Temporary Best Management Practices for Construction Sites

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www.stormwatermanagement.biz

Slide Presentation

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Field Demonstration

3

Exercise

(if there's time)

4

Why Use BMPs?

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Various Pollutants of Concern:

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Pollutants of Concern

Sediment

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Pollutants of Concern

Toxic Chemicals

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Pollutants of Concern

Litter

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Pollutants of Concern

Bacteria

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Pollutants of Concern

Nutrients

Photo: David Franklin

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Pollutants of Concern

Oxygen Demand

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Pollutants of Concern

Oil and Grease

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Pollutants of Concern

Metals

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Pollutants of Concern

Elevated Temperatures

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The Result?

Photo by Craig Solin

Impacts to Plants, Animals and People

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So What's the Answer During Construction??

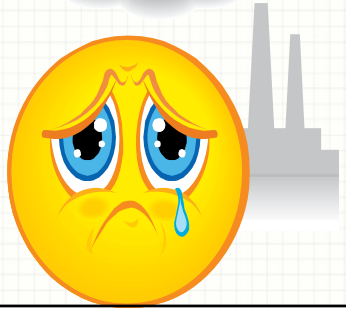

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Photo: David Franklin

Temporary BMPs

For activities and materials…

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Activities Potentially Contributing Pollutants

- Clearing, grubbing and grading
- Landscape maintenance
- Equipment use
- Saw cutting
- Paving operations
- Pressure washing
- Dewatering operations
- Soil importing and stockpiling
- Maintenance of public facilities
- Waste management

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Material Sources That Can Contribute Pollutants

- Soil, Dirt, and Sediment
- Paints and Solvents
- Pesticides/Herbicides
- Fertilizers
- Detergents
- Plaster or related products
- Green waste
- Sanitary waste
- Concrete compounds
- Asphalt compounds
- Petroleum products
  fuel, oil, and grease
- Hazardous chemicals
  acids, lime, glues, adhesives, and curing compounds

Let's take a look at the BMPs

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Temporary BMPs

- Framework for Compliance
- Categories
- Sections
- Narrative vs. Drawings/Details
- BMP Examples

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Photo: David Franklin

Temporary BMPs

- Framework for Compliance
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Photo: David Franklin

Framework for Compliance

- Performance based
- Increasingly there are minimum requirements

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Framework for Compliance

- Local Ordinance
- Construction General Permit
- Contract
- SWPPP or EC Plan
- Industry Guidance

Photo: David Franklin

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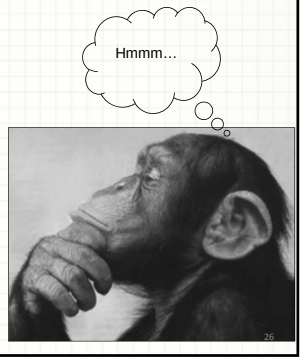
Temporary BMPs

- Framework for Compliance
- Categories
- Sections
- Narrative vs. Drawings/Details
- BMP Examples

Categories of BMPs

- Planning
- Surface stabilization
- Run on; run off
- Sediment control
- Housekeeping
- Non-stormwater

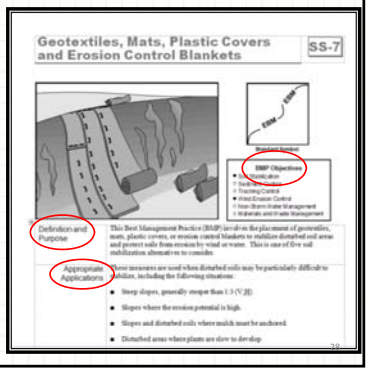


Temporary BMPs

- Framework for Compliance
- Categories
- Sections
- Narrative vs. Drawings/Details
- BMP Examples

Sections

- Definition
- Applications
- Objectives
- Limitations
- Specifications
- Maintenance
- Inspection



Temporary BMPs

- Framework for Compliance
- Categories
- Sections
- Narrative vs. Drawings/Details
- BMP Examples

Narrative vs. Drawings/Details

- Narrative in contract plans and specifications
- Narrative in BMP cut sheets
- Drawings on plans
- Drawings on cut sheets
- There can be conflicts

Narrative vs. Drawings/Details

- Ultimately, rely on
  - Principles of function
  - Evaluation of performance

- Know what is significant and what is not
  - Fiber roll location vs. notch on the stake….

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- "Anyone caught following the drawings will be removed on the grounds of being incompetent"

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Temporary BMPs

- Framework for Compliance
- Categories
- Sections
- Narrative vs. Drawings/Details
- BMP Examples

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BMPs Examples

- Silt fence
- Fiber roll
- Check dams
- Drain inlet protection
- Straw application
- RECP…ECB
- Concrete washout
- Construction Exits
- ….and more

Photo: David Franklin

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BMP Selection and Evaluation

- BMP Factors

Handout

Juggling 3 schedules
Phase of construction
Categories of BMPs
Flow type/direction
Hold or let go
Profile and return
Contributing area
Flexibility and conformity
Permeability and rate
Longevity
Temporary and permanent
Contents
Area
Soil preparation
Sterility
Redundancy
Treatment or prevention
Location
Duration
Access
Time to effective
Blocking flow
Self-anchoring
Reusability
Maintenance
Measurability
Lead time
Cost

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BMP Examples in classroom

- Focusing on
  - Principles of function
  - Phase of construction
  - Associated BMPs

Photo: David Franklin

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Associated BMP

- The sign is an associated BMP to washouts
- It plays a critical role in success and stems from the Planning category

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BMP Examples in field demo

- Focusing on
  - Proper installation
  - Evaluation of performance
  - Maintenance and repair concerns

Photo: David Franklin

Photo: David Franklin

Temporary BMPs…

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Silt Fence

Functions for sheet flow when it is installed properly and used during grading until slope is stabilized

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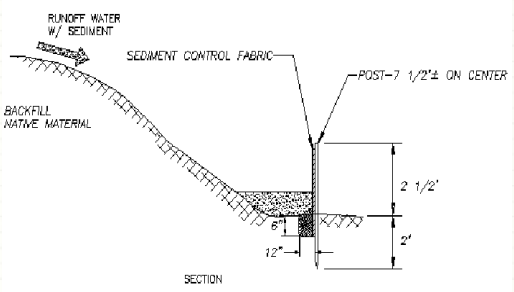
Silt Fence



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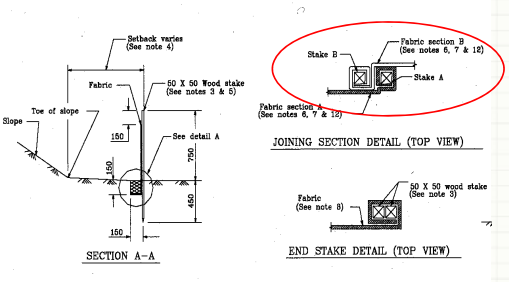
SC-1 Silt Fence Installation Detail



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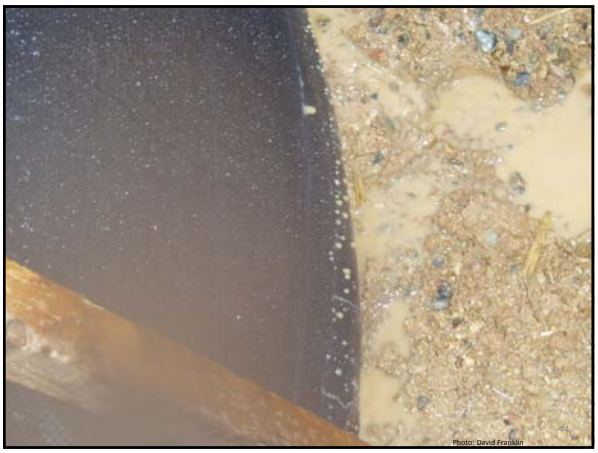
SC-1 SILT FENCE

Permeable fabric designed to intercept and slow flow of sediment-laden sheet flow runoff

- Material Requirements
  - Silt fence shall be woven polypropylene fabric
  - Minimum width of 900 mm (36 inches)
  - The fabric shall conform to the requirements in ASTM (American Society for Testing and Materials) designation D4632 and have an integral reinforcement layer
  - The permittivity of the fabric shall be between 0.1 sec -1 and 0.15 -1 in conformance with ASTM designation D4491



SC-1 SILT FENCE

- Silt fence looses it's permeability when it comes in contact with sediment-laden runoff
- Runoff is ponded

The geotextile is no longer passing 20 gal/min. The forces exerted are great - proper staking and keying-in of silt fence is critical

Six Dead Snakes

Silt Fence

Improperly installed silt fence

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Silt Fence

Silt fence should never be used across concentrated flow

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Photo: David Franklin

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Photo: David Franklin

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Fiber Roll

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Fiber Roll

- Fiber rolls, hinge points, construction notes

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Photo: David Franklin

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Photo: David Franklin

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Photo: David Franklin

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Photo: David Franklin

Photo: David Franklin

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Photo: David Franklin
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14'-8"


Photo: David Franklin


14'-8"
D
5
3
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Photo: David Franklin

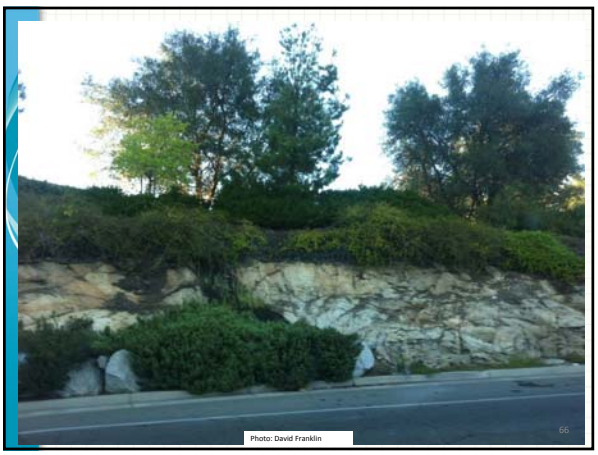
Photo: David Franklin
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Fiber Rolls as Art

Photo: David Franklin

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Check Dam

Top to toe relationship

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Check Dam

Under, over, around or through?

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BMP...

...or

Obstruction??

Q=VA

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Drain Inlet Protection

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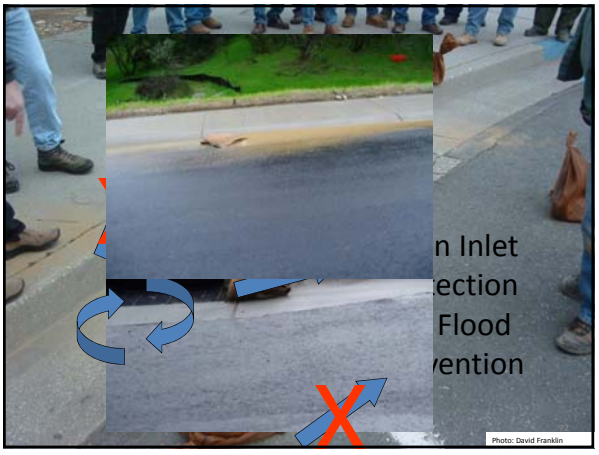
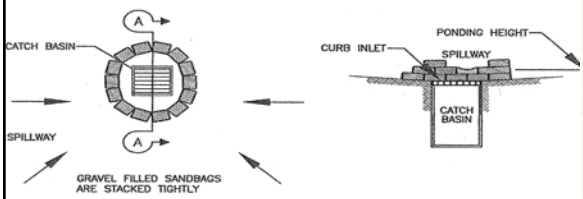


n Inlet
ection
Flood
vention

Photo: David Franklin

NOTES:
1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. SANDBAGS OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.
3. LEAVE ONE SANDBAG GAP IN TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.



PLAN SECTION A–A

5 DRAIN INLET PROTECTION

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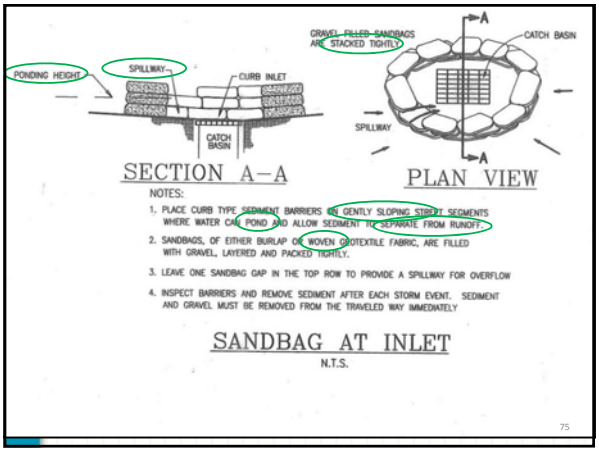

SECTION A–A PLAN VIEW

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SANDBAG AT INLET
N.T.S.

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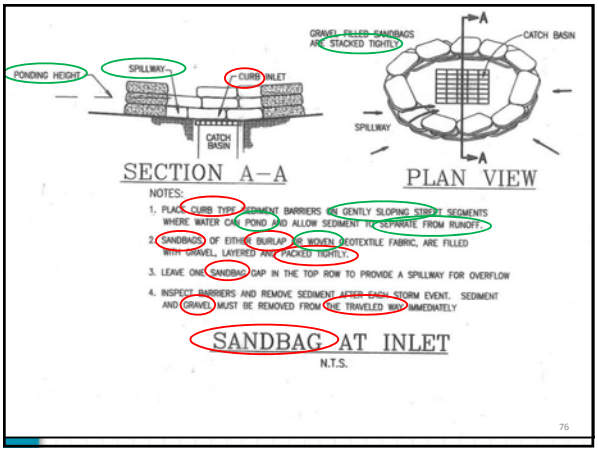

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SANDBAG AT INLET
N.T.S.

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Minimizing Sediment in Discharge

Photo: David Franklin

Water needs to enter! This sediment "control" is interfering with an engineered storm water system.

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Straw

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Straw

Accessibility of Equipment

Soil Preparation


Photo: David Franklin
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Photo: David Franklin
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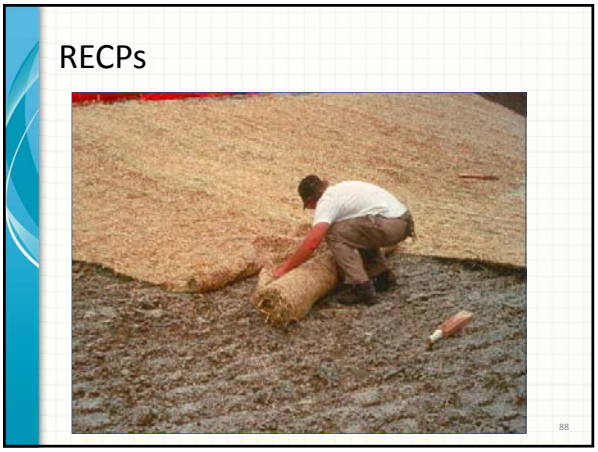
RECPs
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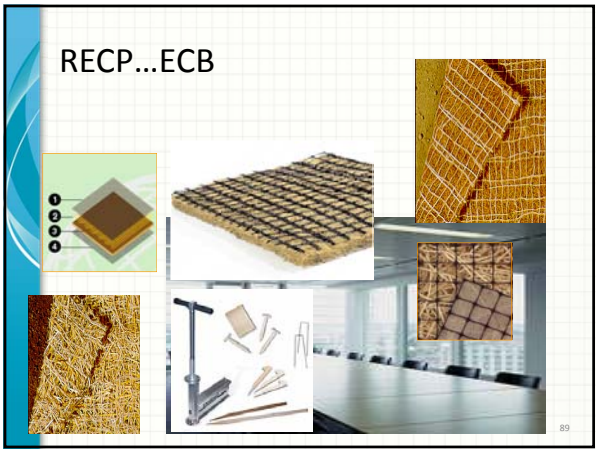
RECP…ECB
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2
3
4
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Photo: David Franklin


01/09/2013
Photo: David Franklin
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01/09/2013
92


Photo: David Franklin


RECP and Fiber Roll
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Steep slopes should be protected as quickly as possible.
Photo: David Franklin

Jute's Strength and Weakness

- Conformable, but open when stretched

Photo: David Franklin

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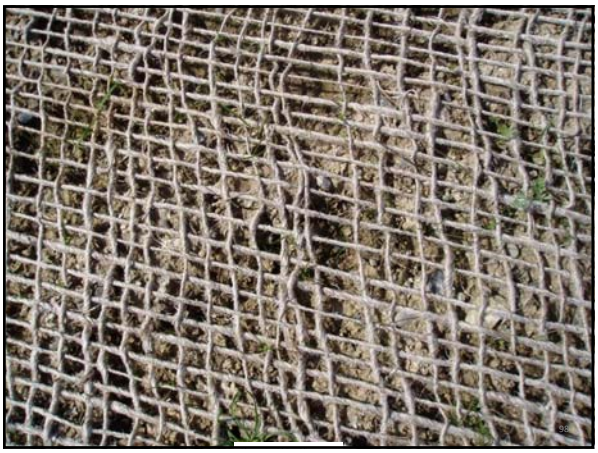


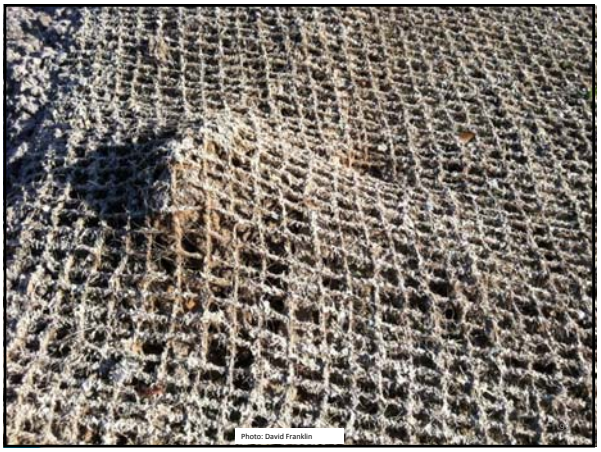
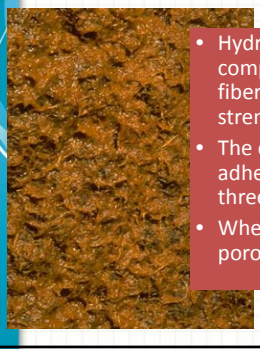


Photo: David Franklin

Bonded Fiber Matrix



- Hydraulically-applied system composed of long strand mulch fibers joined together by high-strength adhesives.
- The combination of mulch and adhesive creates a continuous, three-dimensional blanket.
- When dry, creates a high strength, porous and erosion resistant mat.

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Bonded Fiber Matrix

Generally include:

- Elongated wood fibers
- Cross-linking soil stabilizer
- Adhesive glue
- Tackifier

May include:

- Crimped synthetic fibers
- Other proprietary ingredients

Photo: David Franklin

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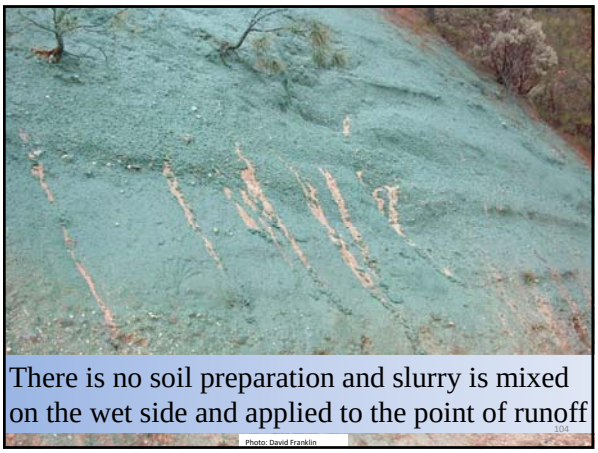

There is no soil preparation and slurry is mixed on the wet side and applied to the point of runoff


Photo: David Franklin
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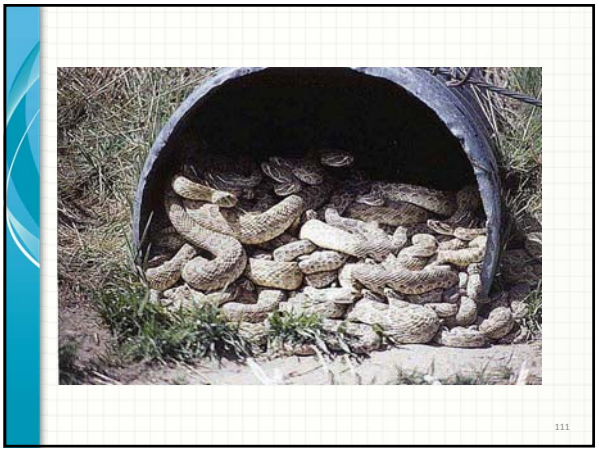
Photo: David Franklin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Concrete Washout
Photo: David Franklin
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Photo: David Franklin
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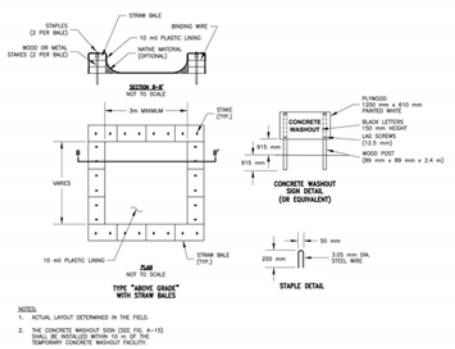
Concrete Washout



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Small Washout Pits

- Compact pit using filled bags and plastic sheeting

Sand or Gravel?

Sand or Gravel?

WM-8 Concrete Waste Management

Construction Exit

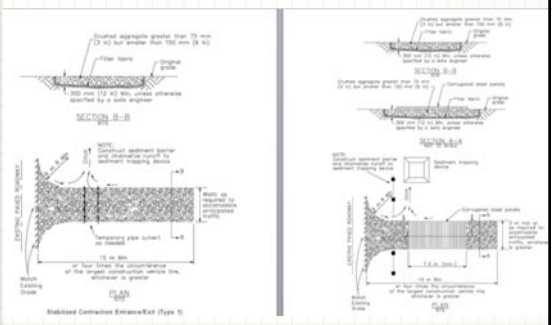

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Photo: David Franklin

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Construction Road

Photo: David Franklin

Tire Wash

Photo: David Franklin

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Good Housekeeping in a Nutshell

Juggling, Phases and Cost of Removal

How do we define removal of temporary BMPs?

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Combination of Effective Measures

Photo: David Franklin

Photo: David Franklin

Combination of Effective Measures

BMP Examples in field demo

- Focusing on
  - Proper installation
  - Evaluation of performance
  - Maintenance and repair concerns

Inspecting BMPs

- Implementation…was it done well?
- Evaluation…is it working?
- Maintenance…means what?
- Repair…or replace?
- Any associated BMPs or redundancy needed?

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BMP Selection and Evaluation

- BMP Factors

Juggling 3 schedules
Phase of construction
Categories of BMPs
Flow type/direction
Hold or let go
Profile and return
Contributing area
Flexibility and conformity
Permeability and rate
Longevity
Temporary and permanent
Contents
Area
Soil preparation
Sterility
Redundancy
Treatment or prevention
Location
Duration
Access
Time to effective
Blocking flow
Self-anchoring
Reusability
Maintenance
Measurability
Lead time
Cost

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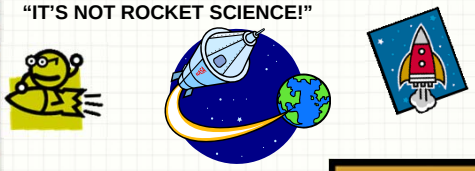
"IT'S NOT ROCKET SCIENCE!"



"IT'S NOT BRAIN SURGERY!"

"I'VE BEEN DOING THIS STUFF FOR 30 YEARS"

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Water Quality

What does it require?

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Thank You!

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