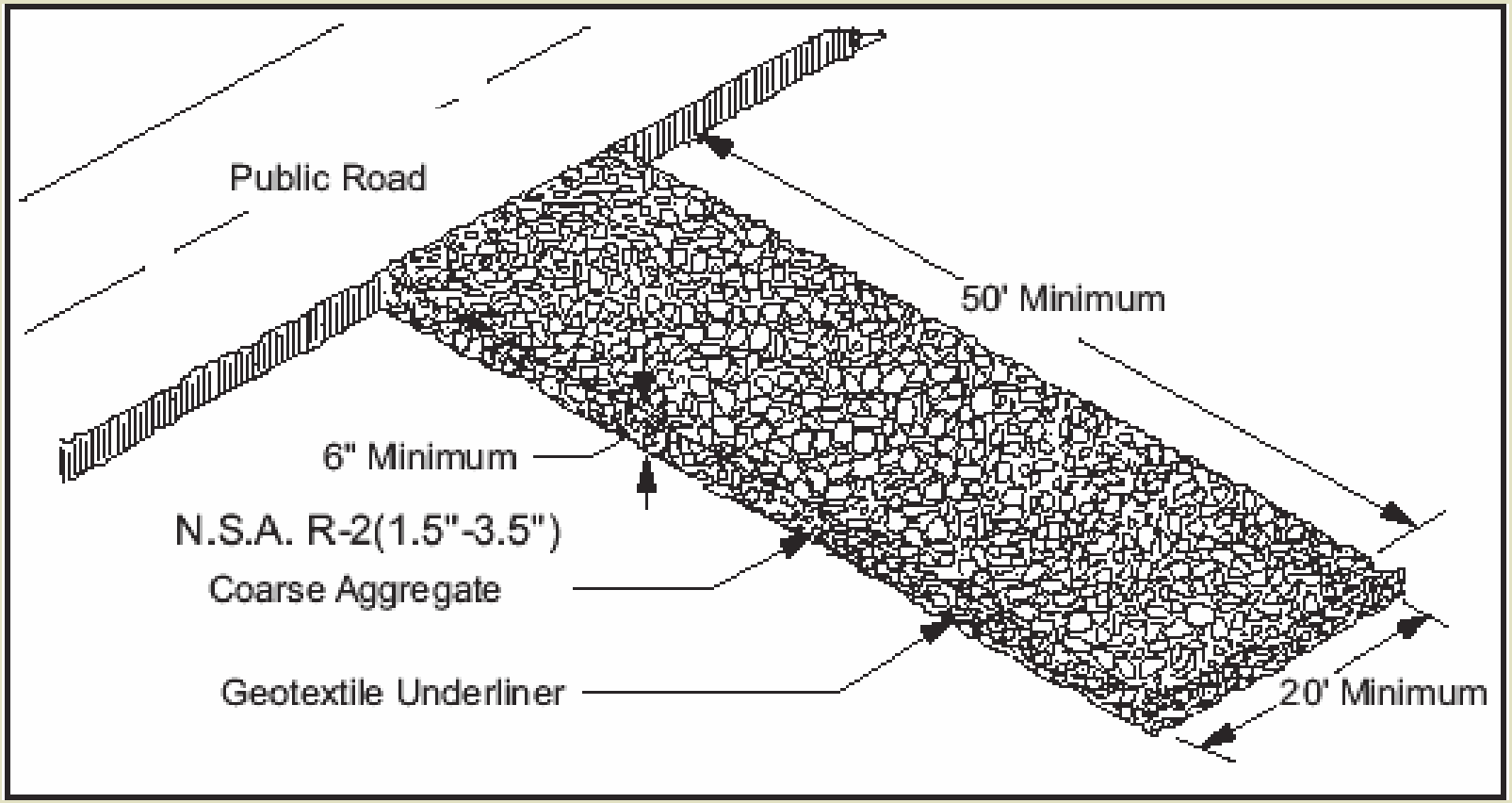
- Cs – Coastal Dune Stabilization
- Du – Dust Control
- Sb – Streambank Stabilization
- Refer to the ES&PC plan for additional info

Example
Structural Practices for Erosion and Sedimentation Control

Co

Construction Exit

- To reduce or eliminate the transport of mud from the construction area



The Good

The Bad

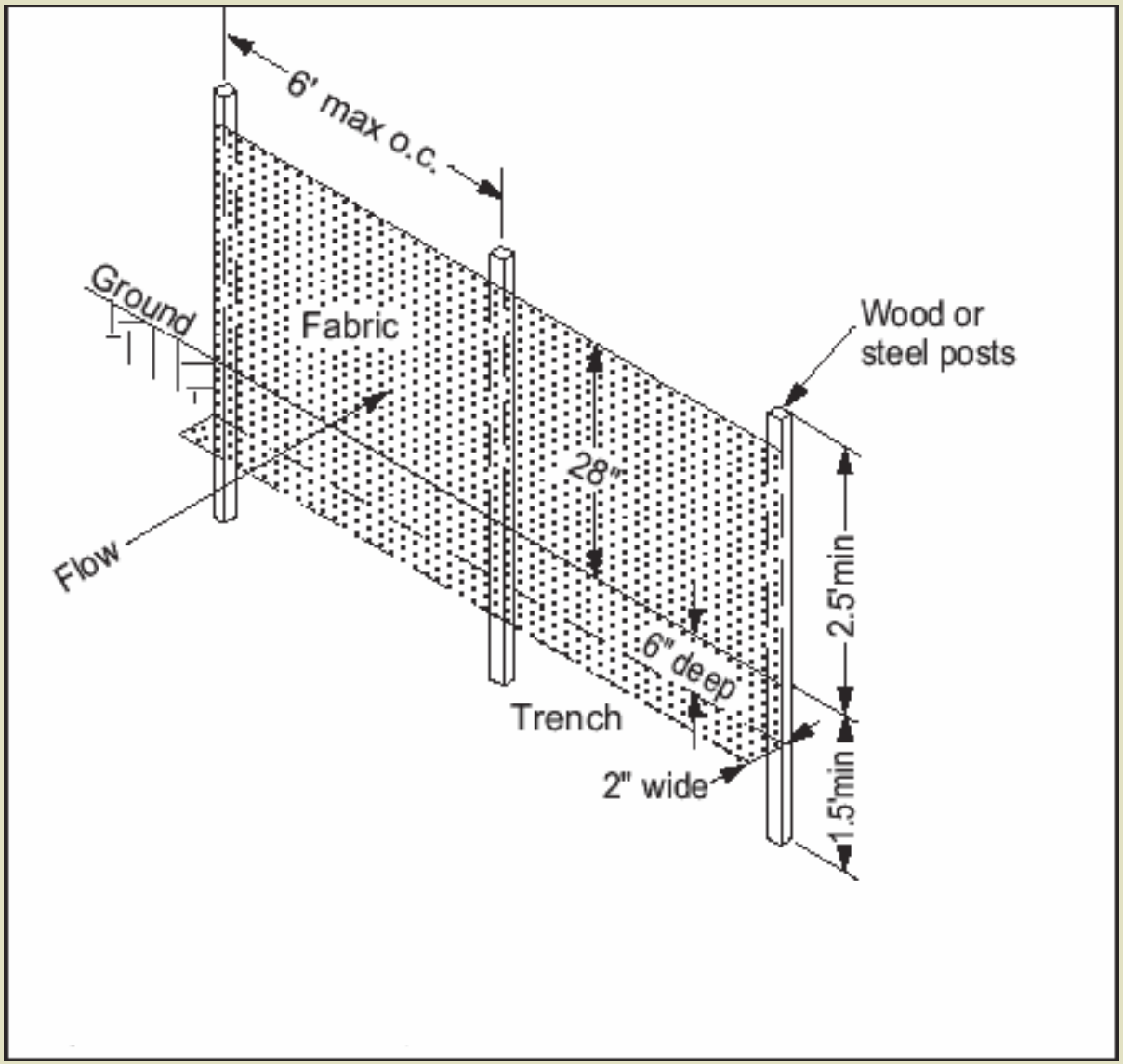
And The Ugly

Sd1

Silt Fence

- To slow the velocity of runoff and cause sediment deposition at the structure
- To filter sediment from runoff

Silt Fence – Type A

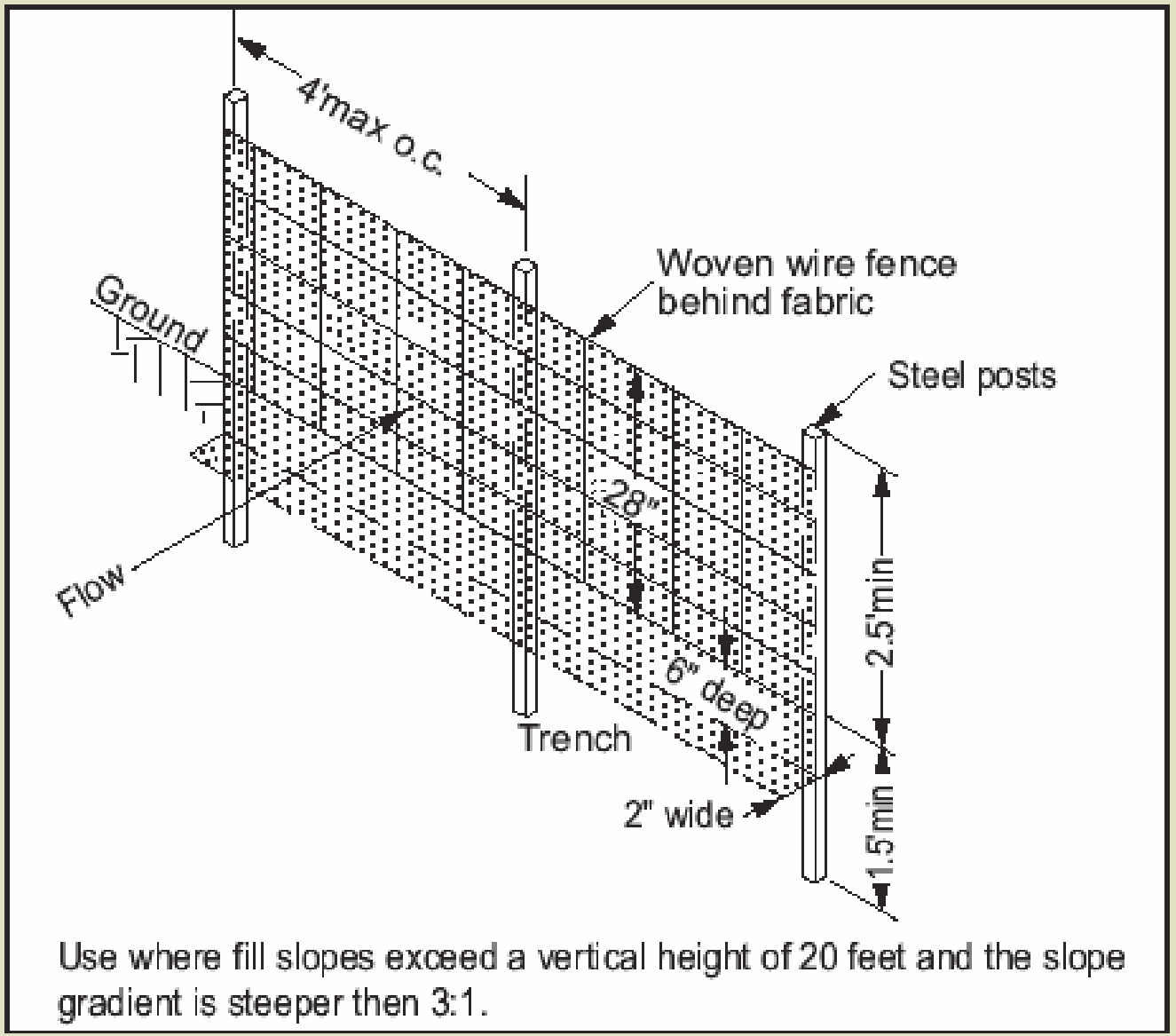


The Good

The Bad

And The Ugly

Silt Fence - Type C



Use where fill slopes exceed a vertical height of 20 feet and the slope gradient is steeper then 3:1.

The Good

The Bad

And The Ugly

Placing soil over this bottom flap is NOT the proper way to trench silt fence

Silt fence must be properly trenched in 6 inches

Sd1

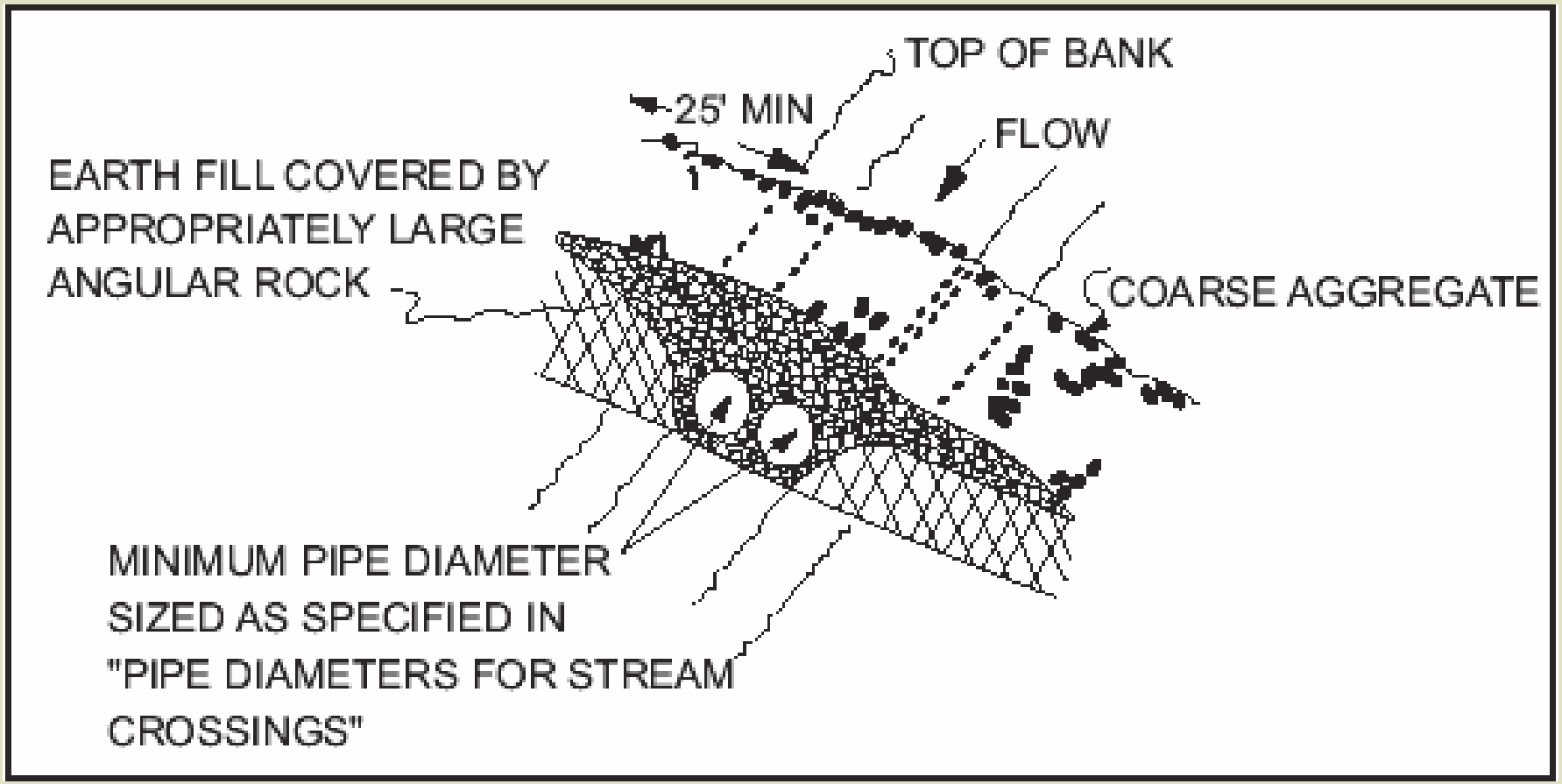
Silt Fence

- For stream buffers and other sensitive areas, two rows of Type C silt fence or one row of Type C backed by haybales shall be used

Sr

Temporary Stream Crossing

- To protect streams from damage and erosion.



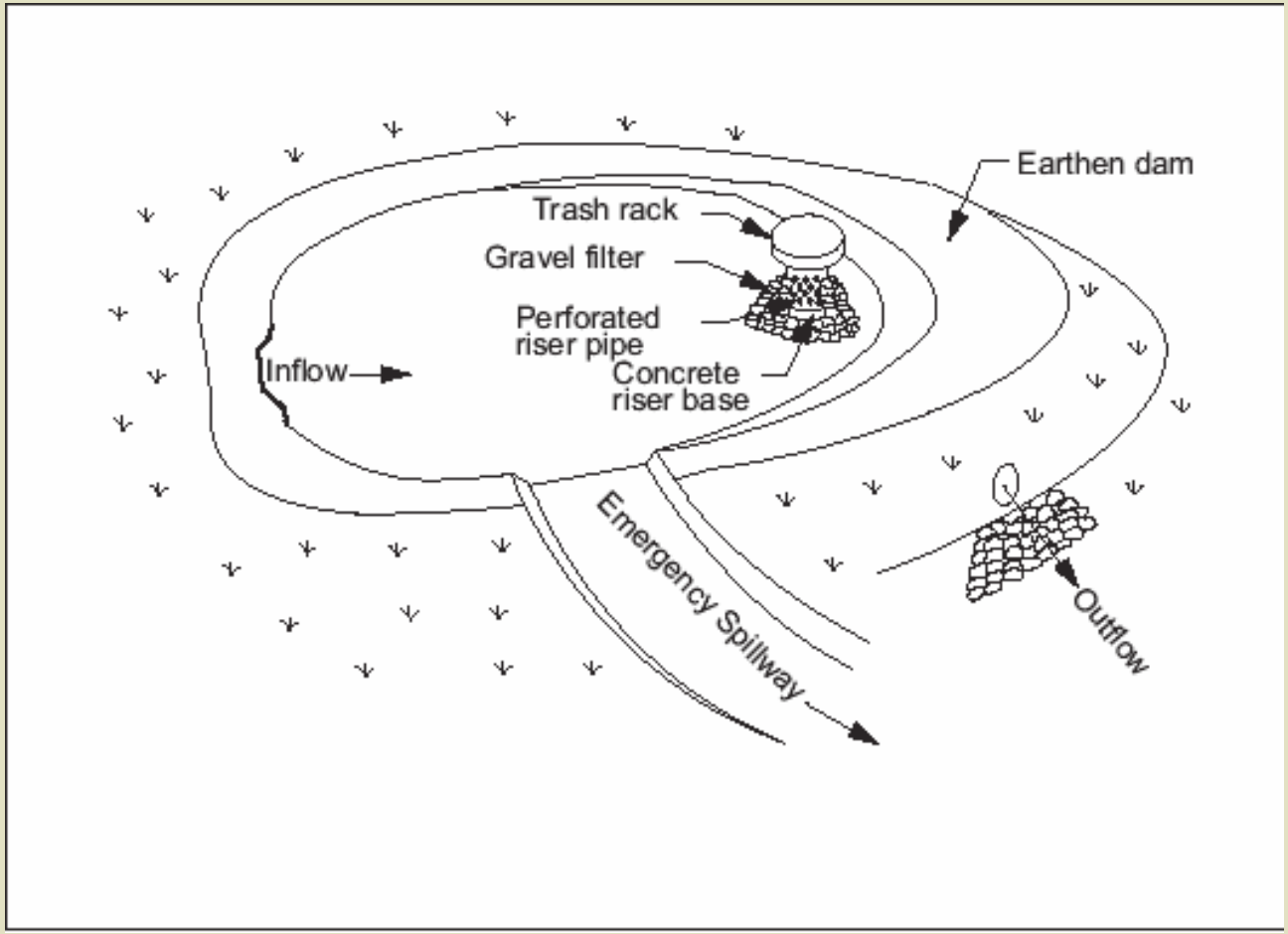
The Good

The Bad

And The Ugly

Sd3 Temporary Sediment Basin

- To detain runoff waters and trap sediment.



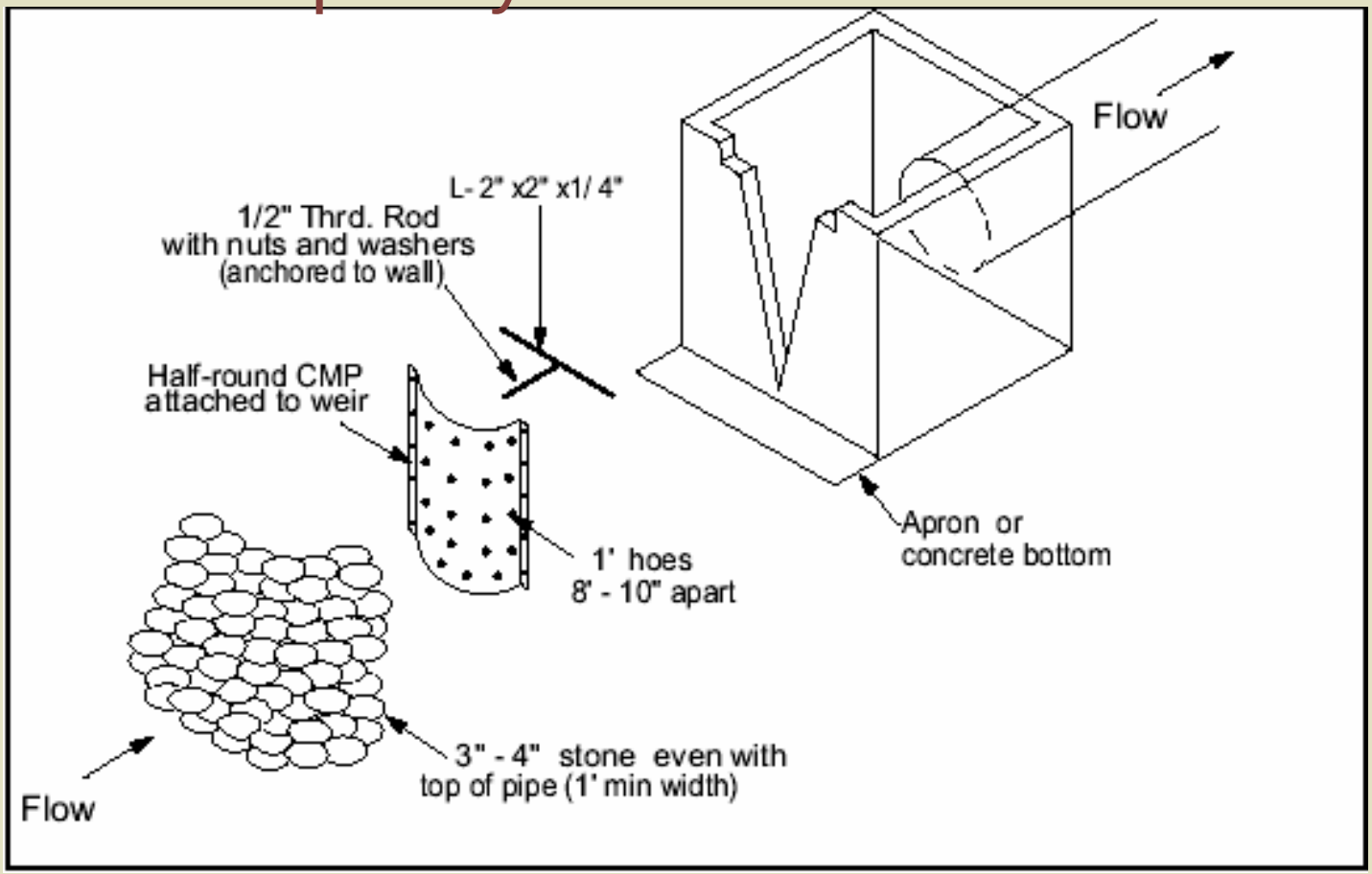
The Good

The Bad

And The Ugly

Rt Retrofitting

- To allow stormwater detention basins to function as temporary sediment retention basins.



The Good

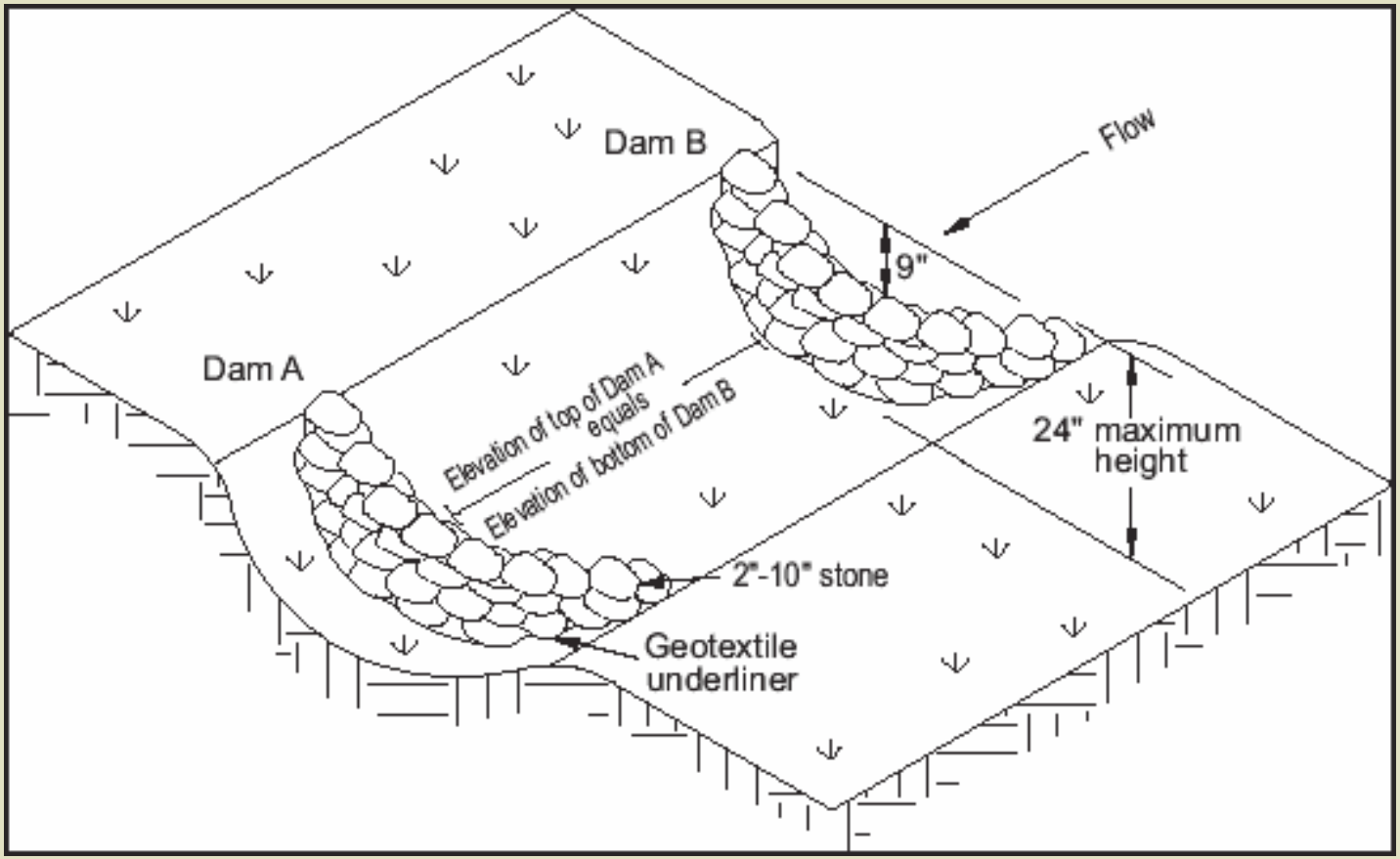
The Bad

And The Ugly

Cd

Check Dam

- To reduce flow velocities and filter sediment.



The Good

The Bad

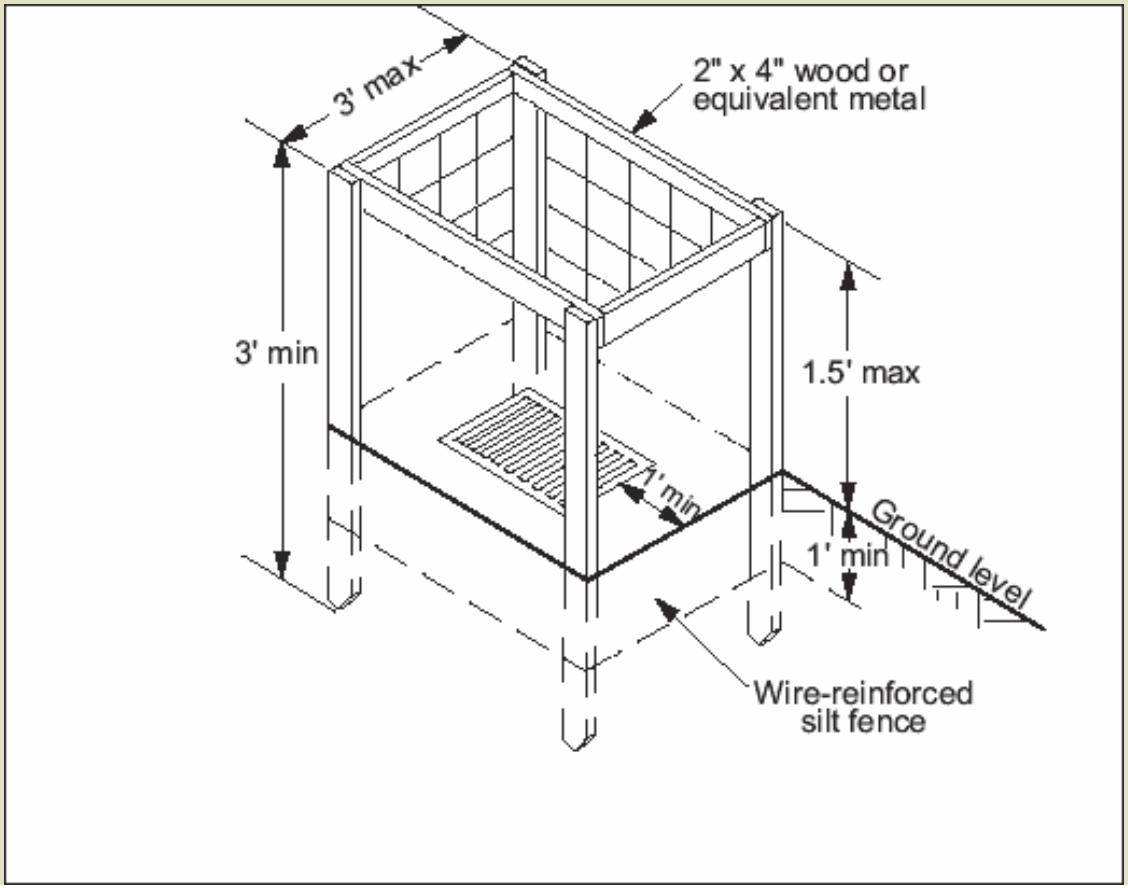
And The Ugly

Never Use Silt Fence as Check Dams

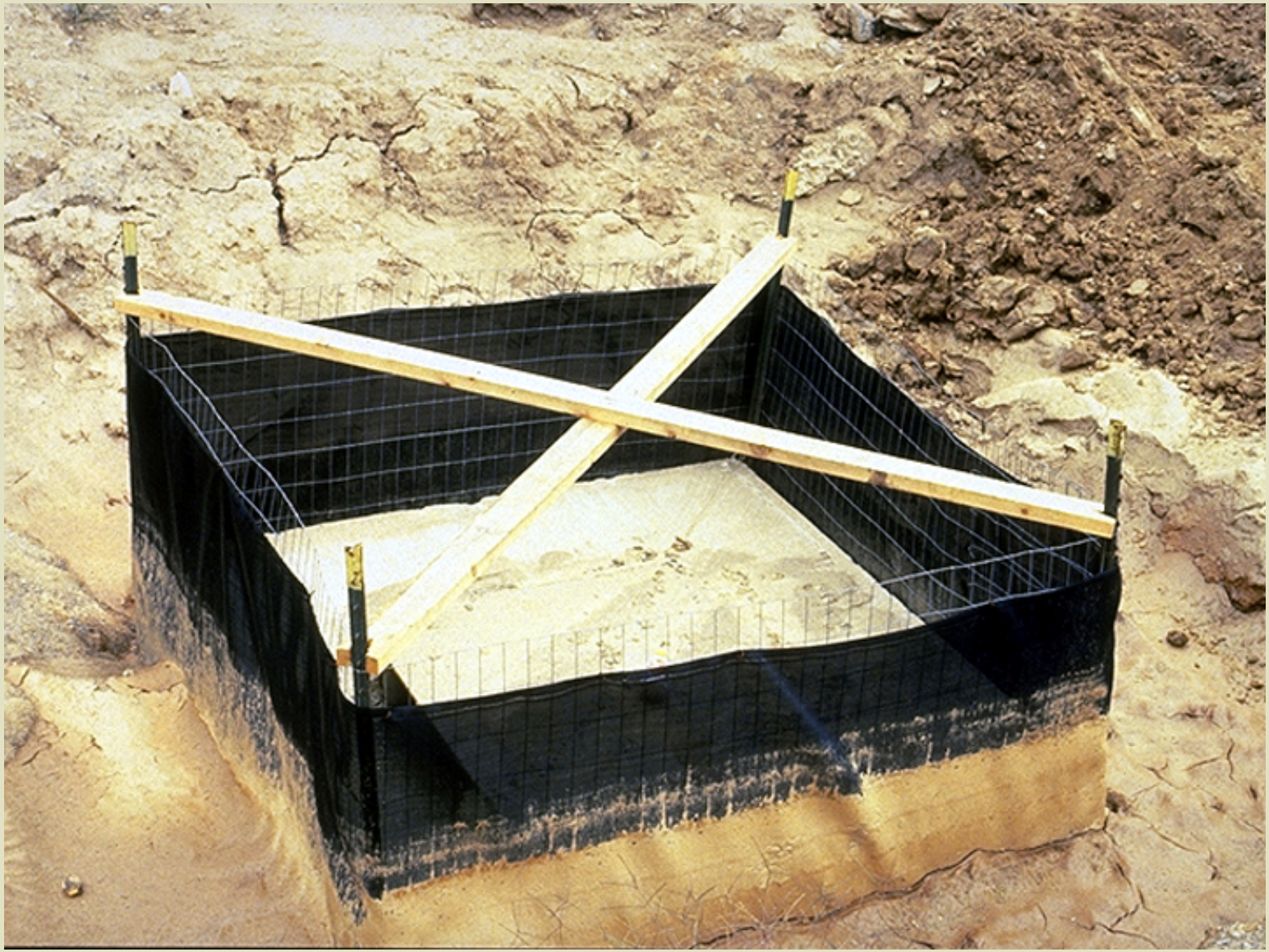
Sd2-F

Inlet Sediment Trap

- To prevent sediment from entering storm drain systems.



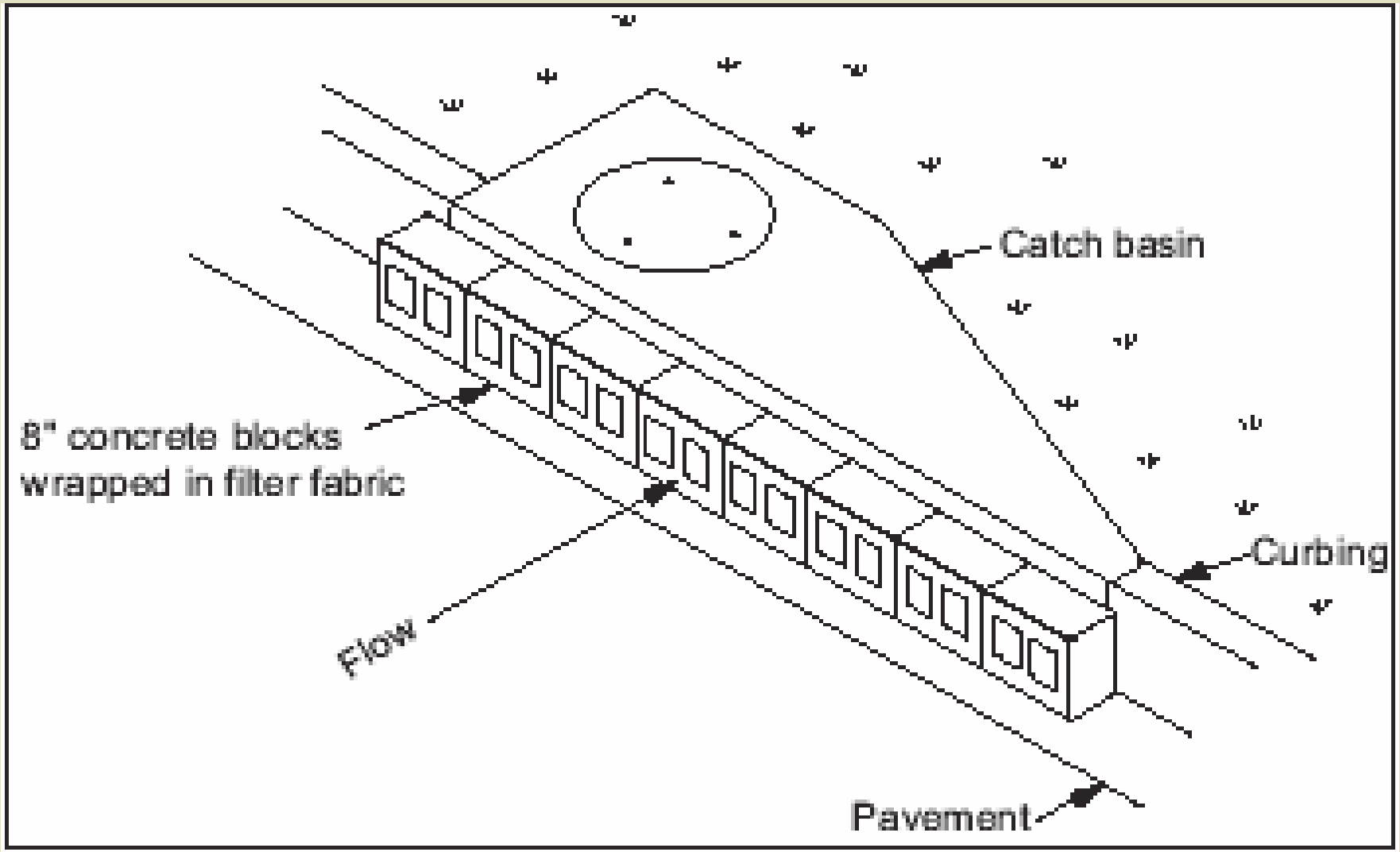
The Good



The Bad

And The Ugly

Temporary Sediment Trap (Sd2-PP)



The Good

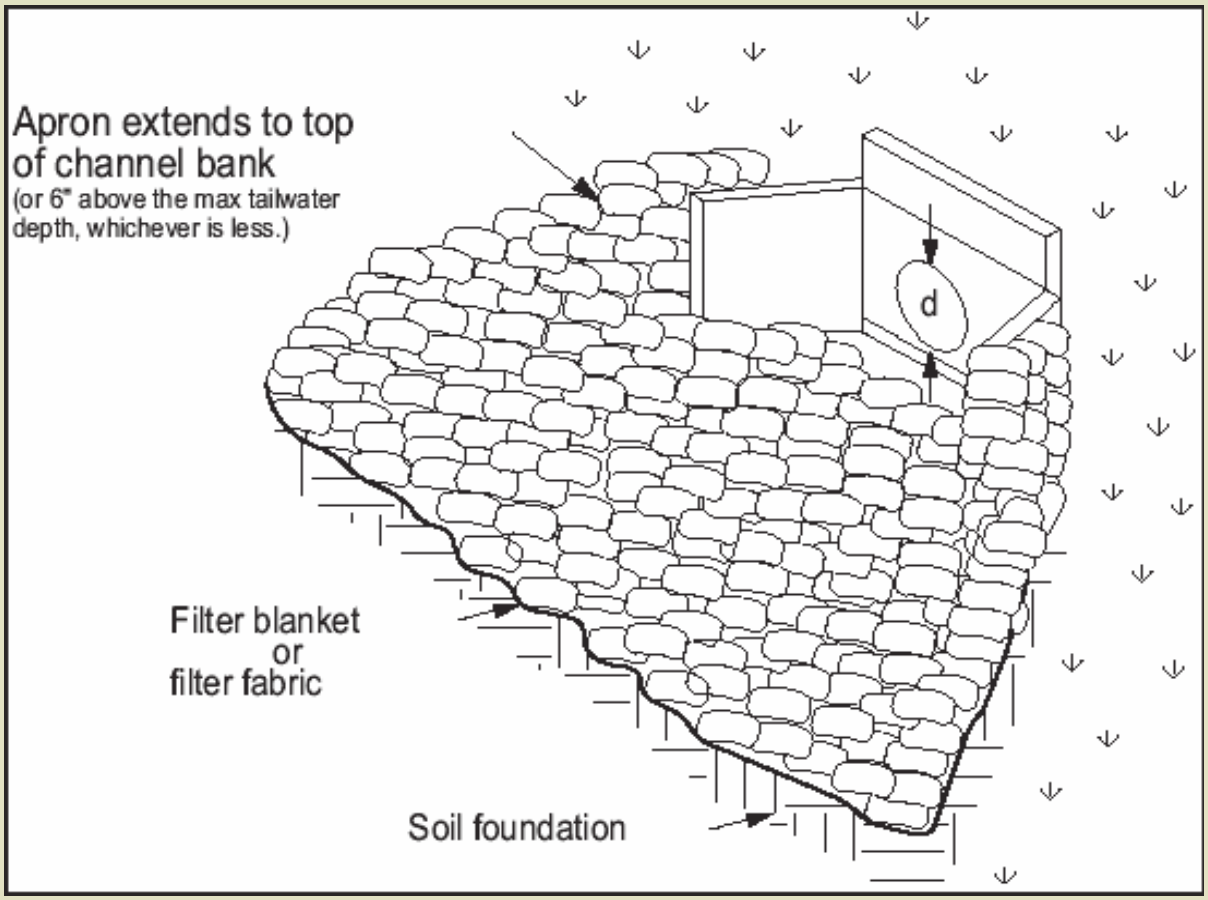
The Bad

And The Ugly

St

Outlet Protection

- To reduce the velocity of flow from storm drain outlets



The Good

The Bad

And The Ugly

Other Structural BMPs

- Ch – Channel Stabilization
- Di – Diversion
- Dn1 – Temporary Downdrain
- Dn2 – Permanent Downdrain
- Ga – Gabion
- Ge – Geotextiles
- Gr- Grade Stabilization
- Lv – Level Spreader
- Rd – Rock Filter Dam
- Re – Retaining Wall
- Su – Surface Roughening
- Wt- Vegetated Waterway

Clean-out Elevations

- One-Half (1/2) Full
  - Silt fence
  - Check dams
  - Rock filter dams
  - Inlet sediment traps
- One-Third (1/3) Full
  - Temporary sediment basins
  - Retrofitted detention ponds

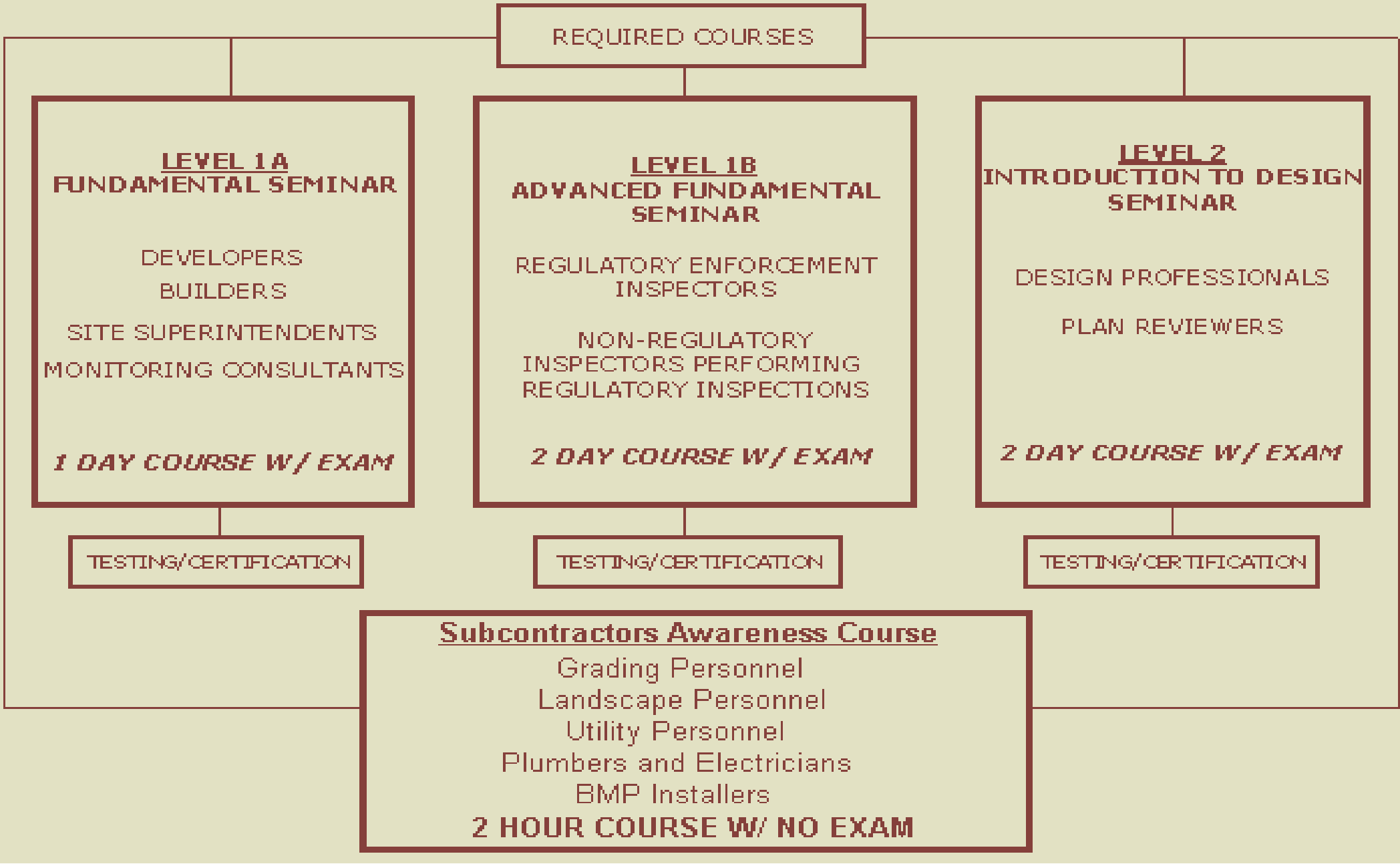
Regulations Governing Erosion and Sediment Control in Georgia

- GA Erosion and Sediment Control Act of 1975
- NPDES Permit for Construction Activities
- Local Government Ordinances

Key Points

- Land disturbing activities are governed on the federal, state and local level
- GESA is a state law that may be adopted and enforced by local governments
    - Includes requirements for Education/Certification Program
- NPDES Permit for Construction Activities is a federal permit delegated to EPD for enforcement
    - Includes requirements for inspections

Education/Certification Requirements



Subcontractor Certification

- Is required for those individuals involved in land disturbing activities working in a subcontractor capacity under a primary, secondary or tertiary permittee.

- Does NOT qualify an individual to perform the duties of a “qualified” or “certified” person/ personnel. If you are performing such duties, a Level IA certification is required.

Education and Certification Program Fact Sheet

Gives guidance on:

- Who needs to be certified
- What type of certification is needed
- What activities are exempt from certification

Available in your course notebook and on the GSWCC website:

www.gaswcc.org under Documents

Examples of a Subcontractor

Include but are not limited to :

- Grading personnel
- Plumbers and Electricians
- Landscape personnel
- Waste water personnel
- Best Management Practice installation personnel
- Other subcontractors conducting land disturbing activities

*Please refer to FACT SHEET for additional occupations

Examples of Primary, Secondary, Tertiary Permittees

Include but are not limited to :

- Developers
- Builders
- Contractors
- Site superintendents

*Please refer to FACT SHEET for additional occupations

Inspection Requirements
Primary and Tertiary Permittees

Inspections made by qualified personnel only (Level 1A Certification)

- **Daily Inspections**
  - Areas where petroleum products are stored, used, or handled for spills and leaks from vehicles and equipment
  - Vehicle entrances and exits for off-site tracking
  - Daily rainfall

- **Weekly and within 24 hours of each rainfall ≥ .0.5”**
  - Disturbed areas not yet finally stabilized
  - Areas used for storage of materials
  - Structural control measures
  - Discharge points as accessible to determine if pollutants are leaving site

  ** For GAR 100002 – this inspection is performed every 14 days

- **Monthly**
  - Areas of site that have reached final stabilization for evidence of impacts to state waters by pollutants and sediment

Permit	Daily (when construction occurs)	Weekly or after each 0.5" rainfall event	Every 14 days or after each 0.5" rainfall event	Monthly
GAR 100001 Stand Alone	1) All areas where petroleum products are stored, used or handled for spills and leaks from vehicles 2) All locations where vehicles enter or leave the site 3) Rainfall for each 24-hour period	1) All areas that have not undergone final stabilization 2) All material storage areas exposed to precipitation that have not undergone final stabilization 3) Structural control measures		Areas that have undergone final stabilization
GAR 100002 Infrastructure	1) All areas where petroleum products are stored, used or handled for spills and leaks from vehicles 2) All locations where vehicles enter or leave the site 3) Rainfall for each 24-hour period		1) All areas that have not undergone final stabilization 2) All material storage areas exposed to precipitation that have not undergone final stabilization 3) Structural control measures	Areas that have undergone final stabilization
GAR 100003 Common Development	1) All areas where petroleum products are stored, used or handled for spills and leaks from vehicles 2) All locations where vehicles enter or leave the site 3) Rainfall for each 24-hour period	1) All areas that have not undergone final stabilization 2) All material storage areas exposed to precipitation that have not undergone final stabilization 3) Structural control measures		Areas that have undergone final stabilization

Inspection Requirements
Secondary Permittees

Inspections made by qualified personnel only (Level 1A Certification)

- **Daily Inspections**
  - Areas where petroleum products are stored, used, or handled for spills and leaks from vehicles and equipment
  - Vehicles entrances and exits for off-site tracking

- **Weekly and within 24 hours of each rainfall ≥ 0.5”**
  - Disturbed areas not yet finally stabilized
  - Areas used for storage of materials
  - Structural control measures
  - Discharge points as accessible to determine if pollutants are leaving site

- **Monthly**
  - Areas of site that have reached final stabilization for evidence of impacts to state waters by pollutants and sediment

Inspection Requirements
Documentation

- If BMP deficiencies are found during an inspection, they should be corrected immediately and the ESPCP must be revised as appropriate within seven days.

- Secondary must notify primary within 24-hours of any suspected BMP design deficiency. Primary must evaluate within 48-hours

Regulatory Agency Enforcement Options

- Notice of Violation (NOV)
- Issuance of a Stop Work Order
- Revocation of business license
- Suspend LDA permit
- Deny future LDA permit applications for 2 or more violations within 3 years
- Imposition of monetary penalties ($32,500 per day per violation)
- Civil Action
- Imprisonment (Up to 15 years)
- Forfeiture of Bonding (bonding is an option provided in the Act up to $3000 per acre)

Local Issuing Authority Enforcement
Warnings/Notice of Violations

When an inspector finds a violation of any provision of the ordinance:

- First & Second Violation – Written warning
  - Violator has five days to correct the action
  - No corrective action = Stop Work Order
- Third Violation – Immediate Stop Work Order

OCGA 12-7-12(c)

Enforcement
Stop Work Orders

- Immediate Stop Work Orders
  - Third Violation
  - Danger to public health or state waters
  - Disturbing land without a permit
  - Stream buffer violation
  - BMPs not properly designed, installed or maintained
  - Sediment entering state waters

OCGA 12-7-12(c)

Summary

- Erosion and sedimentation is a serious problem associated with active construction sites.
- Implementing a series of sound Best Management Practices that are properly designed, installed, and maintained is the only way to prevent problems.
- Any violations associated with erosion and sedimentation must be properly documented and corrected.

Goal