Good and Bad uses of BMPs
(a visual presentation)

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Sediment Control, Run-off Control, Erosion Control, & Housekeeping
Sediment Control
Compost Filter Berms
are placed perpendicular to sheet flow to control erosion & retain sediment

BENEFITS:
- Can be left in place after a job is complete
- Filters water better than silt fence and straw, and repairs quickly
- Uses organic material to keep it from landfills
  including yard trimmings, food residuals, separated solid waste, biosolids, and manure
- Organic material is naturally sticky to help it bind w/o tackifiers
- Can be placed across small wet channels and on cold hard surfaces

DISADVANTAGES:
- Not suitable where large amounts of concentrated runoff is likely or on sandy soils
- Must be established for more than 6 weeks in channel installations
Sediment Control
The usual control for erosion—the silt fence. Everybody knows it doesn't work!

It's easy to put this stuff into place!

This does work—it is COMPOST masquerading as a filter berm! When the job is done, you can spread it out on the ground—and you just did the world a favor.

<table>
<thead>
<tr>
<th>Filter Berm Comparisons</th>
<th>Berm A</th>
<th>Berm B</th>
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</thead>
<tbody>
<tr>
<td>Profile Area</td>
<td>1.439 SF</td>
<td>4.53 SF</td>
</tr>
<tr>
<td>Linear Feet / Cubic Yard</td>
<td>18.76 LF/CY</td>
<td>7.6 LF/CY</td>
</tr>
<tr>
<td>Installed Cost @ $30/CY</td>
<td>$1.60 / LF</td>
<td>$3.95 / LF</td>
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Compost Filter Socks

a type of contained compost filter berm (typically in a tubular fabric)

BENEFITS:
- Many of the same benefits as compost filter berms
- Greater surface area contact with soil than straw waddles
- Socks can be filled and put into place/installed
- Filter socks do not erode like compost filter berms
- Can be laid perpendicular to flow, to reduce velocity and erosion
- Can be used on pavement as inlet protection for storm drains

DISADVANTAGES:
- Socks are typically not left in place after a job is completed
- Unlike berms, socks need to be staked and held in place.
Check your BMPs
Fiber Rolls (Log Rolls or Straw Wattles)

BENEFITS:
- Many of the same benefits as compost filter berms
  Typical rolls are wrapped with UV degradable materials (e.g. burlap)
- Can reduce the effects of long or steep slopes when used with erosion control BMPs

DISADVANTAGES:
- Less surface area contact with soil than socks if just laid in place
- Fiber rolls are not effective unless trenched
- If not properly staked fiber rolls can be transported by high flows
- Fiber rolls have a very limited sediment capture zone
On Slopes

Fiber rolls are installed on slopes at a slight downward angle at the end to prevent ponding. Turn the ends upslope to prevent runoff from flowing around the roll.

1:1 slopes = 10 feet apart
2:1 slopes = 20 feet apart
3:1 slopes = 30 feet apart
4:1 slopes = 40 feet apart

Install fiber rolls in shallow trenches dug:
3 to 5 inches deep for soft, loamy soils (w/ a 24” stake) &
2 to 3 inches deep for hard, rocky soils (W/ an 18” stake)
Did the fence installers run over the waddles?
Rolls should be horizontally overlapped
Silt Fence

To install: Excavate a trench at least 6” to bury the bottom of the filter fabric & backfill.

Do not install perpendicular to the flow direction.

WWF should always be placed on the downstream side.

Remove sediments from the base when the sediment reaches 1/3 to 1/2 the fence height

BENEFITS:

- As a perimeter control, SF can keep equipment in the clearing limits
- When installed correctly, SF can prevent sediment from leaving a site
- Can be used around spoil piles, assuming that they are also temporary

DISADVANTAGES:

- Silt Fence is a temporary BMP that must be removed
- When you remove silt fence, remove the accumulated sediment as well.
- Only appropriate in areas where runoff will occur as low-level flow.
- Cannot be installed on rock surfaces which prevent anchoring.
BLOCKED FLOW
Sediment Control

Maximum 10ft of Slope

Break in SF

WWF?
Straw/Hay Bales
Are no longer a widely accepted BMP

DISADVANTAGES:
- Bales reduce cross-sectional areas, resulting in increased velocity
- Flow around bales can increase a channel's width and change flow
- On impermeable surfaces bales cannot be staked and they float away.
- Bales are high maintenance and expensive
- Bales tend to be impermeable (no filtering, just blocking)
- Seeds in bales may introduce undesirable non-native plants to the area
- Bales are heavy & hard to move around (especially when water logged)
Gravel or Stone Filter berms
Also gravel in bags/socks

BENEFITS:
- Many of the same benefits as compost filter berms
- Berms can allow greater amounts of water to pass thru than compost
- Berms can be left in place
- Socks can be filled and put into place/installed
- Socks can be used on pavement as inlet protection for storm drains

DISADVANTAGES:
- Socks are not left in place after a job is completed
- Socks need to be staked and held in place.
Sediment Basins

are a retention type basin which stores stormwater and allows settlement. Are required for sites larger than 10 Acres and must be able to retain a 2-year, 24-hour storm event

BENEFITS:
- Captures sediment from stormwater runoff before leaving the site
- Stormwater typically remains onsite

DISADVANTAGES:
- Area needed for a sediment basin
Run-off Control
Check Dams

are relatively small, temporary structures constructed across a swale or channel
Should never be more than 3 ft high
Should always be at least 6 inches lower than the sides

**BENEFITS:**

- Slow the velocity of concentrated water flows
- Help reduce erosion from high velocity water
- Catches some of the sediment from the channel itself

**DISADVANTAGES:**

- Cannot be substituted for other erosion control BMPs
- Cannot be substituted for other sediment-trapping control BMPs
Run-off Control
Temporary Diversion Dykes

perimeter control usually consists of a combination dyke and channel constructed along the perimeter of and within the disturbed part of a site.

BENEFITS:
- Typically, this temporary BMP is very cost effective
- Can be installed with equipment already onsite or a trencher.
- Helps keep sediment on new parcels awaiting new construction.
- Properly installed dykes can keep rainwater onsite (infiltration)
- Rainwater has two physical barriers that need to be overcome

Dyke (upstream) and channel (downstream)

DISADVANTAGES:
- If improperly installed, can add to a run-off problem
Remember that it is important to check your BMPs often. Small check dams should have been implemented to slow the flow.
Check your BMPs
Erosion Control
Chemical Stabilization

BENEFITS:
- Applied easily to the surface
- Stabilizes areas effectively
- Provides immediate protection to soils that are in danger of erosion
- Also provides dust control

DISADVANTAGES:
- Can create an impervious surfaces
- It is hard to prove to the client that chemicals were applied. (Take pictures while applying the chemical.)
- Is only good for temporary soil stabilization
Chemical stabilization could have been used to help prevent this erosion.
A truck applies chemical stabilizers to reduce soil erosion where vegetation cannot be planted (Source: Terra Firma Industries, 1999)
**Composting & Mulch Blankets**

Compost: yard trimmings, food residuals, separated municipal solid waste, biosolids, and manure

Mulch: grass, hay, wood chips, wood fibers, straw, or gravel

**BENEFITS:**

- Help seeds germinate and grow rapidly
- Act as a permanent stabilizer on smaller slopes < 1:1
- Keeps materials from landfills
- Can soften the force of raindrops
- Reduces sheet flow velocities
- Can also aid:
  - plant growth by holding seeds, fertilizers, and topsoil in place
    - Hydro-seeding and natural seeding
  - In preventing birds from eating seeds
  - In retaining moisture for seed germination
  - In insulating plant roots against extreme temperatures.
Diagram: US-EPA
Erosion Control

Compost filter berms amend native soil, assist in vegetation establishment and can be easily incorporated when the job is done.
Before

After
Erosion Control
Geotextile Filter Fabrics

Woven fabrics that can contain mulch (sandwiched or interwoven), can be used to hold mulch on a slope, or can be used alone to protect seeding (burlap)

**BENEFITS:**

- Can have many of the same benefits as mulching
- Mats are anchored to protect slope erosion
- Can Stabilize larger slopes; up to a 3:1 slope
- Is applied where vegetation will be slow to establish
- Can be installed in channels with flows exceeding 3.3 ft/s

**DISADVANTAGES:**

- Cost, large areas start to get very expensive
- Might increase runoff or blow away if not firmly anchored
Erosion Control
Erosion Control
Gradient Terraces

**BENEFITS:**
- Can shorten the length of a slope
- Slows, collects, and redistributes surface water

**DISADVANTAGES:**
- Cannot be used on sandy or shallow soils
- Hard to get equipment on slopes
- Construction of the terrace can cause dust problems
- Does not have that natural undisturbed look afterwards
Erosion Control
Soil Roughening

increasing the relief of a surface with horizontal grooves by either stair-stepping or using construction equipment to track the surface

**BENEFITS:**
- Can reduce surface flow velocities (when compared to flat grading)
- Increases infiltration, reduces erosion, traps sediment
- Can be used on slopes greater than 3:1 and is good for spoils piles.
- Prepares the soil for seeding and planting

**DISADVANTAGES:**
- Soil roughening is effective only for gentle or shallow depth rains
- Concentrated flows allows soil roughening to contribute sediment run-off
- Proper dust control methods must be employed.
**Undisturbed Area**

Heavy equipment can be used to mechanically scarify slopes.

**Undisturbed Vegetation**

Dozer treads create grooves perpendicular to slope direction.

**Diversion**

"Tracking" with machinery up and down the slope provides grooves that will catch seed, rainfall and reduce runoff.

Unvegetated slopes should be temporarily scarified to minimize runoff velocities.
Hydro-Seeding

Can be used alone, or with fertilizer, mulch, tackifier, compost blanket, or geotextile fabrics

**BENEFITS:**
- Roots assist in long term soil cohesion
- Plants help to slow and filter the stormwater
- Provides a natural look to landscape after construction.
- Tackifier, mulch, and compost help to bind soil and control sediment

**DISADVANTAGES:**
- Weather and soil conditions can prevent growth
- Must consult a Landscape engineer/architect to choose seed mixes.
Erosion Control
Erosion Control
Soil Retention

Erosion Control
Good Housekeeping/
Materials Management
Construction Entrances

pad of gravel over filter cloth where construction traffic leaves a site

BENEFITS:

- minimizes mud and sediment leaving the site attached to vehicles.
- Filter fabric spreads the vehicle's weight over a larger soil area

Consider a course aggregate of 1 ½” to 3” to prevent tires from carrying the gravel offsite

Sweep the entrance periodically to remove the sediment that makes it past the entrance.

In addition to using a gravel pad, a vehicle washing station can be established at the site entrance. (water is needed & may not be feasible)
Stabilized construction entrances allow dirt to be removed from tire treads and collected as trucks leave construction sites.
Concrete Washouts

Bad

Good
Housekeeping
Portable Toilets
Must be staked down to prevent them from falling over