Erosion Control State Standards Sampling of Material Innovations

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CONSTRUCTION MATERIALS

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Agenda

- Review of Current Regulations (10 min)
- Slope Stabilization Techniques (10 min)
- Channel Stabilization Techniques (10 min)
- Dewatering and Basin Draining (10 min)

North Dakota

- Construction Permit expires 2020
- Less regulation. Good in some respects but harder to get people to change
- 3 or 4 inspectors for the entire state
- Certification: Prime, Subcontractor, and Engineer

North Dakota Continued

- Getting things stabilized and knowing you have to do it as you go.
- Wind erosion – dry conditions.
- Updating the narrative sections of the SWPPP.

South Dakota - DOT

- Certification: Contractor, Maintenance, and Designers
- Standard ESC Plans and Details
- BMP Maintenance
- New Statewide NPDES Permit out for review

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CURRENT RULES - HISTORY

- USEPA – 1972 Clean Water Act (Revised 1990)
  - Created the National Pollutant Discharge Elimination System (NPDES)
  - 1970's – Focussed primarily on "point" discharges
  - 1990's – Focussed changed to "nonpoint" discharges (stormwater)
  - Delegated authority to the states to administer
- State Agencies – NPDES General Permits (MS4, Construction Site, Industrial)
  - 1991 – Major Metropolitan areas (MSP)
  - 2001 – Included most major communities within MN
- Cities, Watershed Districts, SWCDs
  - 2001 to Present – Establishing rules and enforcement to meet their permit requirements

CURRENT STORMWATER RULES

- NPDES – Three General Stormwater Permits
  1. **Construction Stormwater Permit**
     - Sets minimum standards for erosion control, sediment control, and stormwater management
  2. Municipal Separate Storm Sewer System (MS4) Permit – 6 Minimum Control Measures
     1. Public Education/Outreach
     2. Public Participation/Involvement
     3. Illicit Discharge Detection and Elimination
     4. **Construction Site Runoff Control**
     5. **Post Construction Stormwater Management**
     6. Pollution Prevention/Good Housekeeping
  3. Industrial Stormwater Permit
     - Sets standards for secondary containment and other control measures at manufacturing facilities, truck stations, or other industries with chemicals or materials exposed to stormwater runoff.

CURRENT RULES – CITY REQUIREMENTS

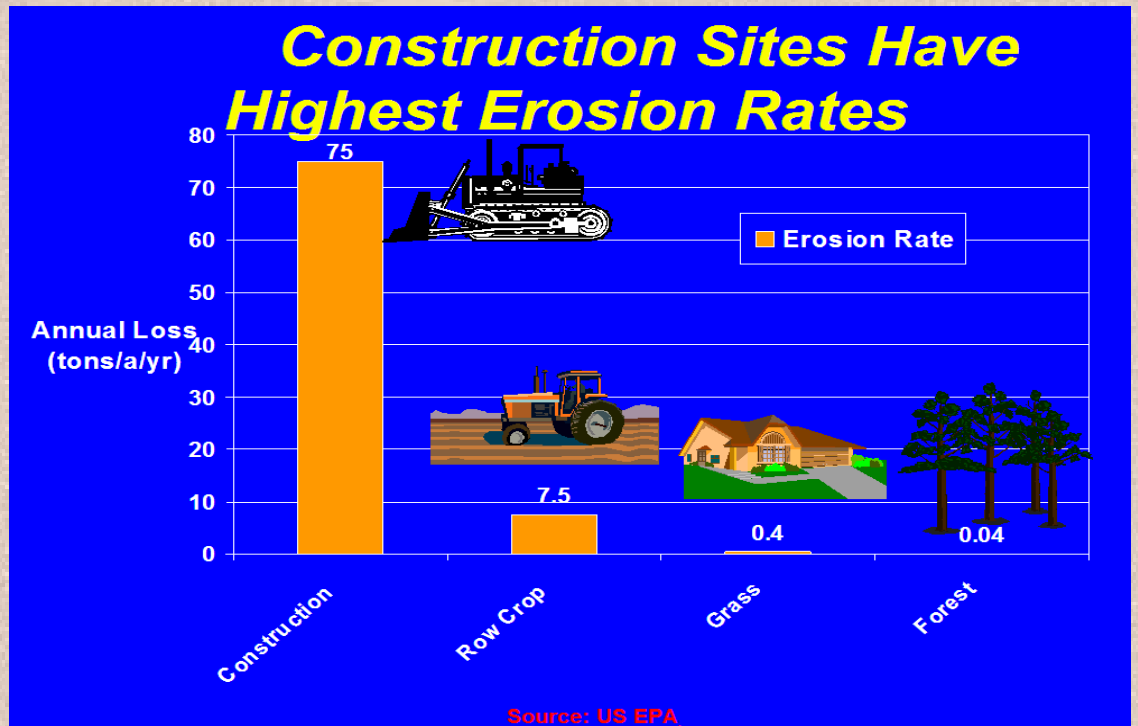
- Communities are required by the state to develop ordinances
- Rules must meet the statewide construction permit standards
- Many communities will have additional requirements or standards
  - Impaired Waters of concern
  - Trout streams
  - Sensitive natural areas
  - Specific products or solutions they feel work better than others
- Enforcement actions are typically:
  - Authorized by land disturbance or grading permits
  - Conducted by public works or building official
  - Involve fines, suspended building inspections, escrow, etc.

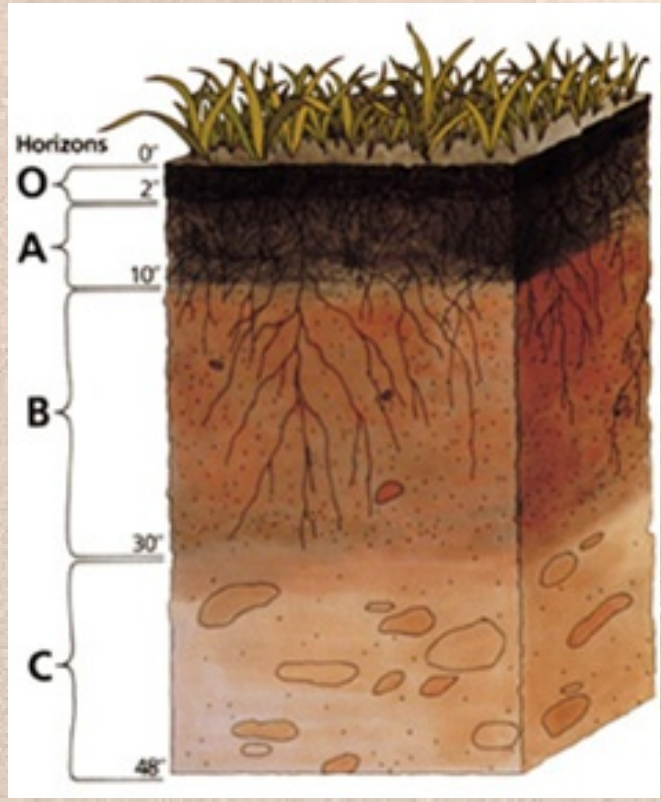
ECONOMIC IMPACTS

- Increased flood damage – storage loss due to sedimentation in stream channel
- Sediment removal costs – Municipal stormwater ponds
- Reduced tourism revenue due to loss of lake and stream biodiversity
- Greater need for irrigation
- Infrastructure cost to store additional runoff rate/volume

ENVIRONMENTAL IMPACTS

- The U.S. Environmental Protection Agency estimates that 20 to 150 tons of soil per acre are lost every year to stormwater runoff from construction sites
- The potential for erosion on highly disturbed land is commonly 100 times greater than on agricultural land
- excess nutrients and excess sediment





GENERAL STORMWATER REQUIREMENTS

1. Develop a Stormwater Pollution Prevention Plan (SWPPP)

- Erosion Control Practices
- Sediment Control Practices
- Dewatering and Basin Draining Activities
- Inspections and Maintenance
- Pollution Prevention Management
- Final Stabilization

SWPPP

What is a SWPPP?

A "living" written document that includes everything you're doing to meet the permit requirements.

For small sites, it can be pretty easy to develop

For big development sites, they can be extremely elaborate and detailed.

- Grading Plan showing pre/post drainage, discharge locations, and receiving water body
- Inspection Reports
- Contact Information
- Location, list, and quantity of all BMPs

In general, just keep everything regarding erosion and sediment control in one place and call it your SWPPP.

EROSION CONTROL VS. SEDIMENT CONTROL

Erosion Control: Keeping sediment from moving

Sediment Control: Once it's moving, get it to stop.

Always think erosion control before sediment control…as sediment is only generated after erosion has occurred.

EROSION CONTROL

Seeding/Vegetation

- Temporary or permanent establishment
- 5 Typical Practices
  - Broadcast seeding
  - Drill seeding
  - Interseeding
  - Hydroseeding
  - Sod
- Seed Type

EROSION CONTROL

- **Straw Mulch**
- **Hydraulic Erosion Control Products**
- **Rolled Erosion Control Products (ECB)**

STRAW MULCH

- Typical Application Rate: 2 Tons/Acre
- Pros
  - Low cost
  - Protects against raindrop splash
- Cons
  - May introduce weed seed
  - Must be crimped to be effective
  - Messy

HYDRAULICALLY APPLIED EROSION CONTROL PRODUCTS

- Types
  - Hydraulic Growth Media (Topsoil Alternative)
  - **Hydraulic Mulch Matrix (1-2 month) $**
  - Stabilized Mulch Matrix (3 month) $
  - Bonded Fiber Matrix (6 month) $$
  - Fiber Reinforced Matrix (12 month) $$$
- Selection Criteria
  - Soil type
  - Slope Steepness
  - Slope Length
  - Functional Longevity (how long until vegetation gets established)

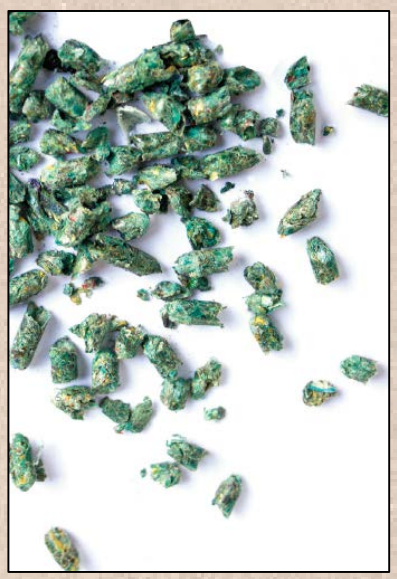
HECP - HYDRAULICALLY EROSION CONTROL

Pros

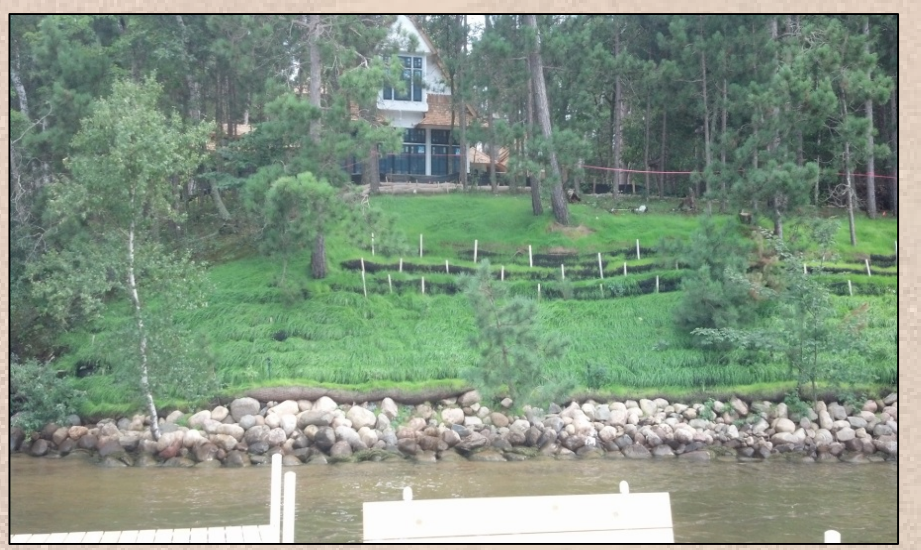
- Very good seed germination
- Cost effective for larger areas
- No netting for mowers!

Cons

- Can be expensive for small projects
- Not appropriate for channelized flow



HECP – HYDRAULIC COMPOST MATRIX

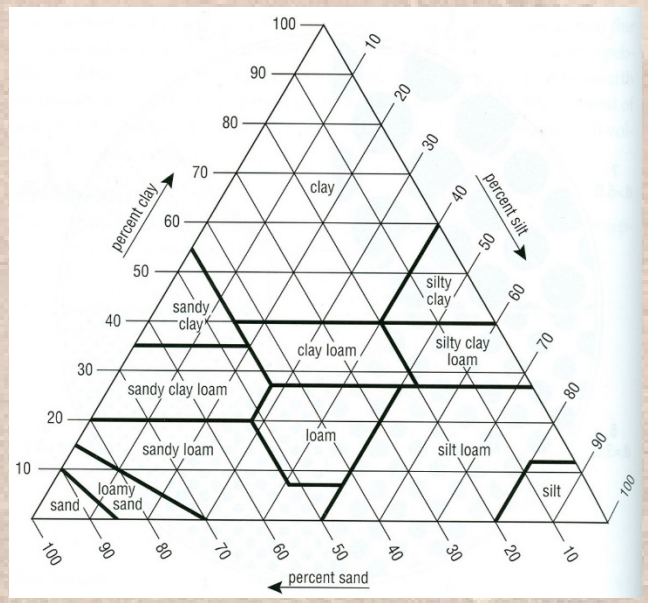


EROSION CONTROL – STOCKPILE PROTECTION

ROLLED EROSION CONTROL PRODUCTS

How do you choose the right product?

- **Performance Testing**
- **Application (Channel or Slope)**
- **Longterm Maintenance (netting issue?)**
- **Estimated Vegetation success**
  - Soil Type/Organic Matter
  - Current weather/forecast
  - Slope length and angle
  - Irrigation
  - Seed type
  - Time of year (dormant seeding?)
- **Cost**



Textural Triangle

ROLLED EROSION CONTROL PRODUCTS

Erosion Control Blankets (ECBs)

100% Straw

70% Straw/30%Coconut Blend

100% Coconut

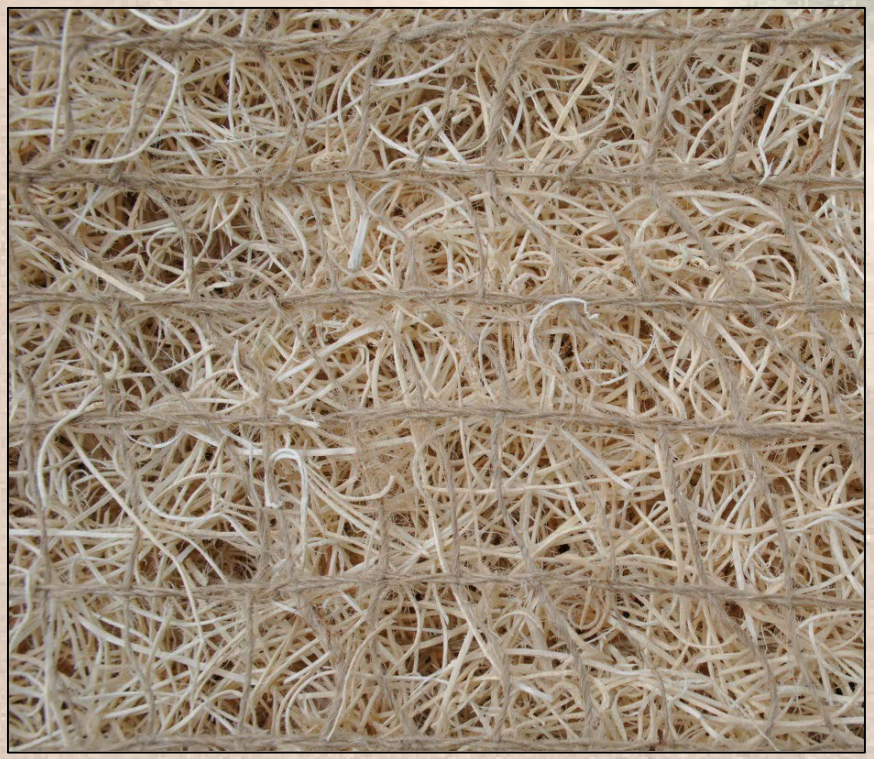
CURLEX (Aspen Wood Fiber)

Turf Reinforcement Mats (TRMs)

Composite or 100% Synthetic

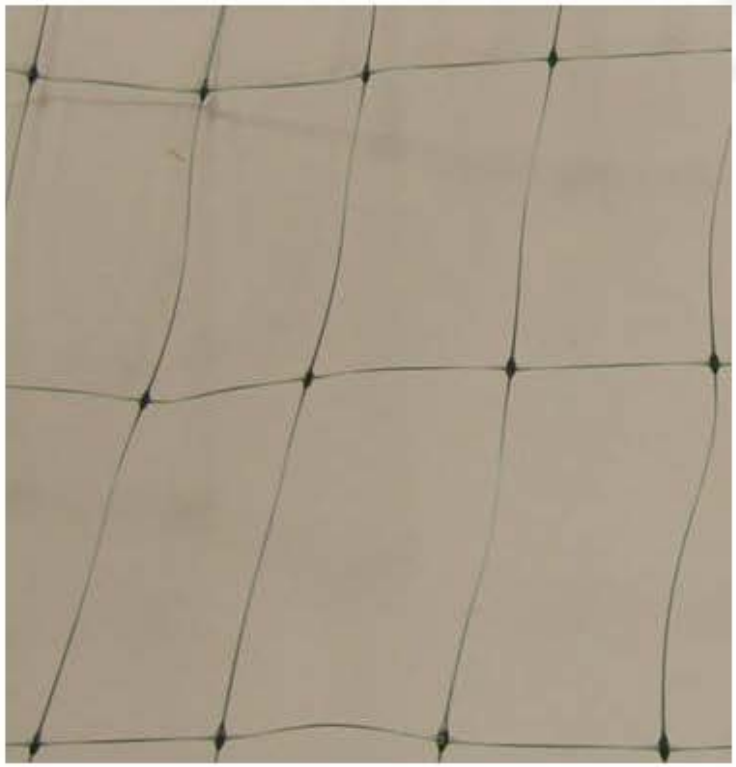
ROLLED EROSION CONTROL PRODUCTS

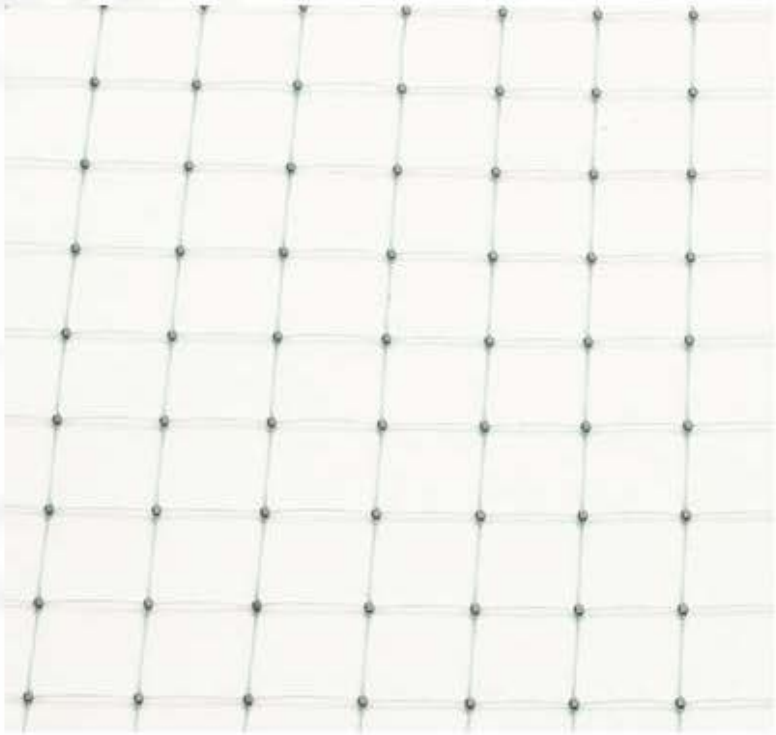
Natural Net ESC Blankets



ROLLED EROSION CONTROL PRODUCTS

Curlex Wood Fiber Netting vs Straw Netting





ROLLED EROSION CONTROL PRODUCTS

Netfree Products

Turf Reinforcement Mats - Soil Fill

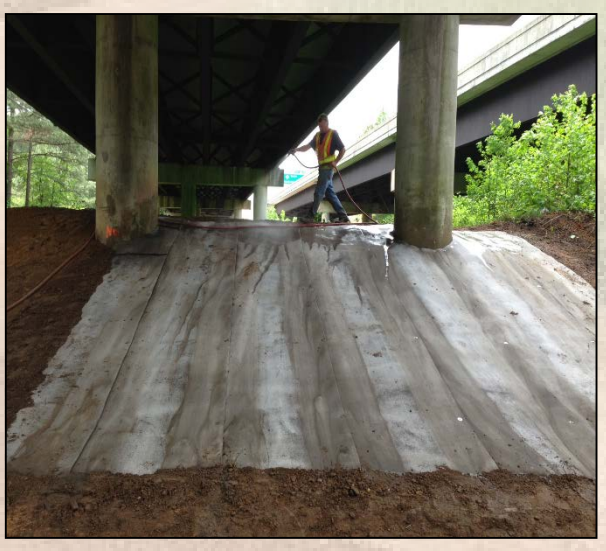
Most TRMs (but not all) should be filled with topsoil or HGM.

Root reinforcement vs. stem reinforcement

Improved vegetation success

Typically cover with a temporary RECP or HECP

CONCRETE BLANKET



SEDIMENT CONTROL

Downstream Perimeter Control

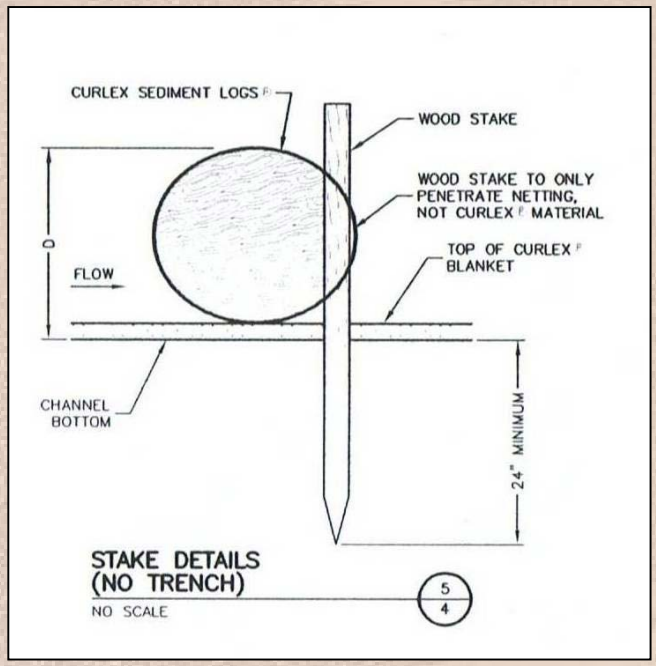
Install and Selection are Important!

Required prior to any land disturbance activity

SEDIMENT CONTROL - MAINTENANCE

All perimeter control must be maintained when 1/3 full

PERIMETER CONTROL



PERIMETER CONTROL

ENERGY DISSIPATION

Must be installed 24hrs after connection

STABILIZED CONSTRUCTION ENTRANCE

INLET PROTECTION

Two Types

- Below Grade
- Above Grade

Last line of defense

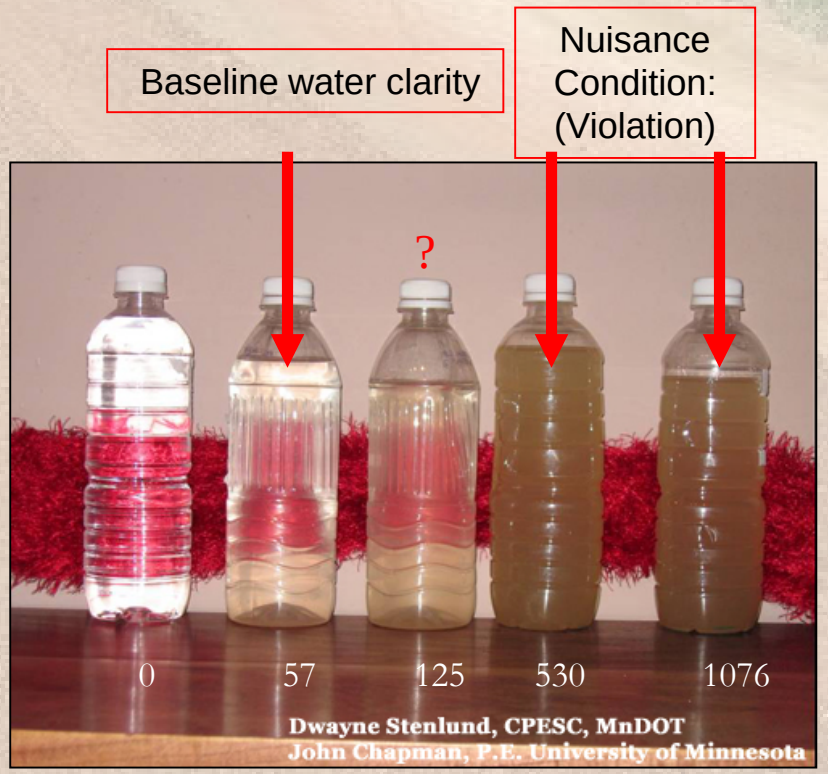
Must Be Maintained!

INLET PROTECTION – ABOVE GRADE

POLLUTION PREVENTION

POLLUTION PREVENTION – STREET SWEEPING

DEWATERING AND BASIN DRAINING



DEWATERING AND BASIN DRAINING

Dewatering Bags

- Flow rate
- Sediment load
- Staging location

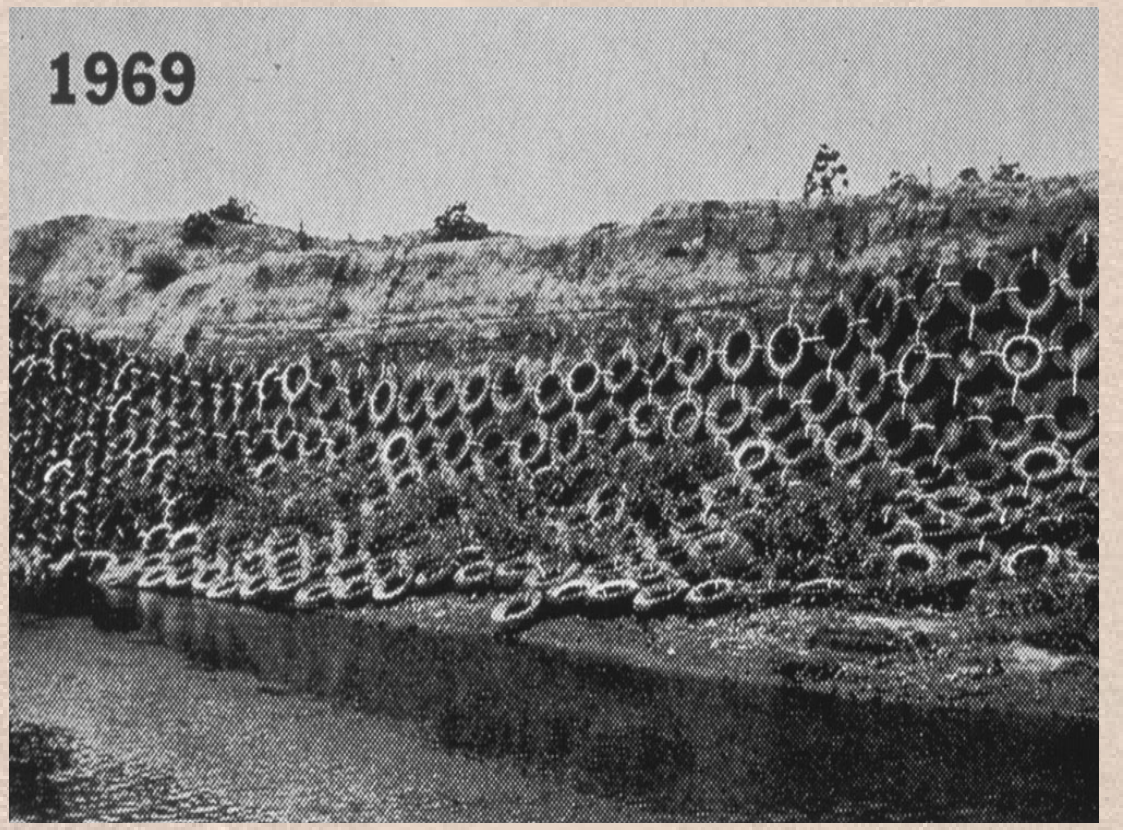
DEWATERING AND BASIN DRAINING

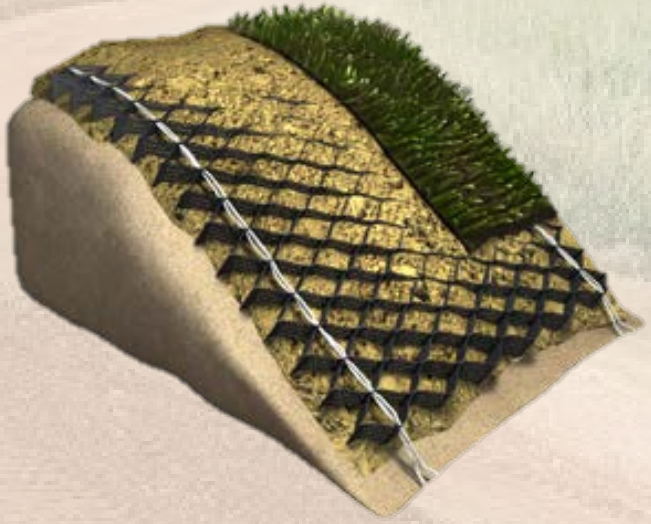
Additional Options

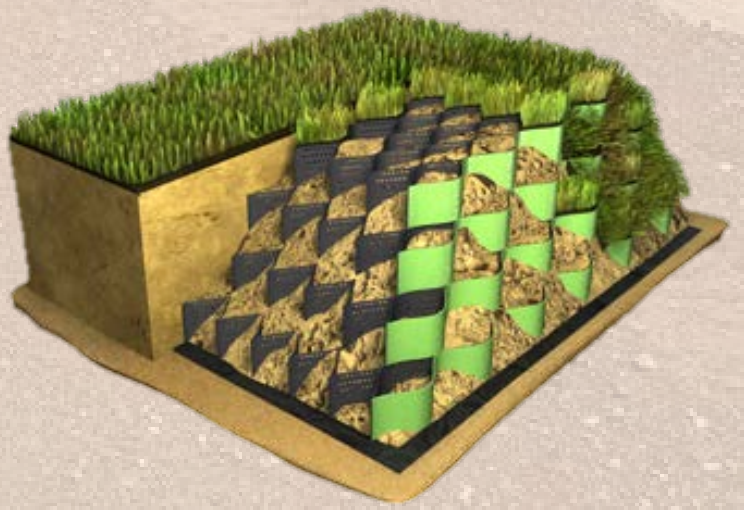
- Chitisan Flocculant
- Rock Barrel Dewatering
- Dewatering Tanks
- Temporary Basins

COMMON TRENDS – RIPRAP ALTERNATIVES

Slope Stabilization

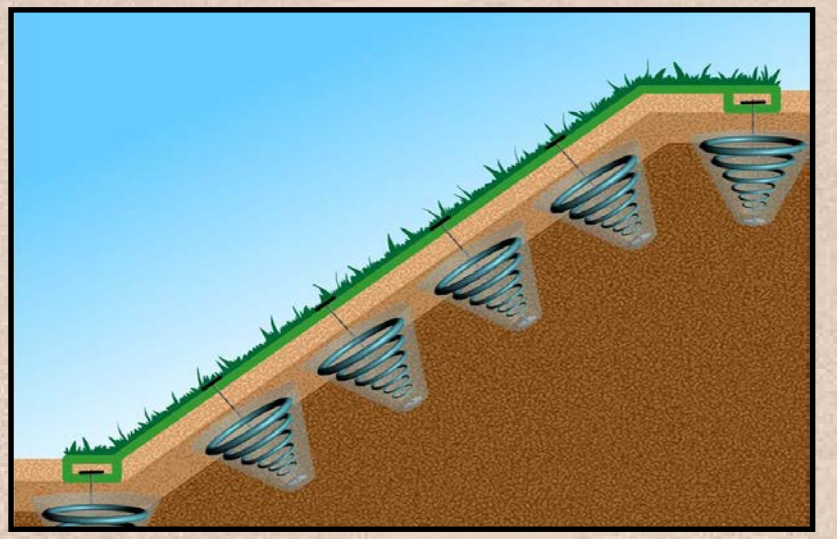


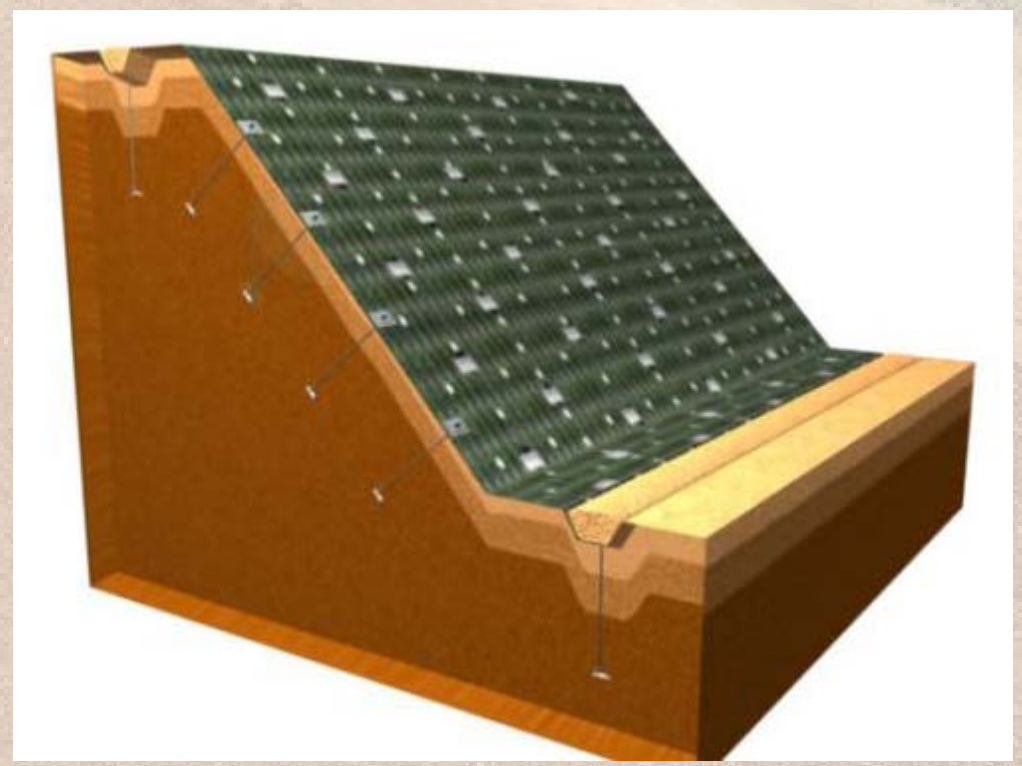




COMMON TRENDS – RIPRAP ALTERNATIVES

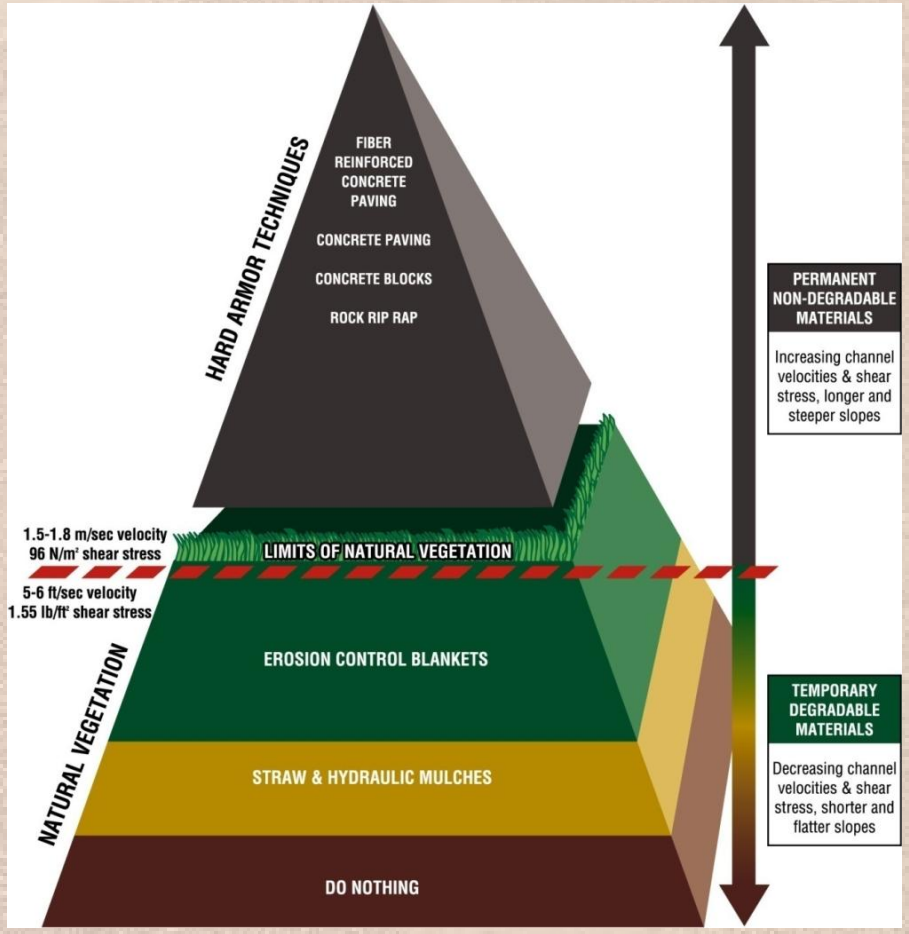
Slope Stabilization – Anchored Reinforced Vegetated System





COMMON TRENDS – RIPRAP/HARD ARMOR ALTERNATIVES

Channel Stabilization



COMMON TRENDS – RIPRAP ALTERNATIVES

Channel Stabilization

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Channel Stabilization

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