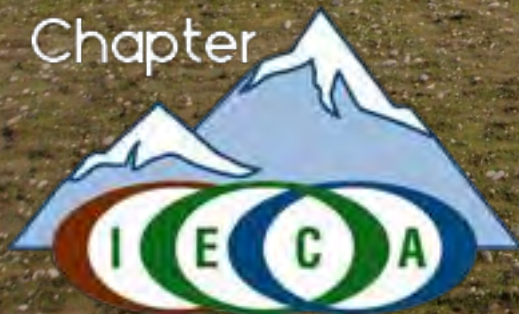




Building for the future while
protecting our environment



Mountain States
Chapter



- 
- ✓ Stabilize Soils
 - ✓ Manage flows
 - ✓ Good Housekeeping

Seeding

Straw Blanket

Wattle

Gravel Filter Berm

Silt Fence

Straw Mulch

What-Where-When?

Soldotna

What is a BMP?



- Schedule of activities** - Prohibitions of practices
- Physical structures** - Construction procedures
- Other management practices to reduce pollution**

Design BMPs

- Minimize disturbance (foot print) of project.
- Maximize integration of existing land contours.
- Minimize length and gradient of slopes.
- Account for both onsite and offsite stormwater during construction.

Procedural BMPs

- Time major soil disturbance for dry season
- Complete project in phases
- Integrate erosion control and construction schedules (they don't have to conflict)



Physical BMPs

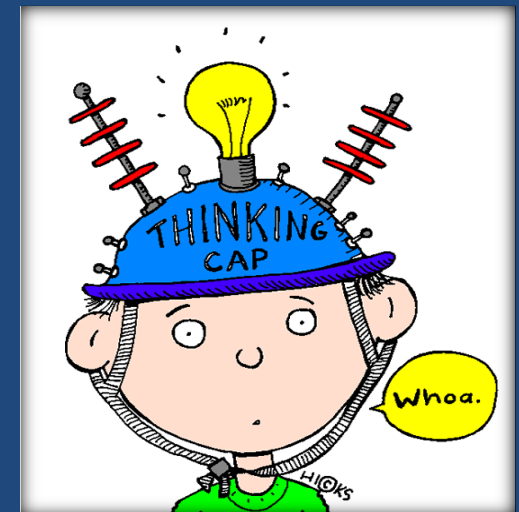
- Implementation of erosion & sediment control practices in the field.
- Must be a supplement to and not a replacement for design & procedural BMPs.





NEWS FLASH

It's about
how you do,
what you do,
and when
you do it!



All Sites Require Multiple BMP's

Compost Sock

Creek

Coir Blanket

Silt Fence

Coir Logs

Seeding

Jute Netting

The trick is...

Gravel Access

The right BMP,

in the right place, at the right time!



Phasing Stabilization Finish as you Go!



Large bare areas for long periods of time increases the potential for erosion.



Exposure to Risk = Extent & Duration of Exposed Soils

Stabilization: Finish as you go!



Phasing Stabilization





Temporary seeding



Sequence or phase construction activities to minimize the extent and duration of exposed soils.





Standard Operating Procedure

Seeding was a normal operation conducted as needed throughout the active construction period.

Tuntutuliak



AK - 14

Alakanuk

Blanket on dredge spoils pile



Vegetation coming in nicely after 45 days



Large wide rolls

- ✓ Speed up installation
- ✓ Reduce overlap









Gravel Road
Wattles
Seeding
Stockpiles Covered
Tree Protection

The Right BMP in the Right Place at the Right Time Takes Planning

Ready for the next phase





- Lot prior to foundation

Same Lot







Time for
curb clean up!

Added Safety Fence

Direct flows off slopes



I-5 – SR 502

Using Wattles to Direct Flows



I-5 – SR 502



Straw Coconut RECP

Pipe Slope Drains

BMP
WA C-204
OR RC-1
AK - 3

- Convey stormwater away from or over bare soil
- Need Energy Dissipation



- 
- Filter Sock
 - Pipe Slope Drain
 - Temporary Liner

Soldotna, AK



- ✓ Avoid Water Contact with Soil
- ✓ Keep Clean Water Clean



Temporary Downspouts



Temporary Downspouts




Temporary Rain Drains

A two-story house under construction with a red-tiled roof. The exterior walls are made of yellowish-brown panels. Large windows are visible on both floors. A metal scaffolding structure is positioned against the central part of the house. A red ladder is leaning against the scaffolding. Two workers are visible on the second floor. A black plastic cover is laid out on the ground in front of the house, secured with white weights. A chain-link fence with a silt filter mesh is installed around the construction area. The foreground is filled with dry, brown brush and weeds. The sky is clear and blue.

Plastic Cover

Perimeter Silt Fence



Silt Fence
Brush Barrier
Vegetative Buffer
Seed & Mulch
Wattle

Plastic Sheet Slope Drain

Soldotna, AK



Persistent
Consistent
Continuous
Constant
Trickle
FLOW







Before
During
After



- ✓ Low tech
- ✓ Simple
- ✓ Safe
- ✓ Easy



Turf reinforcement Mats

Functions Of TRMs

- Immediate unvegetated erosion control
- Enhance vegetation establishment
- Supplement erosion control once vegetation is established
- Reinforce the vegetation to enhance its resistance to erosive forces



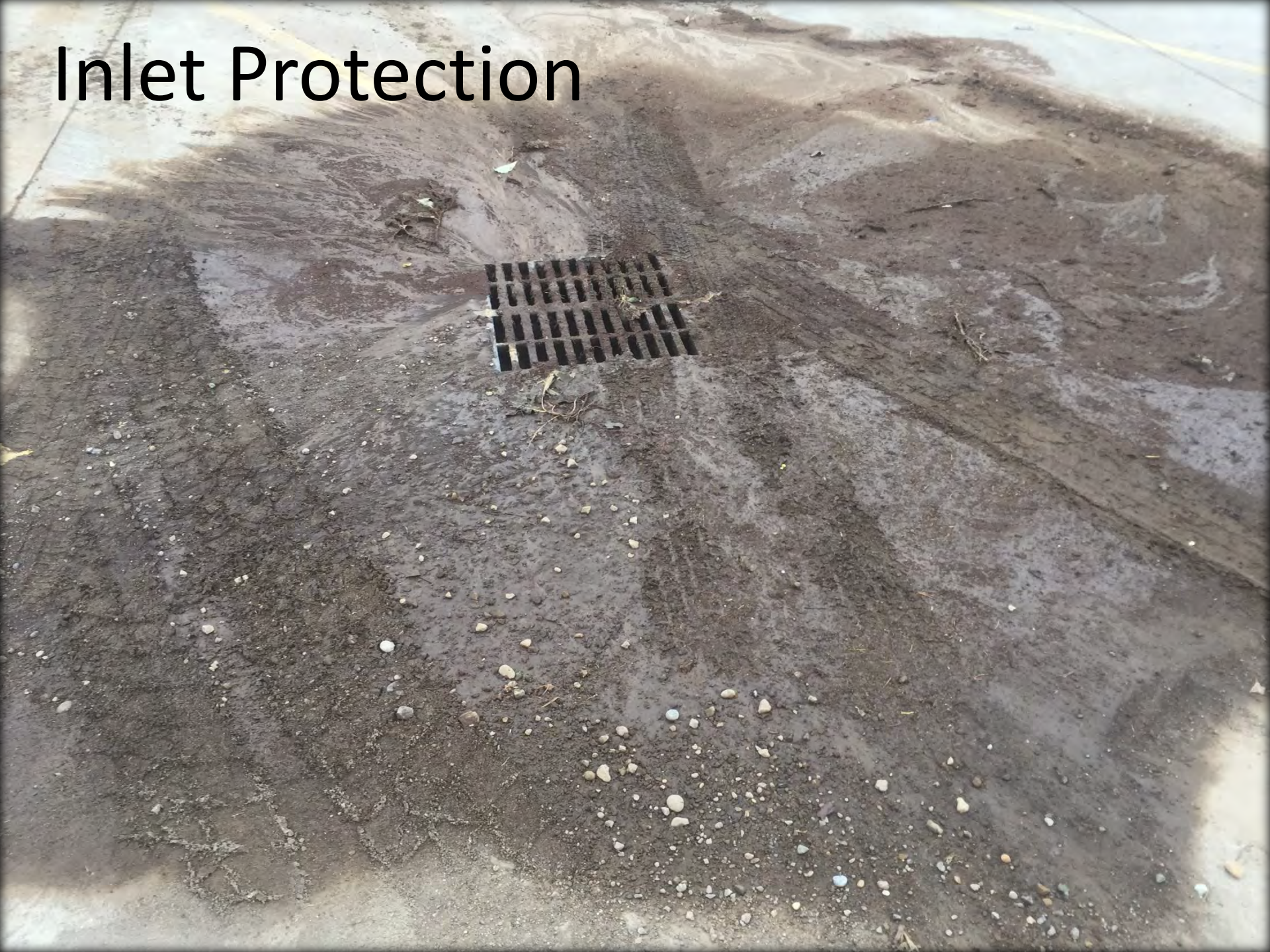
Using 100% Biodegradable BMP's







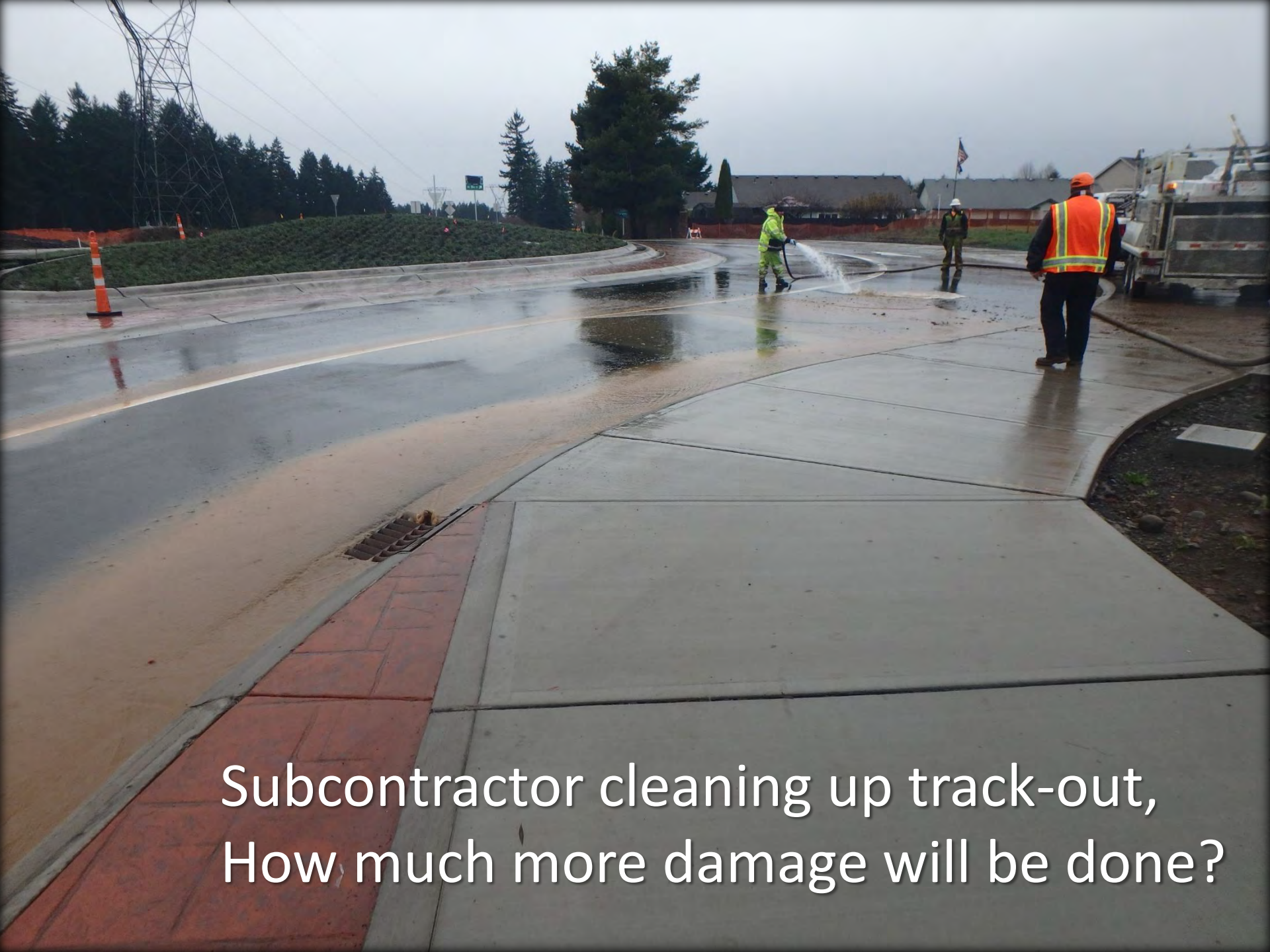
Inlet Protection





Where will this go?





Subcontractor cleaning up track-out,
How much more damage will be done?

Street Sweeping



Mud Mats









**Water From Wheel Washing is
Process Water – not Stormwater**

ALL MUD
AND
DEBRIS
MUST BE
REMOVED
PRIOR
TO
LEAVING
THE SITE
THANK YOU





Alternate Perimeter Controls

Behold: The worlds most effective silt fence



Down-Slope Sediment Controls

Choices

Choices

Choices

Silt Fence

Vegetated Buffer

Compost Berm

Straw Wattle





Tasty BMP's

Vegetated Strip

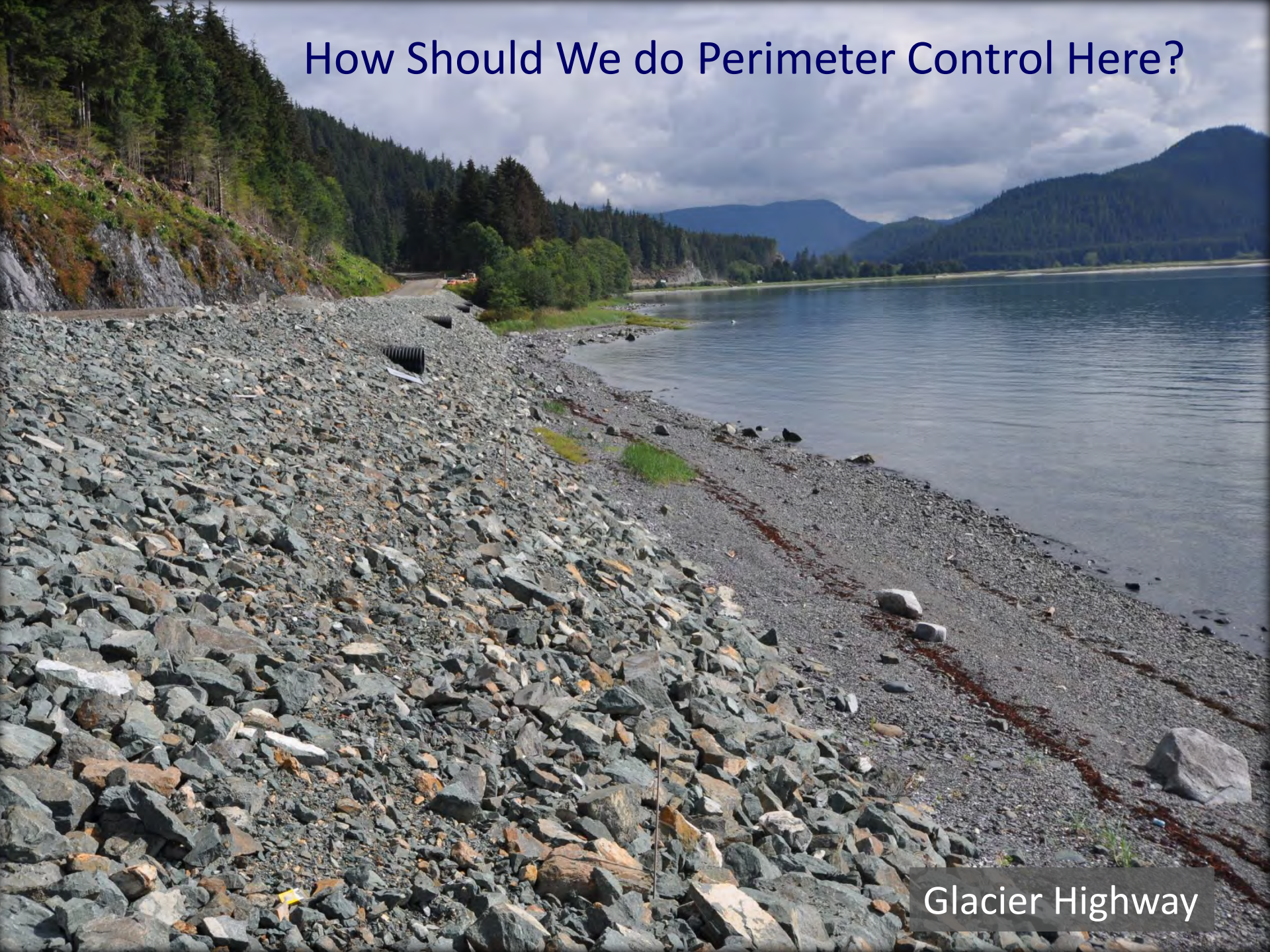


Reduce the
transport of
coarse sediment

Reduce the
runoff velocities
of overland flow

BMP
WA C-234
OR EP-2
AK - 16

How Should We do Perimeter Control Here?



Glacier Highway



Glacier Highway

Perimeter Controls On the Cheap and Easy



Glacier Highway

Gravel Berm Perimeter Control



Glacier HWY Juneau



Glacier HWY Juneau

A rusty metal hopper or small train car sits on a track in a wooded area. The hopper is tilted upwards and has a large metal mechanism on its side. The background is filled with green foliage and trees. The foreground shows a pile of gravel.

INTRODUCING:

The All NEW!

BERMANATOR

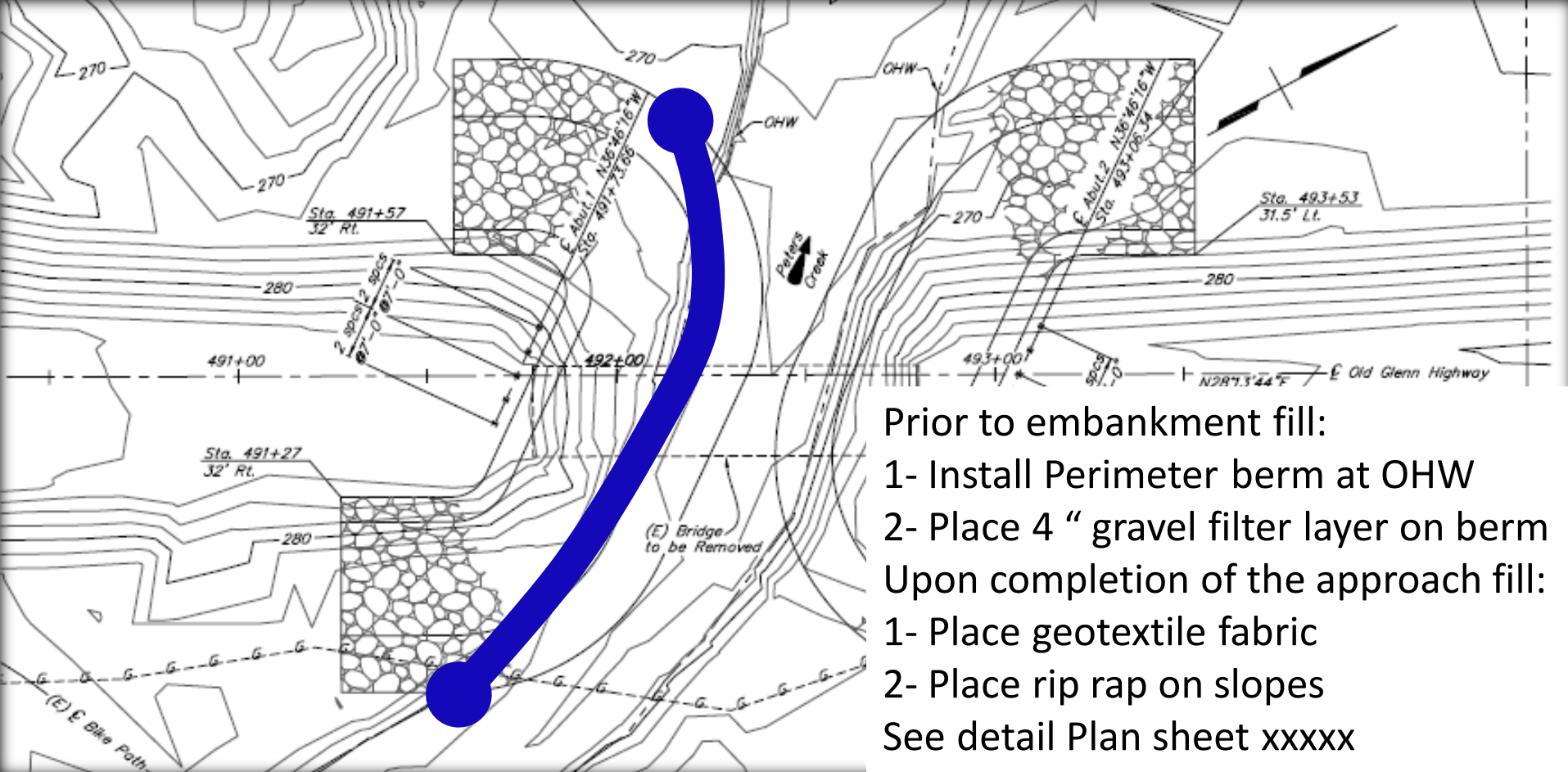




Glacier HWY Juneau

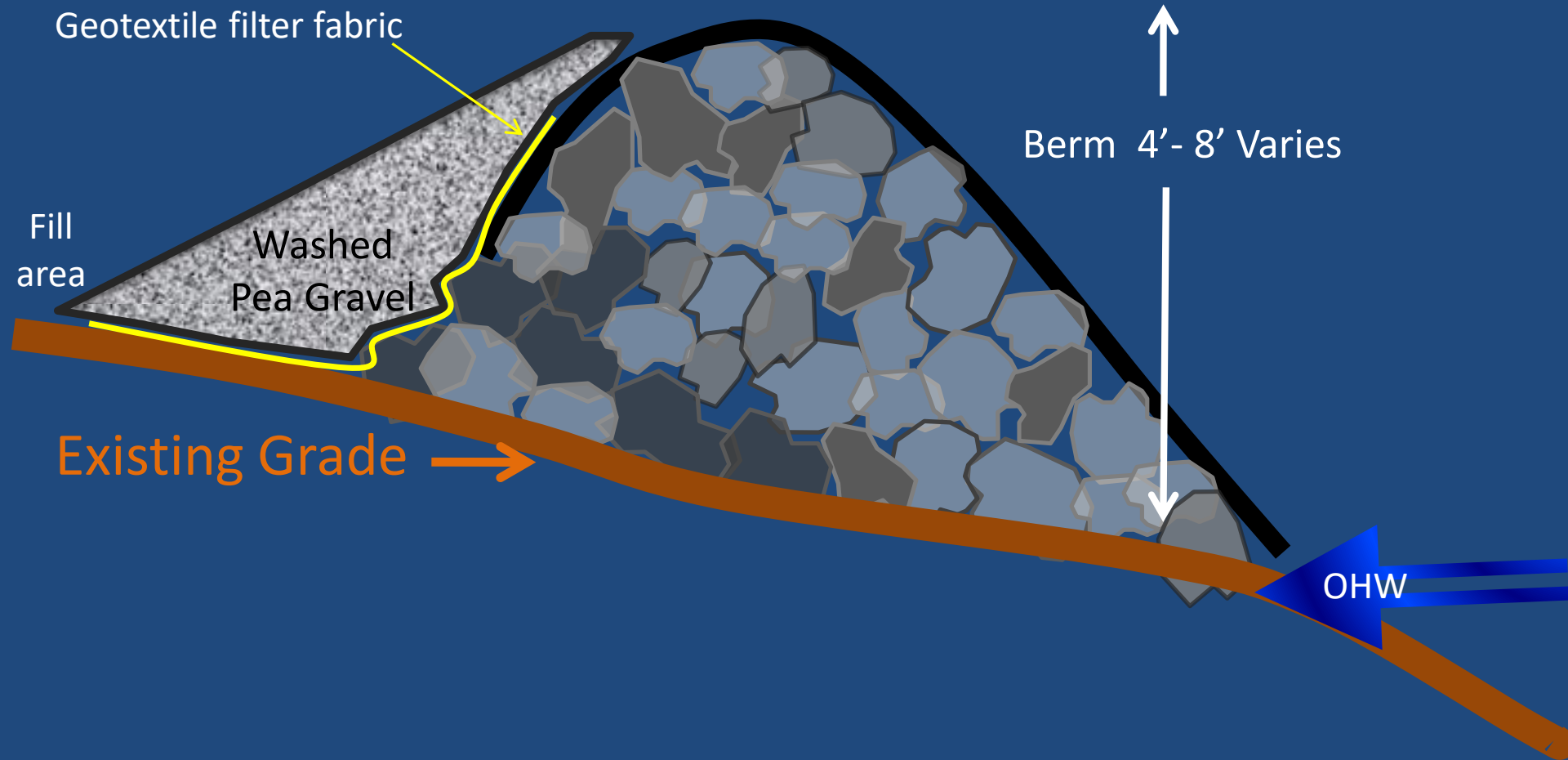


Glacier HWY Juneau



Describe the sequence and timing of activities that disturb soils and of BMP implementation and removal. Phase earth disturbing activities to minimize un-stabilized areas, and to achieve temporary or final stabilization quickly.

Filter Berm



Gravel Filter Berm & Embankment Stabilization





What should the inspection report say?



Have you signed reports stating that you are in compliance with the SWPPP & Permit?









Seeding

Plastic

Wattles

Silt Fence

RECP's

Preserve
Vegetation

Channel
Lining

What-Where-When?

- Finish as you go
- Turn Liabilities into Assets
- Manage Risk











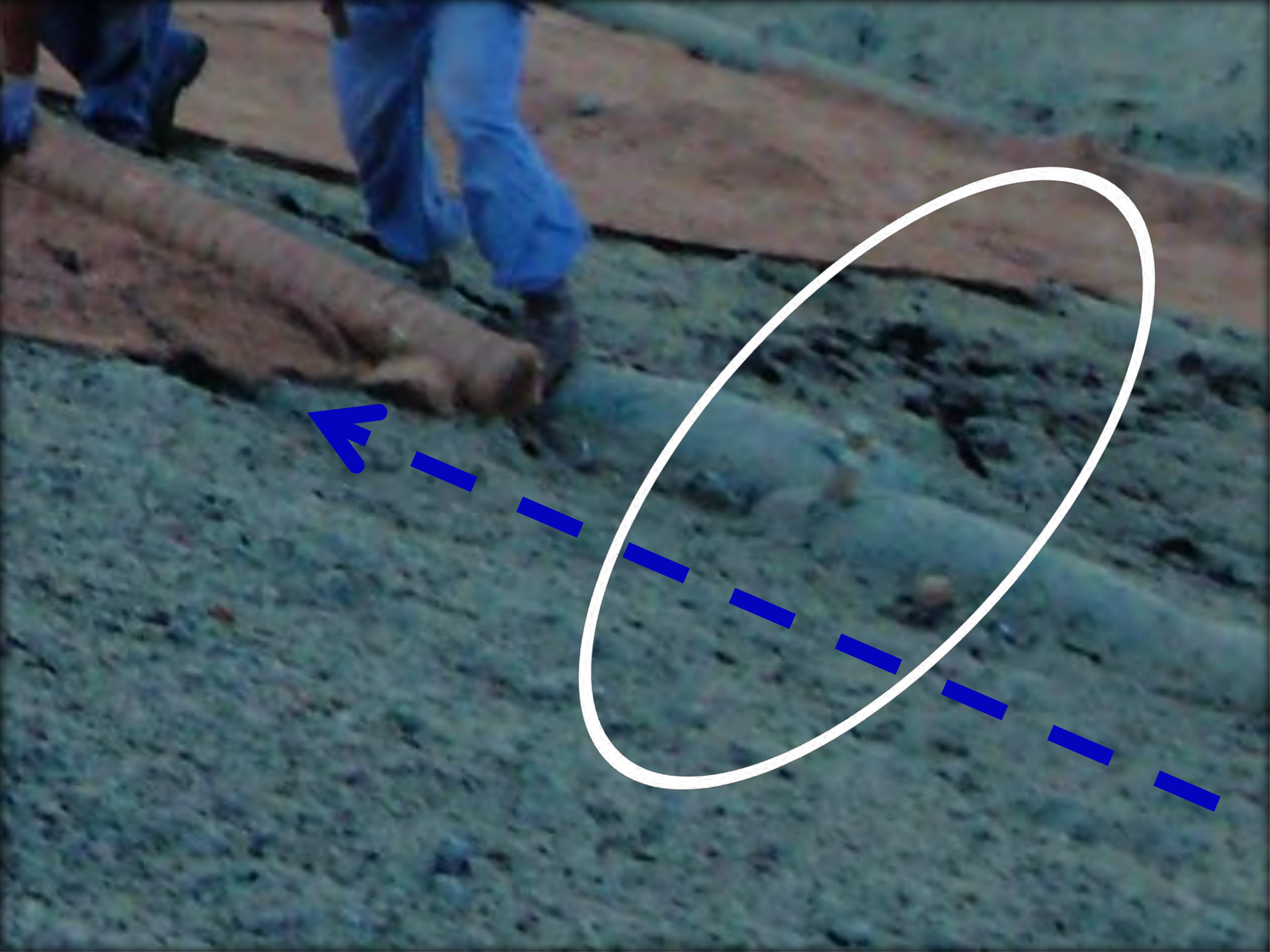


09.16

Detail the planned process











Phase the Process



Work the Plan




**If Your not Nervous:
Your Nuts!**



Any Less Nervous?

Current Practices

- 
- Strip topsoil & stockpile
 - Compact the ground
 - Haul & Spread topsoil
 - Apply seed, fertilizer & erosion control,
 - Sometimes irrigate...



Use existing equipment,
Simpler mobilization,
\$\$\$ Saved \$\$\$





- ✓ Standard Equipment
- ✓ Lower Operating Costs
- ✓ Contractor Profitability



Unique Mobilizations



Complicated Site Access

The Biotic Approach Asks...



Is importing topsoil really
needed for establishing
vegetation?

The Goal:

Not just Germination





Sustainable Revegetation



Why Focus on Vegetation



Mulch is Temporary Vegetation is Permanent

**The Goal:
Establish PERMANENT
Erosion Control**

Living in the soil are plant roots, bacteria, fungi, protozoa, algae, mites, nematodes, worms, ants, maggots, insects and grubs, and larger animals.

science of soil

soil is

made of about **45%** minerals
25% water
5% organic matter **25%** air



what's underneath



Healthy soil has amazing water-retention capacity.

Every

1%

increase in organic matter results in as much as

25,000

gal of available soil water per acre.



One teaspoon of healthy soil contains

100 million-1 billion individual bacteria



All of the soil microbes in **1 ac/ft** of soil weigh more than **2 cows**

Earthworm populations consume **2 tons** of dry matter per acre per year, partly digesting and mixing it with soil

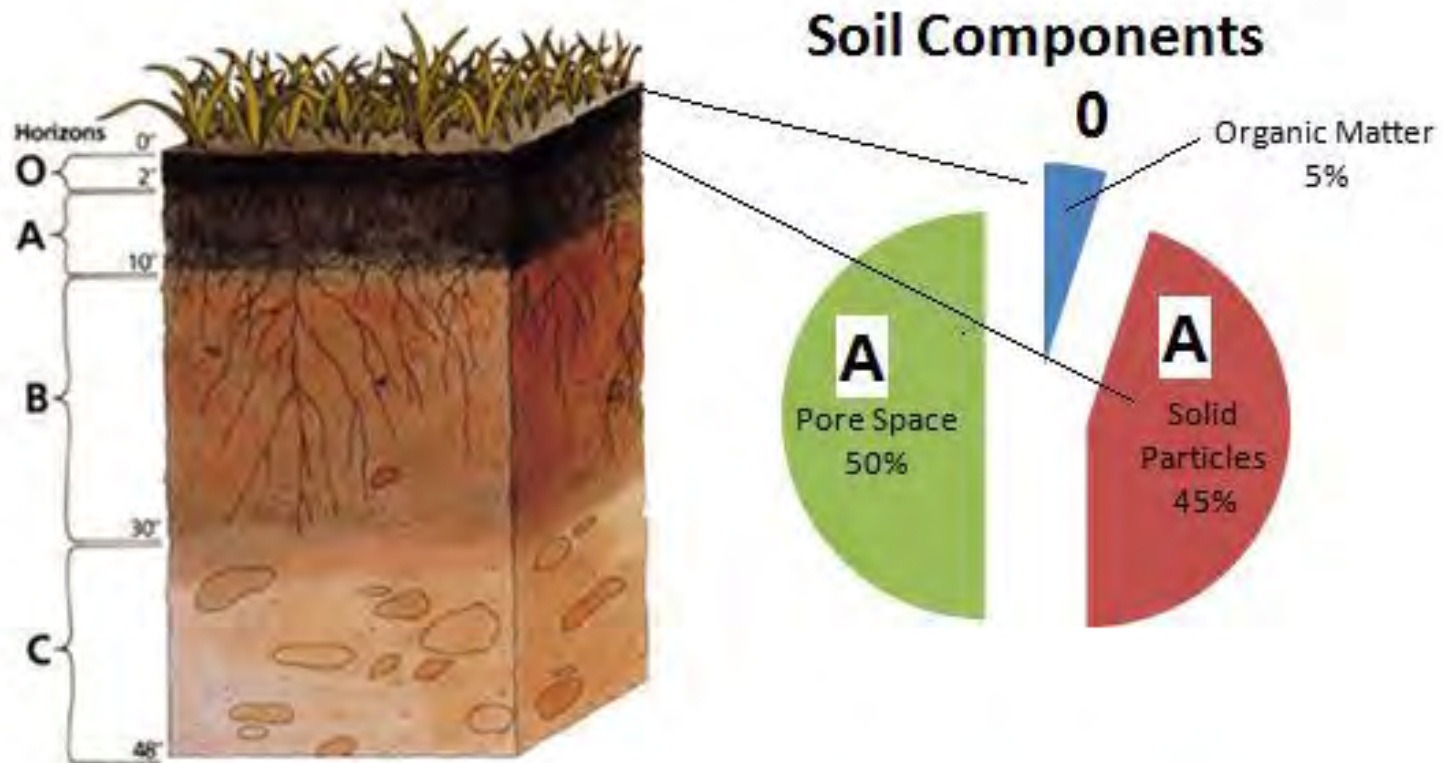




What Happens to Soil During Construction?

- Organic matter, the soil's food bank, is lost.
- Porosity, crucial for air and water exchange, is reduced.
- Microbes essential for nutrient cycling are absent.

If we're adding topsoil to add organic matter, but organic matter is less than 5% of topsoil?



O) Organic matter: Litter layer of plant residues in relatively undecomposed form.

A) Surface soil: Layer of mineral soil

B) Subsoil: This layer accumulates iron, clay, aluminum

Topsoil & Compost

10 trucks per acre loaded with 26 cubic yards of soil in each.



Conventional approach
to restoration.

Biotic
Approach

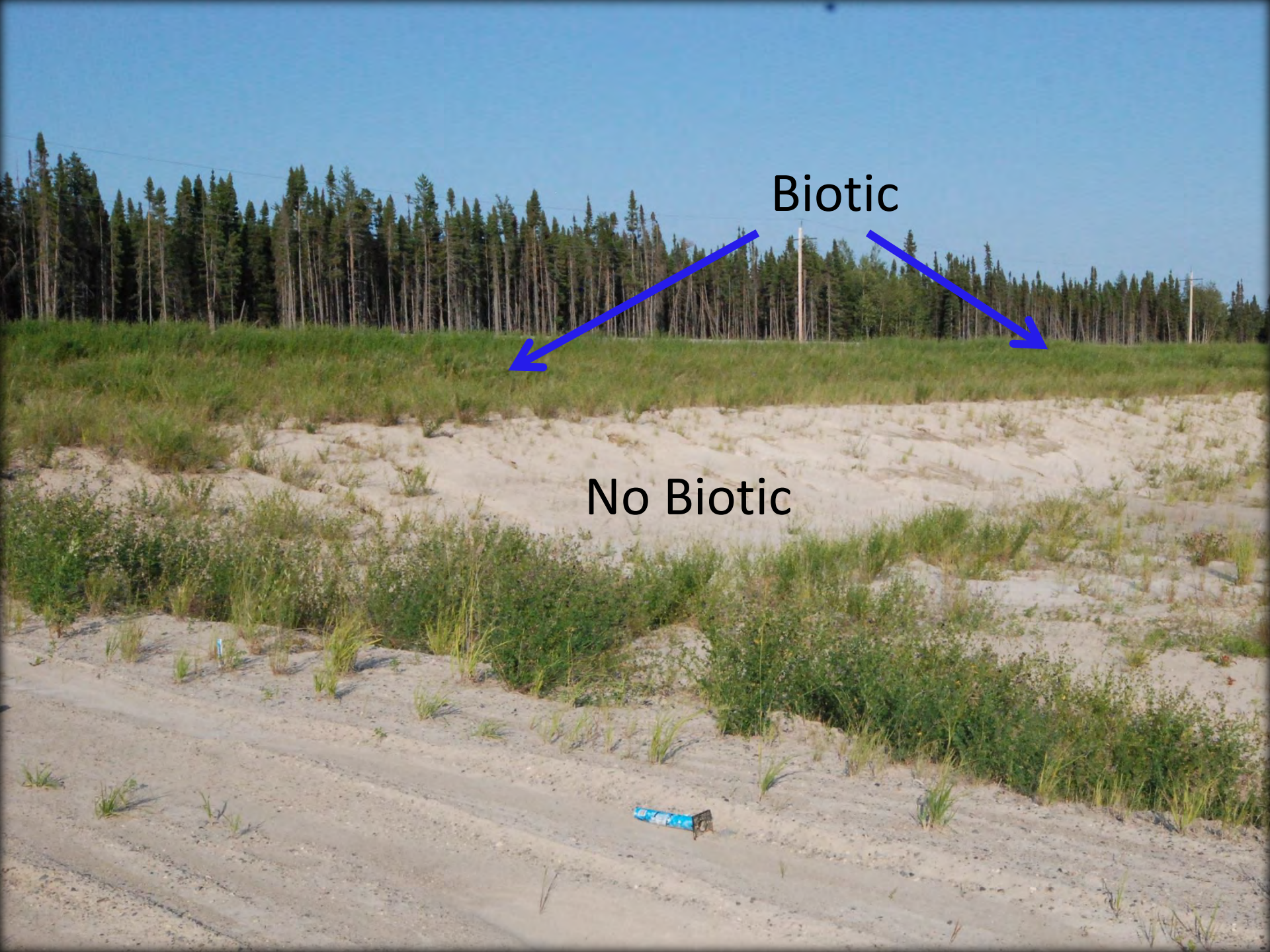


Add Only
What's Needed!



Treated vs Untreated





Biotic

No Biotic



Location

Location

Location



Alex Zimmerman CPESC

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