



Erosion & Sediment Control BMPs for Excavation, and Dewatering and Treatment of Sediment Laden Water

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Office of The Commissioner

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Protecting Maine's Air, Land and Water

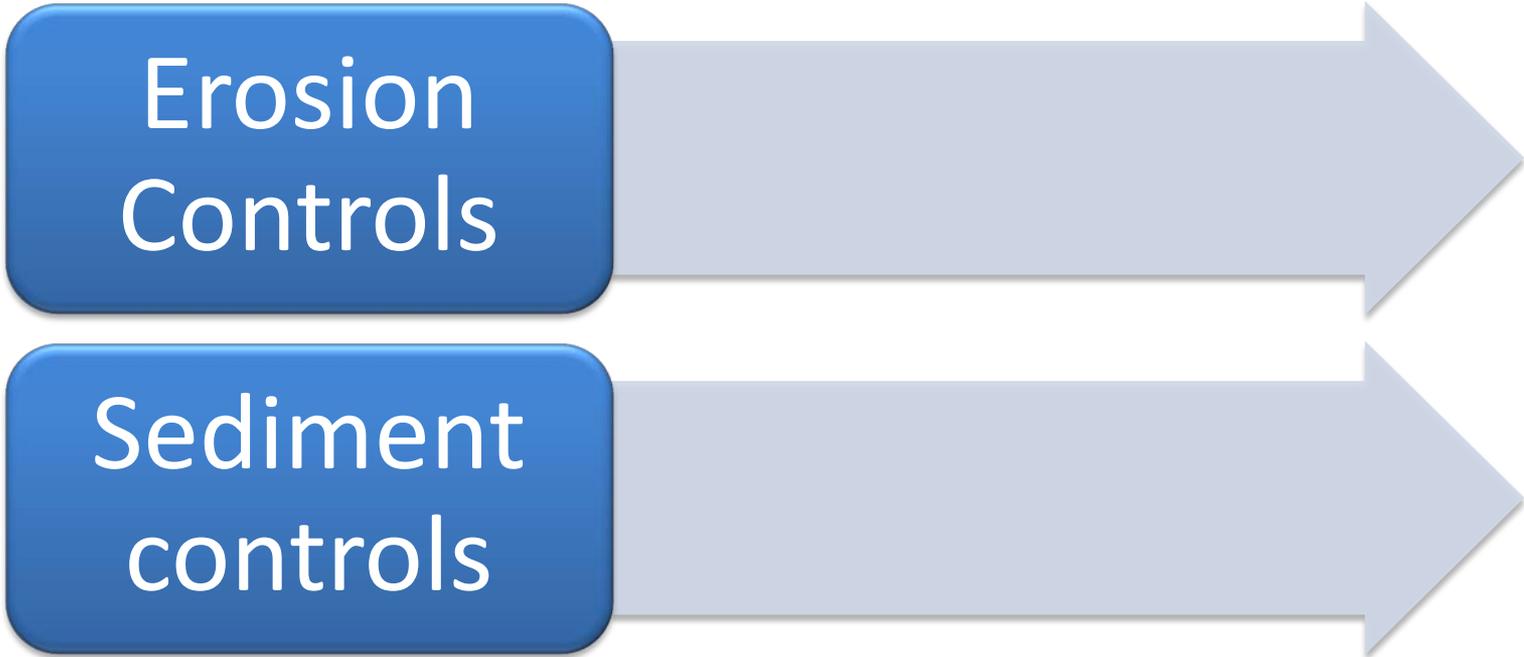
What Are Best Management Practices?

“A method, measure or practice, that when installed or performed, corrects or improves water quality.”



Best Management Practices(BMPs)

BMP's fall into two groups:



Erosion
Controls

Sediment
controls

Erosion controls prevent soil particles from leaving the construction site

- Do not allow soil particles to get suspended in the first place
- Limit exposed soil
- Phase operations to limit exposed soil
- Mulch exposed soil
- Slow the velocity of water on the site



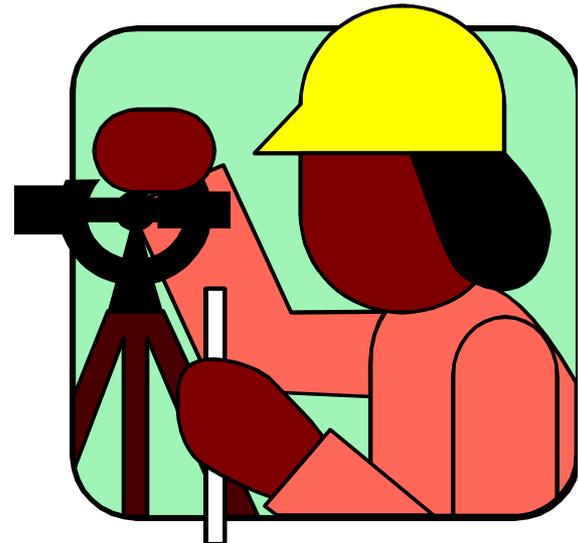
Sedimentation controls prevent suspended particles from leaving the construction site or getting to protected resources

- Filtering soil particles out of water is very difficult and not efficient
- All other BMPs remove less than 80% of the sediment load
- Most BMPs designed to slow water to the point that settling occurs
- Removal of 98% of particles = clean looking water



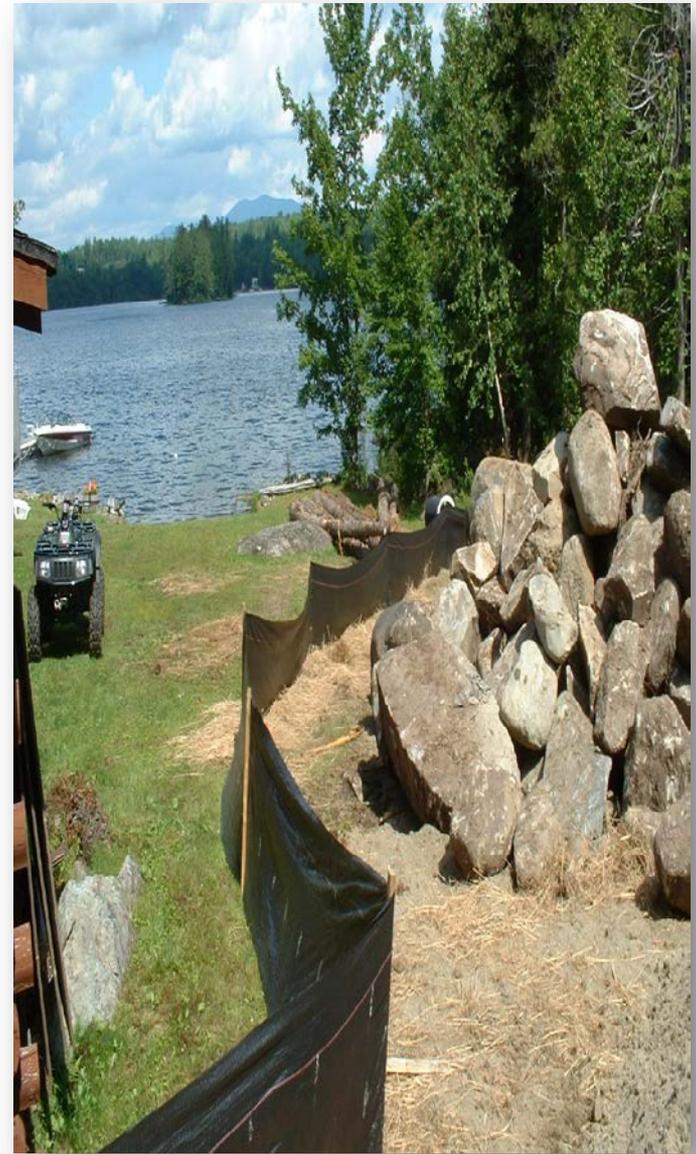
Erosion and Sedimentation Controls Can Be Broken Further Into Two Additional Groups –

- Temporary Controls
- Permanent Controls



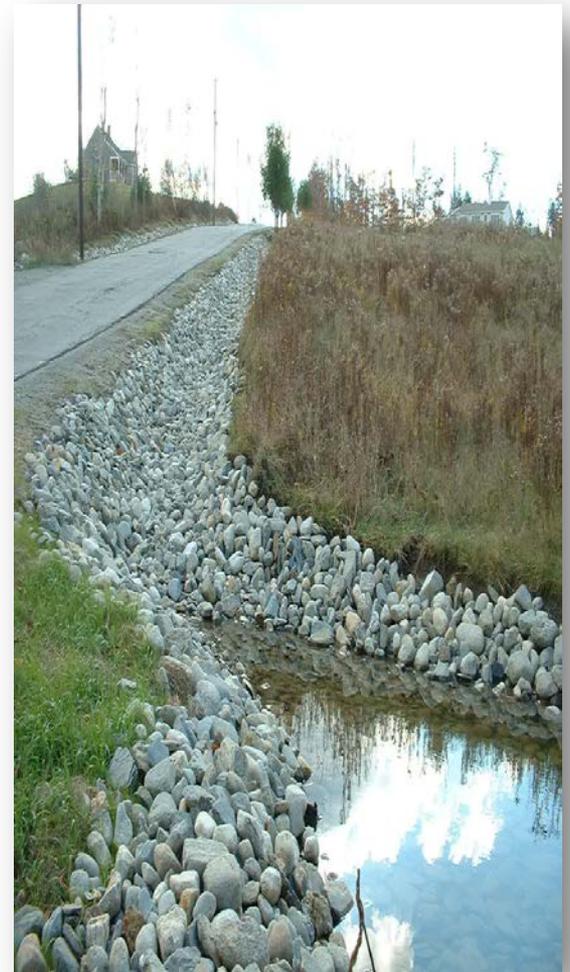
Temporary Controls

- Used during earthwork operations
- Maintained until site is stabilized
- Required by law



Permanent Controls

- Become a permanent part of the project
- Stop areas from becoming unstable either from flowing water or other means
- Covers the bare soil



Temporary Erosion Controls:

Mulching

Sediment barriers

Diversions

Storm drain protection

Dewatering



Mulching

Most important of all erosion controls

- Breaks the impact of falling rain drops and maintains soil absorptive capacity
- All kinds are available, most common -hay/straw and erosion control blankets



Hay Mulch For Erosion Control

Heavy mulch not for seed establishment but designed for erosion control. 3-4 inches thick

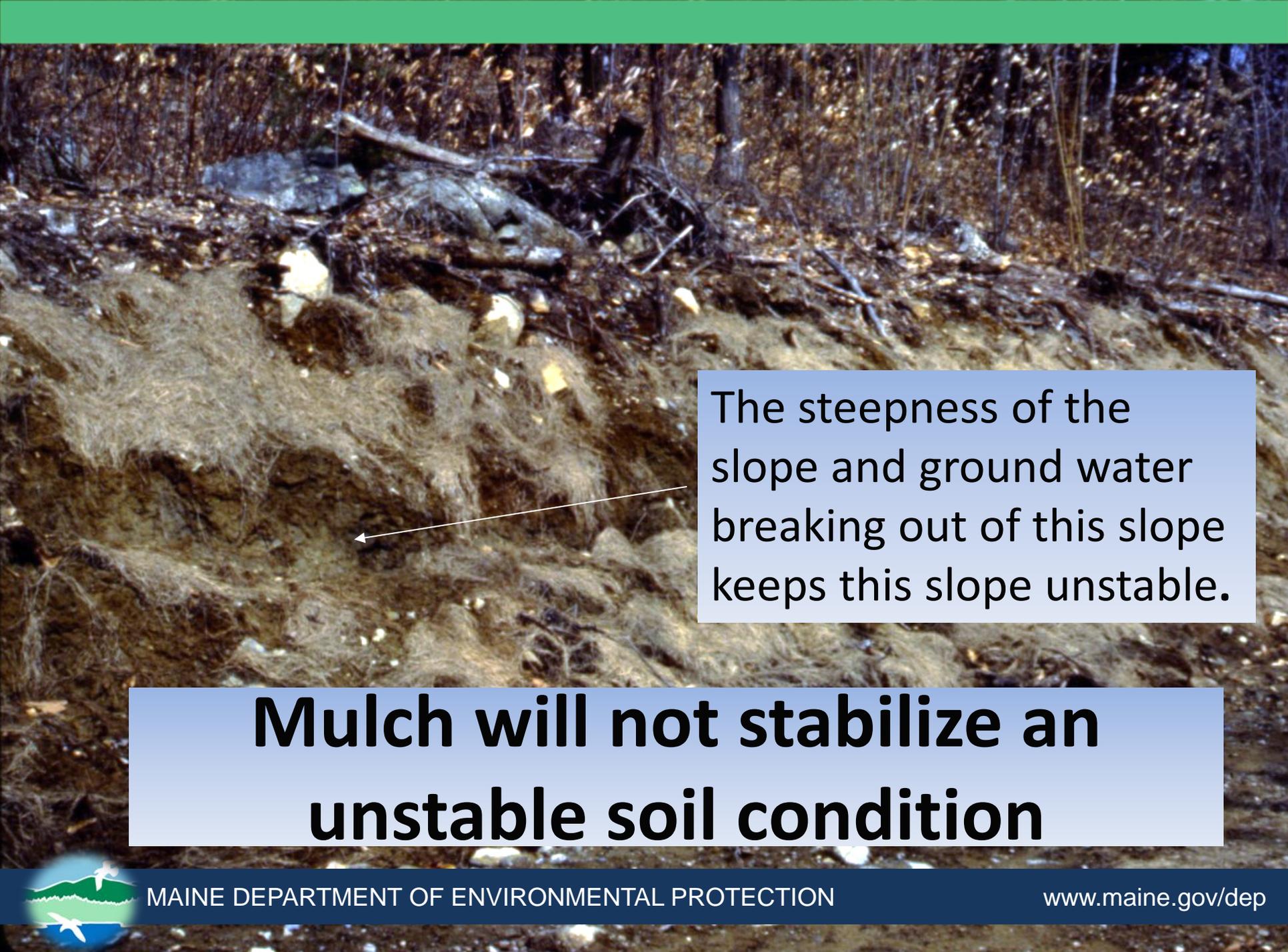


Hay Mulch / Application

- Needs to be anchored or cut-in.
- Applied at a rate of 90-100 bales / acre.
- Winter mulch applied at twice the normal rate

Blowers chop and spread hay for rapid coverage on large areas that are protected from wind





The steepness of the slope and ground water breaking out of this slope keeps this slope unstable.

Mulch will not stabilize an unstable soil condition



Erosion Control Mix – Mulch

- Can be used as a permanent, over winter stabilization or left to naturalize.
- Consists of: Stump and wood grindings, shredded bark, composted bark, or flume grit. Has both a high organic component as well as a limited soil component.
- Thickness of mulch layer varies per slope steepness : 2 inches on 3 to 1 slopes or less and add an additional $\frac{1}{2}$ inch per 20 feet of slope

Erosion Control Mix – Mulch

(more ...)

Limitations:

- Not for concentrated flows. (ditch lines, culvert outlets) and slopes greater than 1 to 1
- Wood chips, Construction debris, or Bark chips -- Not acceptable.
- May not perform well in areas of groundwater seeps

Sediment Barriers

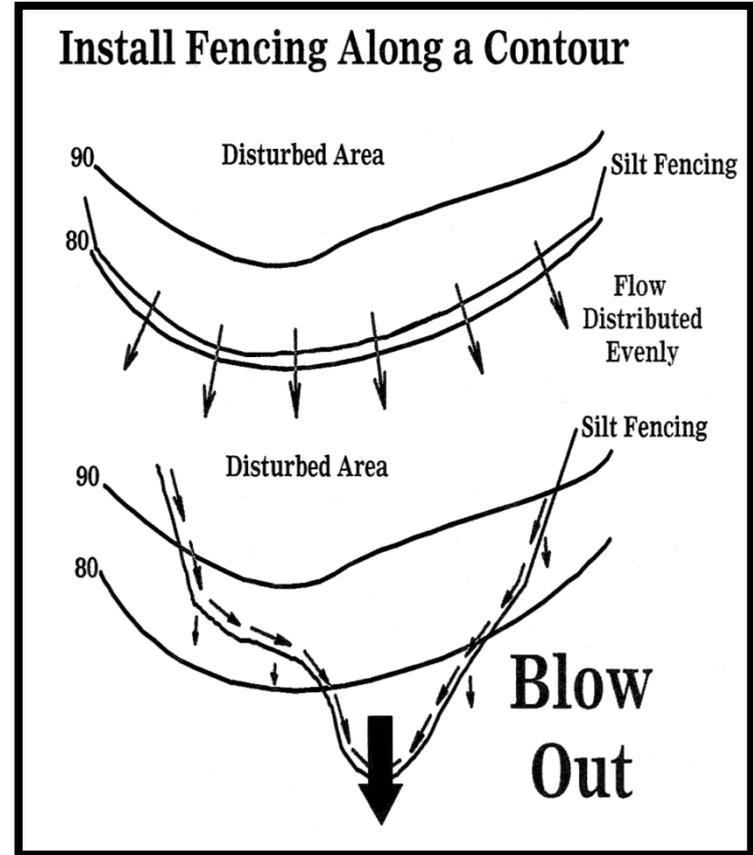
- Sediment barriers are used to slow runoff velocity down by ponding the runoff and allowing for settling of eroded particles to occur
- Sediment barriers should be installed prior to soil disturbance



Sediment Barriers cont.

All sediment barriers require the following design criteria:

- Installed along a contour
- Ends turned up slope
- Area up-gradient should be provided for ponding



Sediment Barriers

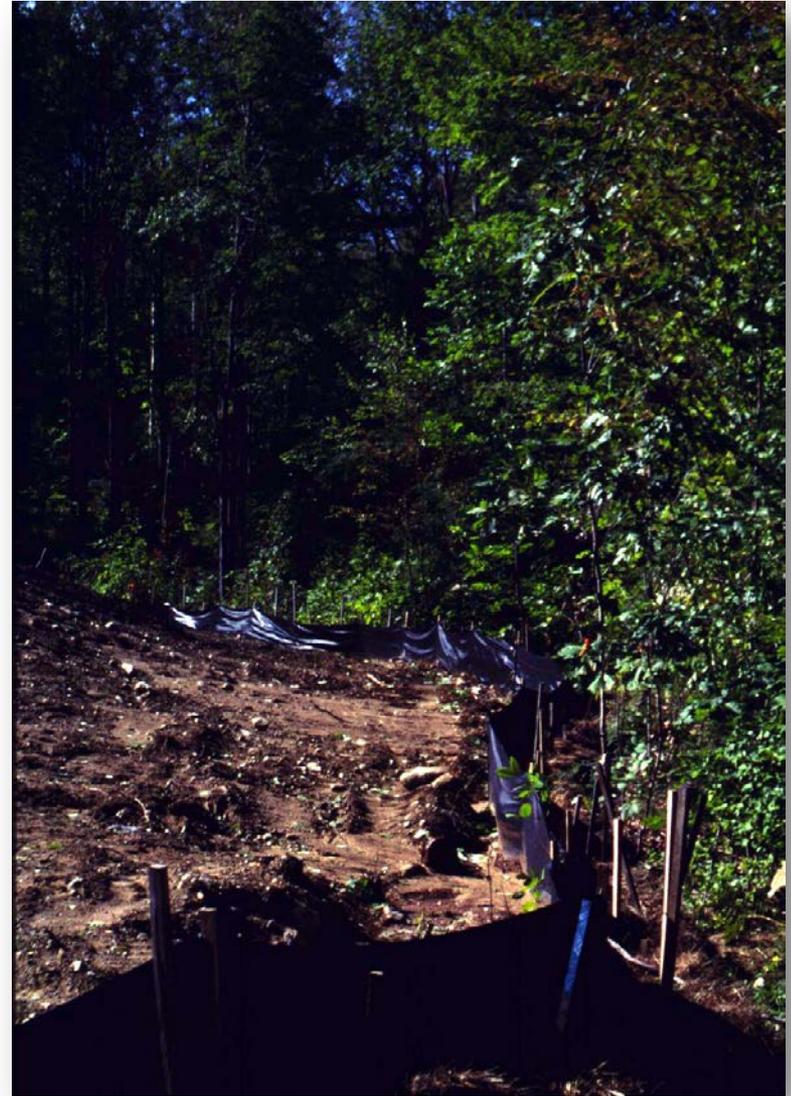
Sediment barriers include but are not limited to:

- Silt fencing
- Hay Bales
- Filter socks
- Erosion Control Mix Berms



Silt Fencing

- Not designed to filter soil out of water, but rather to slow the velocity to allow settling
- Keyed into soil whenever possible
- Flap may be held down by stone or hay bales but need good soil contact



Sediment Barriers cont.

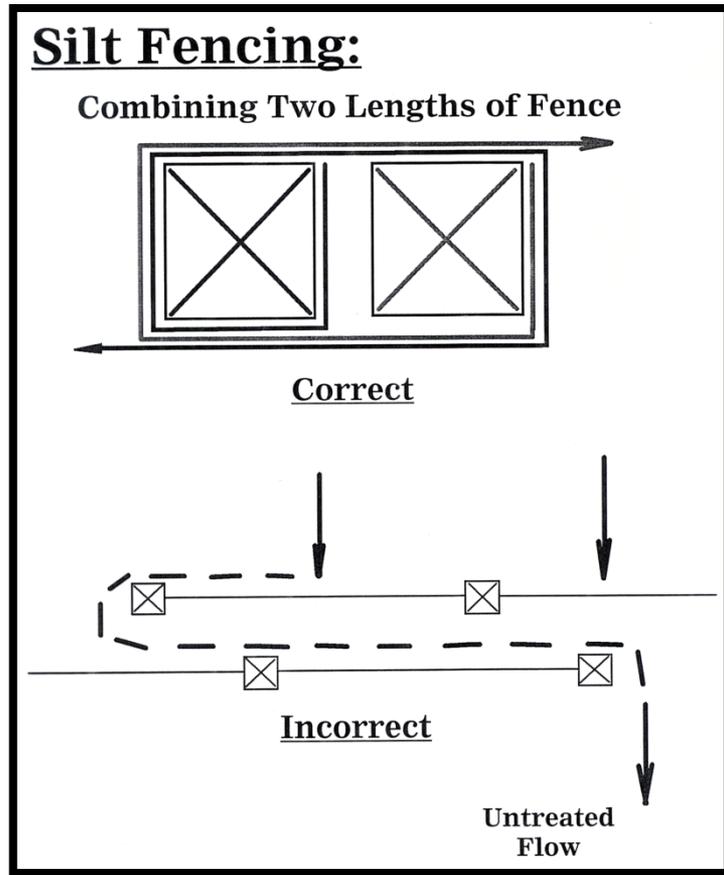
100' x 100' Rule. Fencing limits 1/4 acre of drainage per 100 feet of silt fence

In other words: No more than 100' of drainage behind 100' of fence



Silt Fencing (more...)

Wrap ends together when connecting two lengths of fence

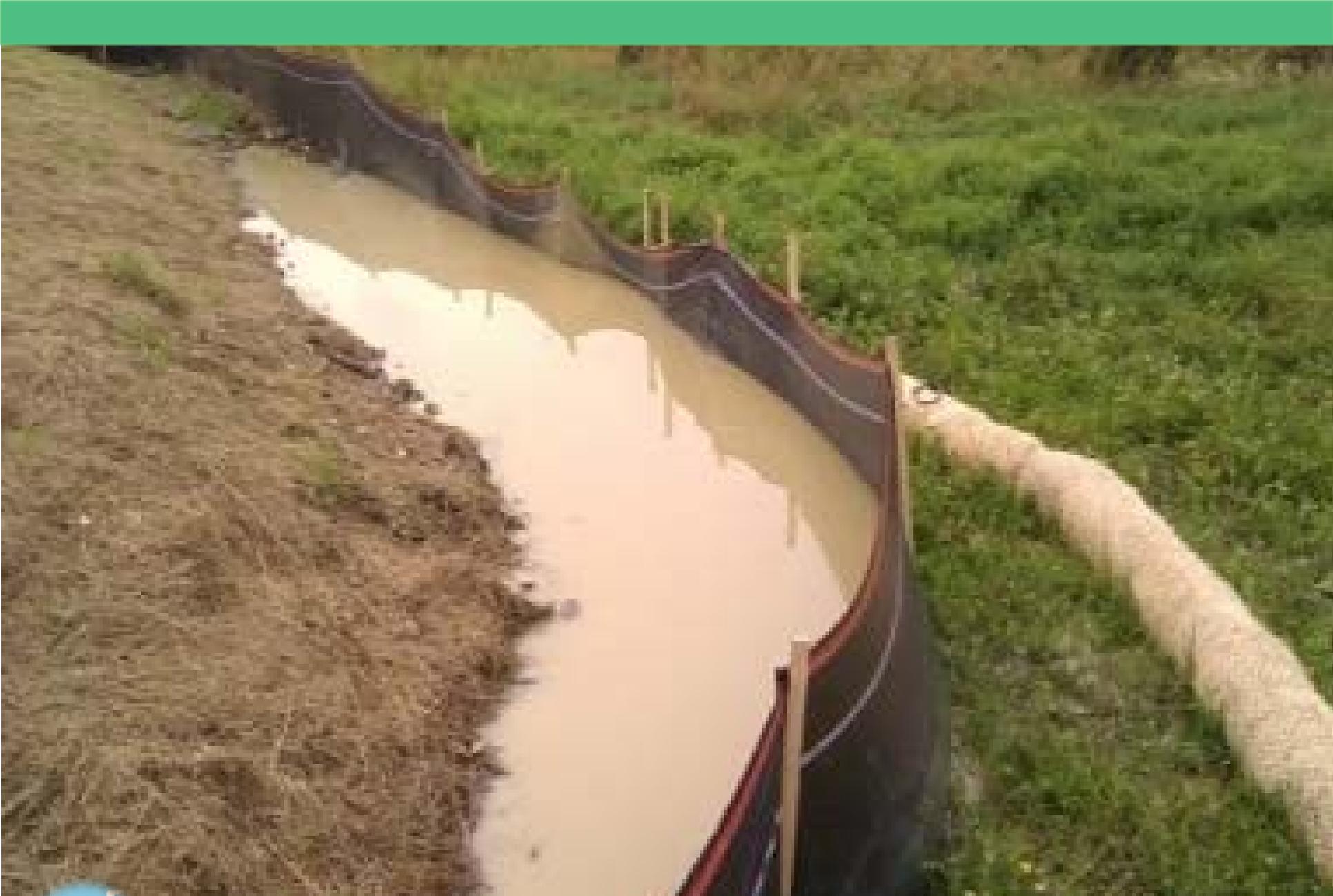




Fence should be installed in tension
not loose. Stakes every 8' or
at manufacturer's specification



**Never install in
concentrated flows!**





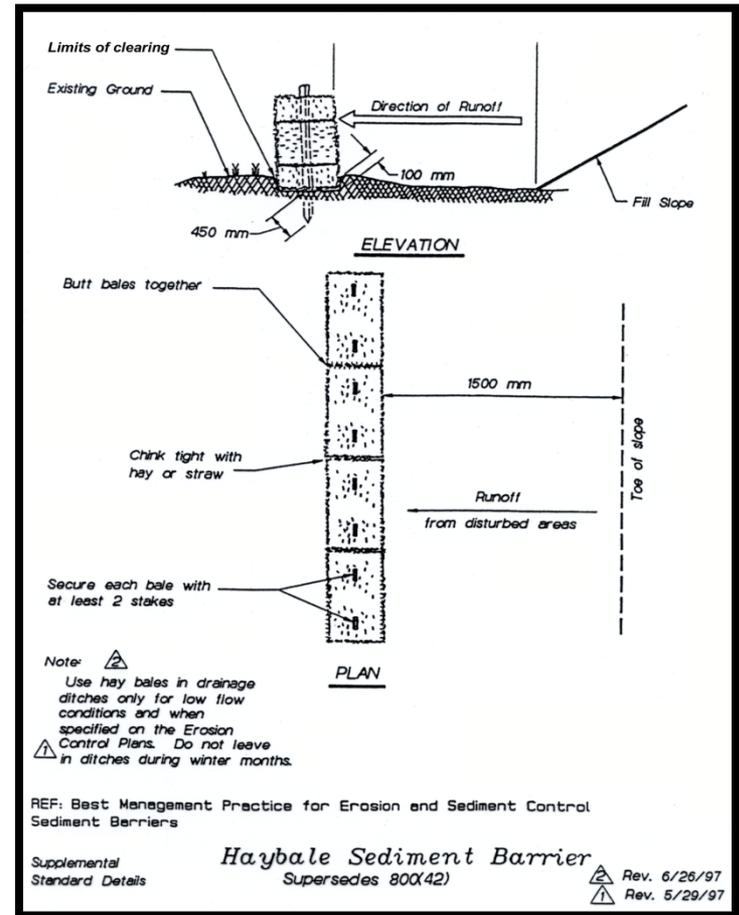
Maintenance is necessary!

- Remove sediments at 1/2 fence height.
- Remove fence once the ground is stable.



Hay Bales

- Should only be used for a small disturbance
- Not designed as a filter
- Keyed into soil
- Staked in place.
- Need good soil contact
- Need to have loose hay “chinked” in between bales





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Installed at toe of slope

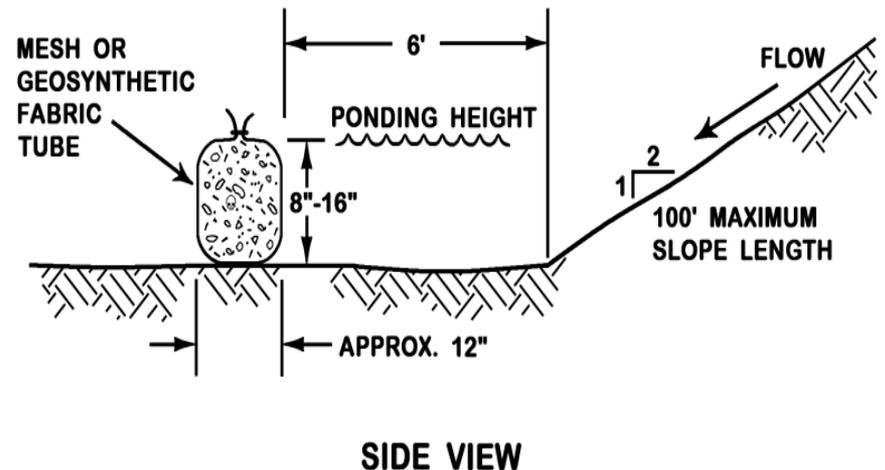
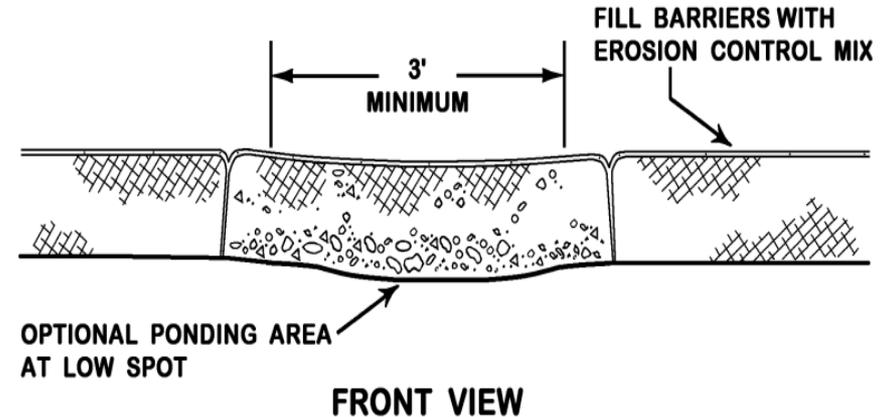
Not trenched in!!

Filter Socks



Filter Socks

- Synthetic netting tube
- Filled with erosion control mix or other shredded organic material
- Full contact with ground is critical



Erosion Control Mix – Sediment Barriers

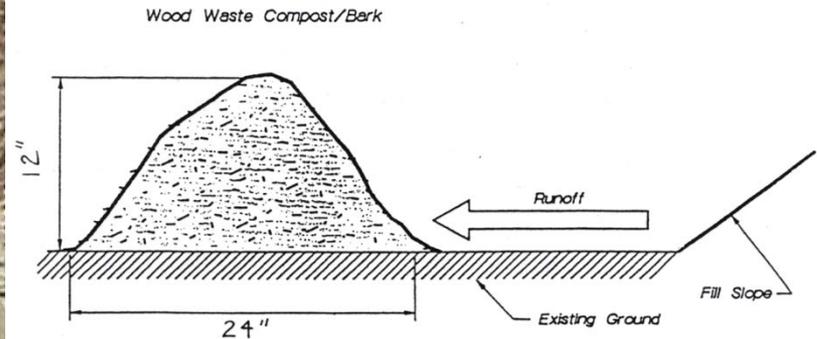
- Slow down runoff, encourages settling
- Installed along a contour
- Turned up at ends
- Minimum of 12 inches high (measured on up-hill side) and 24 inches wide
- Consists of: Stump and wood grindings, shredded bark, composted bark, or flume grit. Has both a high organic component as well as a limited soil component

Erosion Control Mix – Sediment Barriers (more ...)

Limitations:

- Never installed in concentrated flows.
- Limited to $\frac{1}{4}$ acre of drainage per 100'.
- Maximum slope for installation 2 to 1.
- Wood chips, Construction debris, or Bark chips -- Not acceptable.

Erosion Control Mix – Sediment Barriers

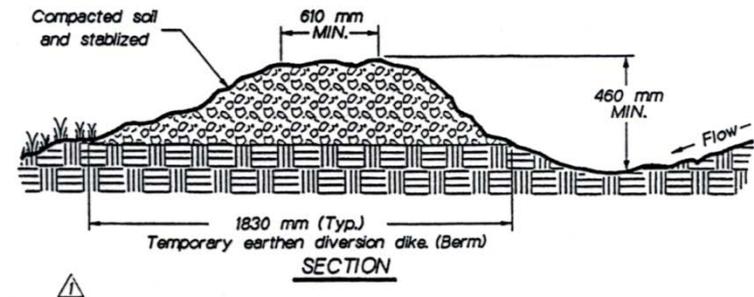
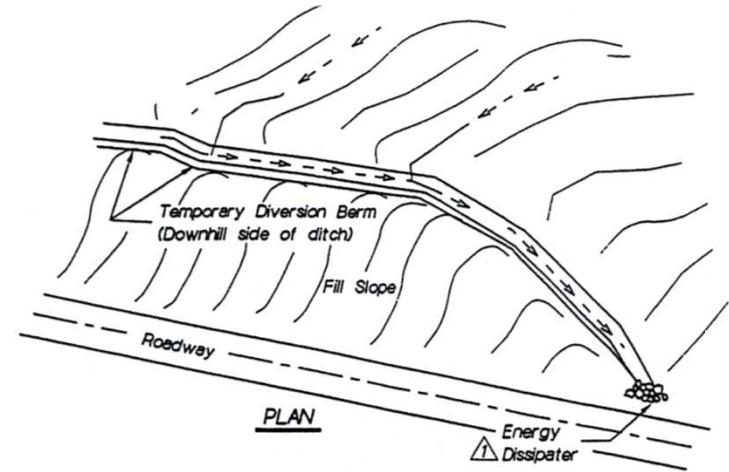


NOTE:

Wood Waste Compost/Bark Filter Berms may be used in combination with Silt Fence to improve sediment removal and prevent clogging of the Wood Waste Compost/Bark Berm by larger sediment particles. (Silt fence placed to filter runoff before Wood Waste Compost/Bark)

Water Diversions

- Keeps clean water from crossing a dirty site
- Prevents need for extensive sediment control.
- Breaks concentrated flows into easier to manage amounts



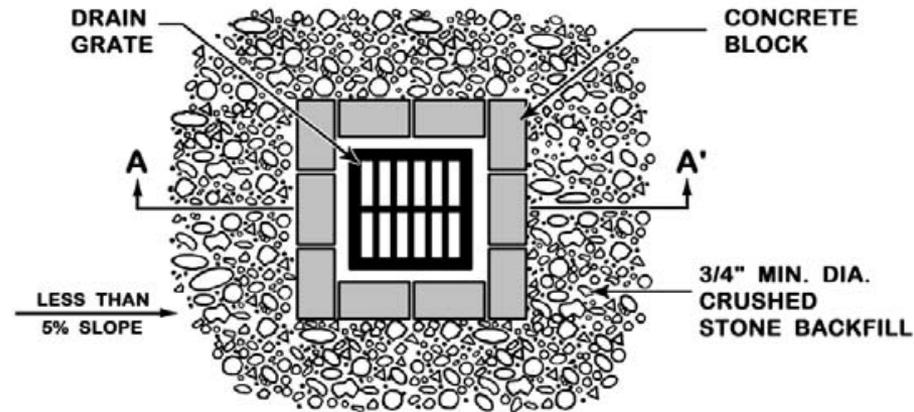
- This diversion should be angled away from the slope
- Excavated channel is lined with erosion control fabric and waste pile covered with mulch (though too light)
- Pipe at end diverts water down slope to ditch line



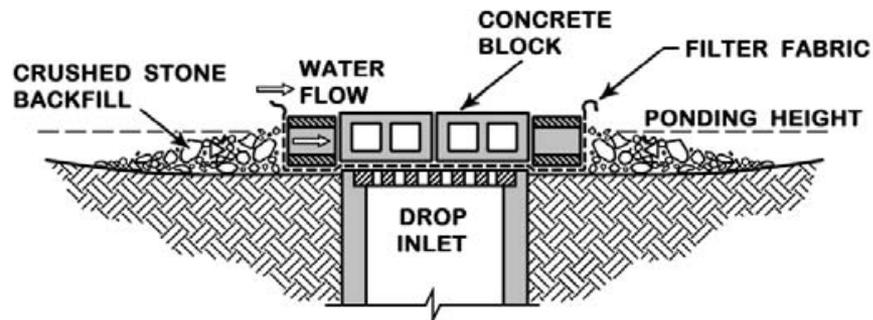
Storm Drain Protection



Storm Drain Protection



PLAN VIEW



SECTION A-A'

Considerations For Storm Drain Protection

- Drainage area has to be less than 1 acre
- Must be able to be easily maintained
- Removed sediment must be properly disposed of and stabilized





Dewatering









One Option - Pump and Truck to an approved disposal location



Sediment Traps, Basins and Ponds

- Ponds slow down the velocity of runoff, suspended soil particles drop out
- Sediment traps are used for small drainages (<5 acres).
- Sediment ponds are used for large drainages (<20 acres). Will need an overflow outlet
- Must not be part of a flowing stream. Constant flow through disturbs settling particles







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Geotextile Filter Bag



Geotextile Filter Bag

- Must be located on a slope no greater than 5% and its discharge directed to a stable and well-vegetated area
- Type of fabric is based on the size of soil particles to be trapped (i.e. a woven material for coarse particles and a nonwoven material for the finer particles)
- Any sign of erosion or channelization from the bag requires immediate correction







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Considerations When Dewatering

- Must remove water from construction area and remove sediment
- Discharge water must be prevented from eroding soil on the site
- Treated water must discharge away from waterbodies and through vegetated area



Management / Planning Measures

- Site Planning / Avoidance
- Phasing of Operations
- Limiting the Exposed Area / Mulching Daily
- Retain as much natural vegetation as possible.
- Maintain erosion controls on a weekly basis and before and after every significant rain event.
- Consider extra controls and standards for Winter Construction.
- Where construction will occur within 100' of a water resource, minimize window of exposure to 7 days from initial disturbance and 24 hours from final grading





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