

# CREST

Columbia River Estuary Study Taskforce

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## Erosion Control Guidance

Dear Clatsop County builder:

Recently, you've probably heard a lot about water quality problems in Clatsop County, or that many Oregon fish-bearing streams no longer support fish runs.

We're almost sure to hear even more about these issues in the coming months and years. The fact is that these are serious problems here in Clatsop County, just as they are across the entire state of Oregon.

These problems can't all be attributed to a single cause. However, several common causes of water quality problems are well known. One of the most common is erosion from construction sites.

Erosion from construction sites is responsible for some pretty serious problems in the county. Fish habitat is being degraded from soil that gets washed into streams. Salmon can't successfully spawn in gravel that is clogged with fine sediments like those coming from construction sites. Shellfish growing areas can be destroyed by a heavy layer of fine sediments. Light can't penetrate very deeply into sediment-laden waters, affecting the growth of vegetation in estuaries.

*The most effective way to deal with soil erosion from construction sites is to prevent it from happening in the first place.*

CREST, in conjunction with Clatsop County and the State of Oregon, has developed some technical assistance materials to help deal with the problem of construction site erosion in Clatsop County.

The materials in this folder describe simple steps that can be taken to prevent erosion from occurring on your building site. Inside, you'll find instructions on how to prepare an **Erosion Control Plan** as well as simple instructions on how to use various inexpensive materials and methods to prevent soil erosion.

Certainly there are many water quality problems in Clatsop County. But the most important ones for us to focus on are the ones we can solve. Eroding soil from construction sites is one of the easiest to solve. Please join forces with the County, CREST, and the State of Oregon by reviewing the material in this folder and applying some of the methods to control soil erosion. Feel free to contact CREST any time with your questions.

# Planning Ahead for Erosion Control

Spending a few hours looking at a construction site and planning ahead can save days of work later.

## **It's important to look at the "lay of the land":**

- What direction will water run off the site?
- How steep are the slopes on the site?
- Are there any natural drainage channels on the site?
- Are there any springs on the site?
- How will excavation on the site affect where runoff water will go?
- Where will runoff water go as it leaves the site?

## **It's important to look at the site in terms of activities:**

- What areas will be cleared of vegetation?
- Where will there be excavation?
- Where will vehicles be parked?
- How will vehicles enter and leave the site?
- Where can soil be stockpiled?

## **It's important to look at timing:**

- What time of year is the best for building?
- Can construction be phased in several stages?

## **It's important to be familiar with simple soil erosion control materials:**

- Matting and mulch prevent the direct impact of falling rain on bare soil.
- Silt fence and straw bales prevent concentrated water flows that make gullies.
- Biofilter bags filter silt and sediments from runoff before it enters storm drains, culverts, or ditches.

With answers to these questions in mind, an **erosion control plan** can be drawn up.

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## **Making an Erosion Control Plan Work**

Drawing up an Erosion Control Plan is a simple process of drawing the construction site, noting slopes and drainage flow, and drawing in erosion control measures to be used. With this plan, erosion can be monitored and held to a minimum.

Following is the four-page folder of guidance on preparing an **erosion control plan**.

# Preparing an Erosion Control Plan

**This publication will show you how to prepare a soil erosion control plan that can prevent many soil erosion problems on your construction site.**

## Planning Ahead

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By planning ahead, you can make the whole construction job easier and incur less cost repairing the landscape after the construction is completed.

- **Review** the erosion control **practices** described in this guidance.
- **Establish** a **vehicle parking area** to keep vehicles from creating disturbed areas all over the jobsite.
- **Save vegetation** as much as possible to minimize bare soil areas that will be easily eroded.
- **Limit vehicle access** to vegetated areas with barriers to minimize disturbances to stable areas.
- **Stockpile** valuable **topsoil** and redistribute it after construction is complete.
- If possible, **avoid winter rainy season** construction.
- Plan to **stage work** phases to minimize disturbed areas particularly in the rainy season.
- Get a **gravel driveway** in place before construction starts.
- Make sure the **builder** and **contractor understand your plans** and can comply with them.

## Preparing your Erosion Control Plan

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On the back of this folder is a blank form that you can use to draw your **Soil Erosion Control Plan**. A photocopy of your architectural plan could be substituted for this form.

Inside this folder is an example Soil Erosion Control Plan with descriptions of the various components and measures that make up the plan.

### Steps to prepare the plan:

- Draw the **streets** and **roadways** leading to the property.
- Draw in the **boundaries** of the property.
- Indicate which direction is **north**.
- Draw in the proposed **building** on the site.
- Add arrows showing the direction **water will flow** off the property.
- Indicate the **steepness of slopes** by classifying them as steep, moderate or gentle.
- Designate areas where **vegetation** will be left **undisturbed**.
- Draw in the **access driveway** and designate an area for **vehicle parking**.
- Determine where soil will be **stockpiled**.
- Determine what **erosion control measures** will be used. **Draw and label** the control measures.

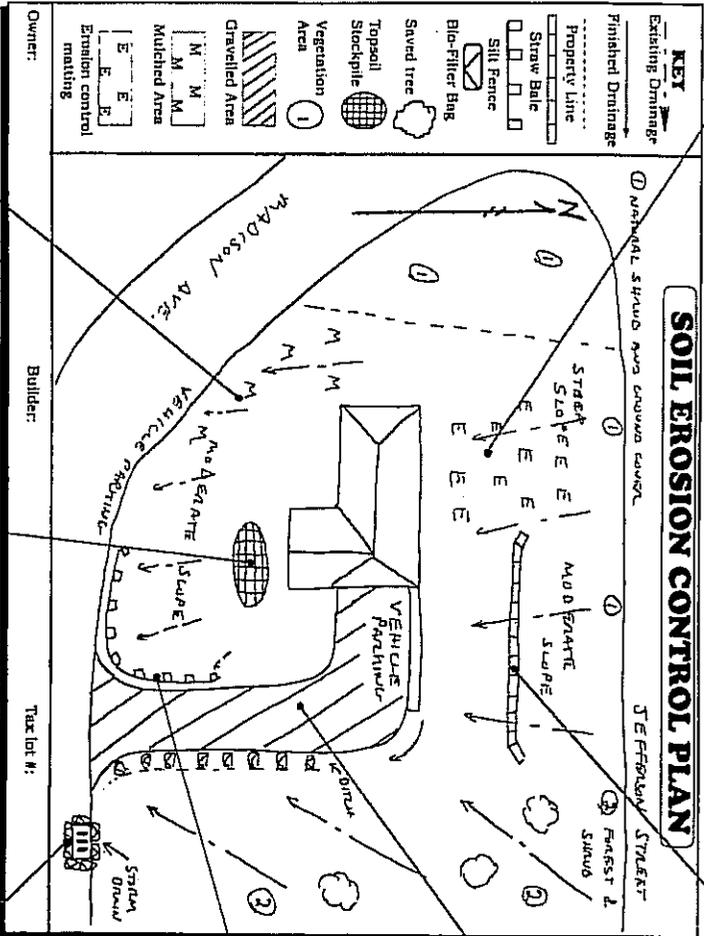
# Sample Soil Erosion Control Plan

- Erosion Control Matting (EM)**
- Install lengths for top to bottom on steep slopes.
  - Follow manufacturer's recommendation for staple spacing.

- Regular cleanup**
- Cleanup soil tracked unto streets by vehicle traffic and return to jobsite.
  - After heavy rains, clean up soil washed off jobsite.

- Downspout extenders**
- Route water to a vegetated or paved area.
  - Install as soon as gutters and downspouts are completed.
  - Maintain until ground cover is established or drains installed.

- Revegetation**
- Seed, sod, or mulch bare soil as soon as possible.
  - Use seed as recommended on revegetation sheet.



- Straw Bales**
- Install immediately following grading.
  - Place parallel to the contour of the land to allow water to pond behind barrier.
  - Entrench 4 inches deep.
  - Anchor each bale with two stakes.
  - No gaps between sections of silt fence.
  - Inspect and repair once a week or after heavy rains.
  - Maintain until vegetation is established on slope.

- Gravel Drive**
- Install a single access drive using 2 to 3 inch aggregate.
  - Lay gravel at least 6 inches deep and wide enough to accommodate all vehicles - at least 7 feet.
  - Maintain throughout construction.

- Silt Fence**
- Install immediately following grading.
  - Place parallel to the contour of the land to allow water to pond behind barrier.
  - Entrench 4 inches deep.
  - Stake silt fence 1 stake every 6 feet.
  - No gaps between sections of fence.
  - Inspect and repair once a week or after heavy rains.
  - Maintain until vegetation is established on slope.

- Inlet protection**
- Use biofilter bags or gravel as protection to slow and filter runoff from job site before it enters storm drains.
  - Maintain inlet protection by regular cleaning to avoid clogging and street flooding.

- Straw Mulch (M)**
- Spread on shallow slopes.
  - At least a 2" layer

- Soil Piles**
- Locate away from downslope streets, driveways, streams, or drainageways and away from vehicle parking and traffic.
  - Protect from erosion with straw, plastic or temporary seeding.

## SOIL EROSION CONTROL PLAN

Owner: \_\_\_\_\_ Builder: \_\_\_\_\_ Tax lot #: \_\_\_\_\_

# SOIL EROSION CONTROL PLAN

## KEY

 Existing Drainage

 Finished Drainage

 Property Line

 Straw Bale

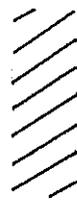
 Silt Fence

 Bio-Filter Bag

 Saved tree

 Topsoil Stockpile

 Vegetation Area

 Gravelled Area

M M

M M

Mulched Area

E E

E E

Erosion control matting

Owner:

Builder:

Tax lot #:

# **Before you Start Digging**

## Making an Erosion Control Plan

Planning ahead can save a lot of expense later in the construction.

## Saving the Vegetation

The more vegetation that is left undisturbed on the construction site, the less soil erosion will occur. Landscaping after construction will be much easier and probably less costly.

A. Plan ahead. Talk with the excavator and contractor and find out how much of the construction area definitely needs to be clear of vegetation.

B. If possible, rope or block off areas of vegetation to be preserved, including areas under larger trees to prevent vehicles and equipment from damaging roots or overhead branches.

## Controlling Vehicle Traffic

Keeping vehicles confined to smaller areas of the building site will leave more of the ground undisturbed.

A. Set up a specific parking area for vehicles coming on the construction site.

B. Lay down a gravel driveway at the road or street entrance.

## Stockpiling Topsoil

Removing topsoil from the building area and putting it in a pile before construction begins will save valuable soil.

A. Designate an area where a topsoil pile can be placed away from the immediate construction area.

B. Cover the pile with straw, plastic, or an erosion blanket to avoid erosion and loss of soil.

### Phased Clearing

Clearing the building site in stages will minimize areas exposed to erosion.

### Seasonal Considerations

If possible, plan the major part of the excavation and foundation work for the late spring or summer when there is a minimum of rain and runoff. Seed large bare areas before October 1 to insure that grass will have enough time to grow and establish itself before the heavy winter rains start. Where seeding will not germinate before the rainy season, mulch all bare soil areas and maintain the mulch until spring.

### GRAVELLING THE DRIVEWAY

Gravelling the entrance driveway will keep vehicles from tracking soil and mud out of the building site. On steep sloping driveways, the gravel will help with keeping silt in runoff water from washing down the driveway.

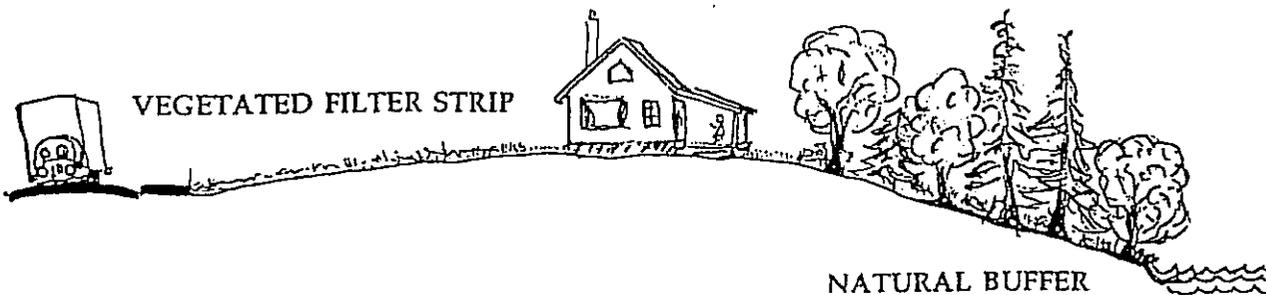
- A. Use "3 inch minus" crushed rock.
- B. The rock layer should be at least 6 inches deep.
- C. Make the driveway wide enough to handle all size vehicles that may enter the building site.

For more information, contact  
the Columbia River Estuary Study Taskforce (CREST)  
750 Commercial St, Room 214  
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# FILTER STRIPS

*Vegetated Filter Strip* - A vegetated section of land designed to accept runoff as overland sheet flow from up-slope development. The purpose of these vegetated areas is to slow down the flow of water and trap particles of sediment, allowing them to settle out of the run off and be captured on site. Vegetated filter strips are recommended for slopes up to approximately 12 percent and the surface area of the filter strip must be equal to or preferably greater than the surface area of the development area being treated. Filter strips may closely resemble many natural vegetated forms, from grass slopes to riparian forest. A filter strip cannot treat high velocity flows; therefore, they have generally been recommended for use in agriculture and low density developments.

A vegetated filter strip differs from a natural buffer in that the filter strip has been designed and constructed specifically for the purpose of sediment removal. A filter strip can also be an enhanced natural buffer, whereby the sediment removal capability of the natural buffer is improved through engineering and maintenance activities such as land grading. Periodic inspection, repair and regrading are required to prevent channelization of the slope. Inspection and maintenance are especially important following storm events. Excessive use of pesticides, fertilizers and other chemicals should be avoided on vegetated filter strips and to avoid soil compaction, vehicular and pedestrian foot traffic should be kept to a minimum.



*Natural Buffer* - A low sloping area of grassy or woody vegetation located between a pollutant source and a waterbody. A natural buffer is formed when a designated portion of a developed piece of land is left unaltered from its current state. A natural buffer differs from a vegetated filter strip in that it is "natural" and it need *not* be solely used for water quality purposes. The riparian regions adjacent to waterbodies are natural buffer zones, but may need some enhancement through additional plantings or grading of channelized areas to reduce concentrated flows.

# Gravel Entrance Way

## What is it?

A graveled entrance roadway to the construction site.

## Purpose

To provide a temporary hard surface for vehicle traffic to minimize disturbance of soil.

## How it works

The graveled surface allows water to drain off the road surface and keeps the road surface hard and stable in the heaviest traffic area.

The gravel entrance way also serves as a base for a paved driveway.

## Where to use it

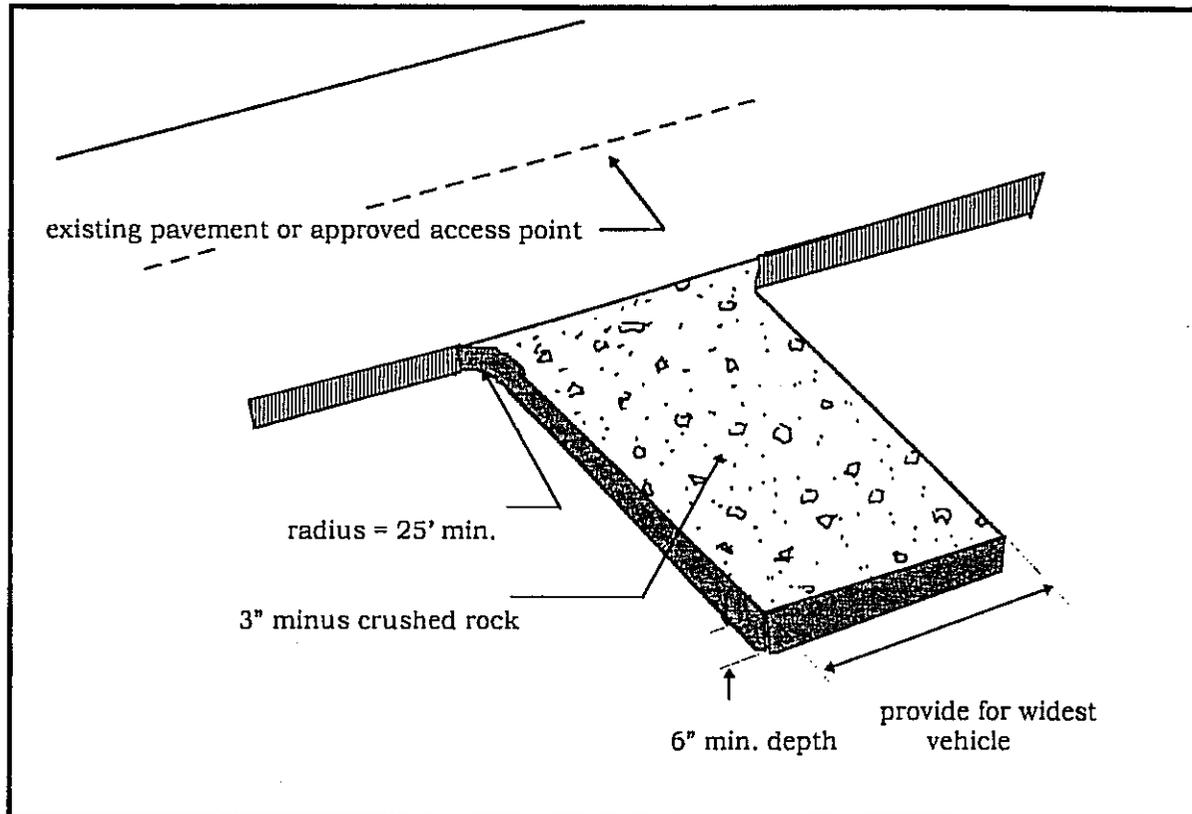
At the entrance to the construction site.

## How to install

1. The gravel drive should be wide enough to handle all size vehicles that may enter the construction site.
2. In most cases, use 3" minus crushed base rock. In severe conditions, use 6" to 8" pit rock.
3. The rock layer should be at least 6 inches deep.

See diagram on reverse side for a typical graveled driveway.

## GRAVEL ENTRANCEWAY CONSTRUCTION



# Revegetating

## What is it?

**Seeding** or **sodding** bare soil with grass or vegetative cover. Seeding can be done by hand or by hydroseeding. Hydroseeding is done by spraying a mixture of seed, fertilizer, mulch, and a type of adhesive over large areas with a pump. Sodding is the laying down of already growing grass or vegetative cover.

## Purpose

To provide a temporary or permanent cover of plants that will stabilize the soil and prevent erosion.

## How it works

The grass or cover plants slow down water flowing on slopes and prevent channeling in the soil. The plant roots bind the soil and prevent soil erosion.

## Where to use it

1. As a temporary measure on bare slopes and in drainage ditches.
2. As a temporary measure on soil stockpiles.
3. As a permanent measure on all bare soil surfaces.

## How to install

### Seeding

1. Seeding or planting should occur well before the onset of the rainy season. Seeding should be completed before October 1. After October 1, soil should be protected by mulching.
2. If soil is compacted, till it first. Spread a layer of 4 to 6 inches of topsoil if none exists.
3. Fertilize with approximately 10 lb of fertilizer per 1000 square feet.
4. Seed with an appropriate mix for the site (see table).
5. Rake lightly to cover seed with about 1/4" of soil.
6. Mulch with straw if necessary when the rainy season is starting. Use about one bale per 1000 sq. ft. on slopes. Anchor straw by punching into soil.

## Sodding

1. Sodding can be done any time of year.
2. Till soil if it's compacted. Spread a layer of 4 to 6 inches of topsoil if none exists.
3. Fertilize with approximately 10 lb of fertilizer per 1000 square feet.
4. Lightly water soil.
5. Lay sod. Tamp or roll lightly.
6. On slopes, lay sod starting at the bottom and work toward the top. Peg each piece down in several places.

Maintain other erosion control measures, such as silt fences or straw bales, until vegetation has taken hold.

Table 1 - Recommended seed mixtures<sup>1</sup>

Site Characteristic	Mixture	Amount lbs/acre
Temporary cover on construction sites	annual or hybrid ryegrass	30
Temporary cover on construction sites	cereal grains	100
Stabilization of roadways and other disturbed areas	annual or hybrid ryegrass	3
	tall fescue	18
	creeping red fescue	8
	bentgrass	1
	big trefoil	4

<sup>1</sup>From the Oregon Interagency Guide for Conservation and Forage Plantings, OSU Extension Service

# Silt Fencing

## What is it?

Silt fencing is a continuous sheet of woven material about 3 feet in width. It is supplied in rolls of 100-300 feet. It is usually made of plastic having some resistance to deterioration by sunlight. The weave forms tiny holes in the material so that water will pass through but soil and silt will be trapped. It is made with pre-formed pockets every 5 or 6 feet to insert stakes.

## Purpose

To reduce dirt and soil running off the construction site in water flows by providing a barrier to catch soil and slowing water runoff velocity. Provides some sediment filtration.

## How it works

The fence creates a barrier to slow water flows. The soil and silt have a chance to settle out of the water. The water is filtered through the fence and runs off, leaving the soil and silt behind.

## Where to use it

- A. Down slope of disturbed areas and at the boundary of cleared areas.
- B. At the bottom or toe of soil stock piles.
- C. At intervals along the slopes of large disturbed areas.
- D. At the bottom of steep banks.

## Where not to use it

Across streams.

## How to install Silt Fencing

- A. Fencing comes with loops stitched into the fabric to attach the fence to 2" x 2" posts. The posts are driven into the ground and should not be more than 6 feet apart.

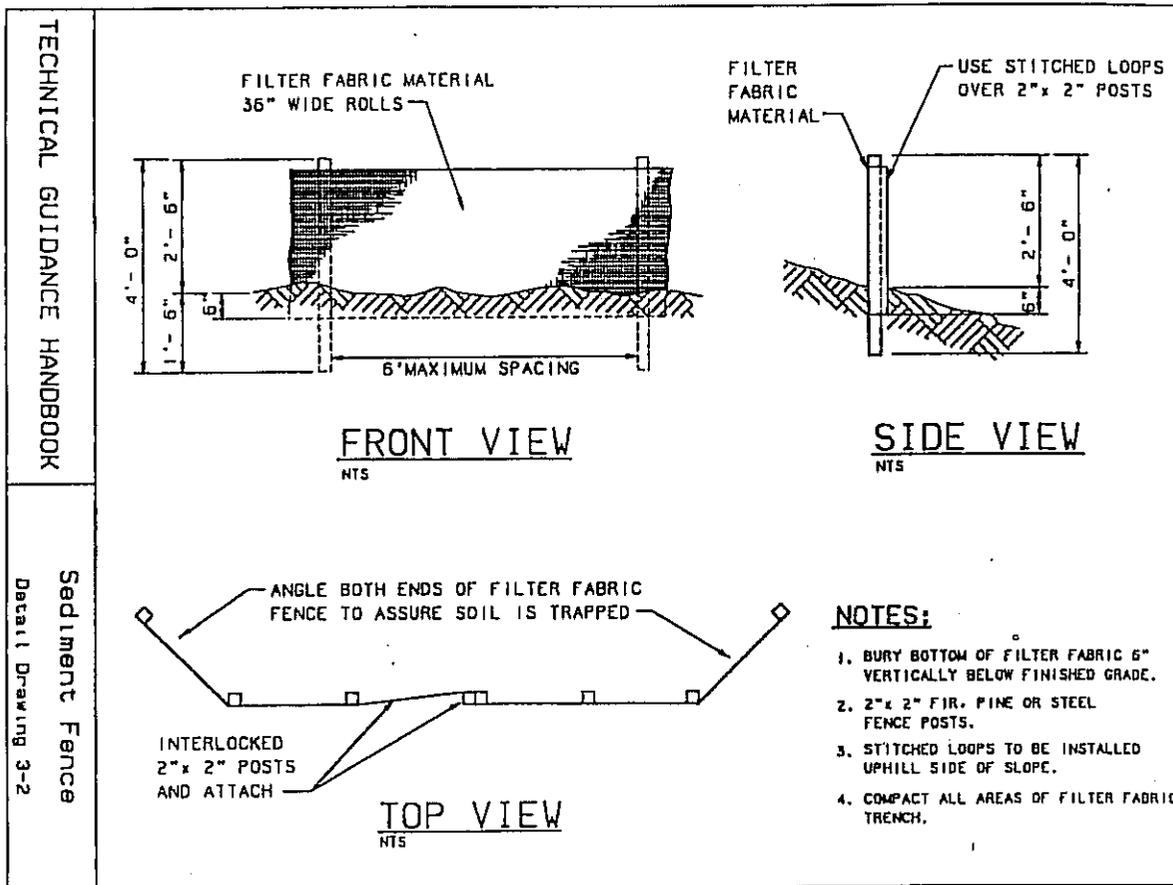
B. The bottom of the fencing is buried 6 inches by digging a narrow trench on the uphill side of the fencing. The soil from the trench is placed against the uphill side of the fencing. This holds the bottom of the fencing down to keep water from running underneath.

C. Avoid joints in the fence line. If a joint is necessary, interlock the fencing ends with two posts at the interlock.

Maintenance

A. Check periodically to be sure the fence has not been undermined by water flows or has been knocked down.

B. Remove soil sediment build-ups of more than 1 foot deep from behind the fence..



Drawings courtesy of the United Sewerage Agency of Washington Co., Oregon

# Storm Drain Inlet Protection

## What is it?

A barrier of various materials surrounding a storm drain inlet.

## Purpose

To prevent silt and sediment from entering storm drain systems.

## How it works

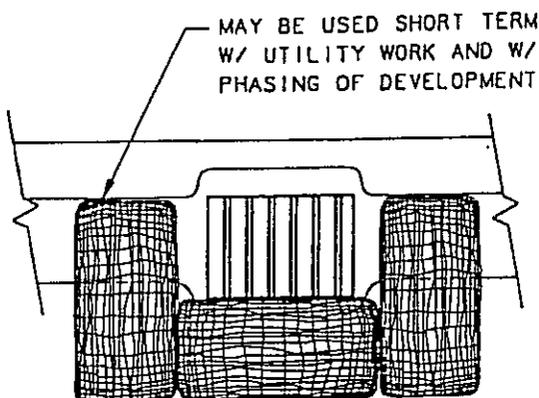
Storm water is filtered to remove silt and sediment before the water enters the storm drain.

## Where to use it

As a temporary measure around storm drain inlets until disturbed soil areas on the construction site are stabilized.

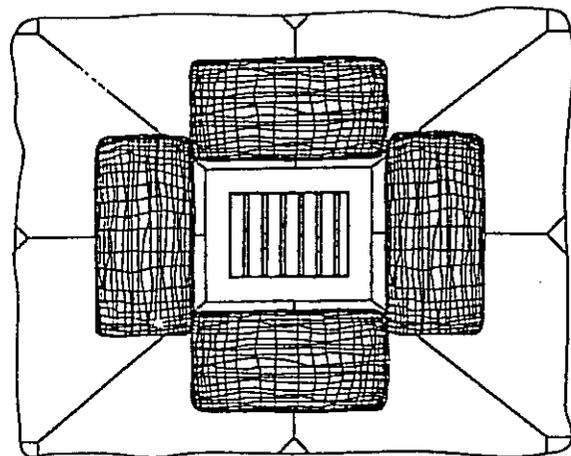
## How to install

Refer to drawings below and on back of this page.



CATCH BASIN

NTS

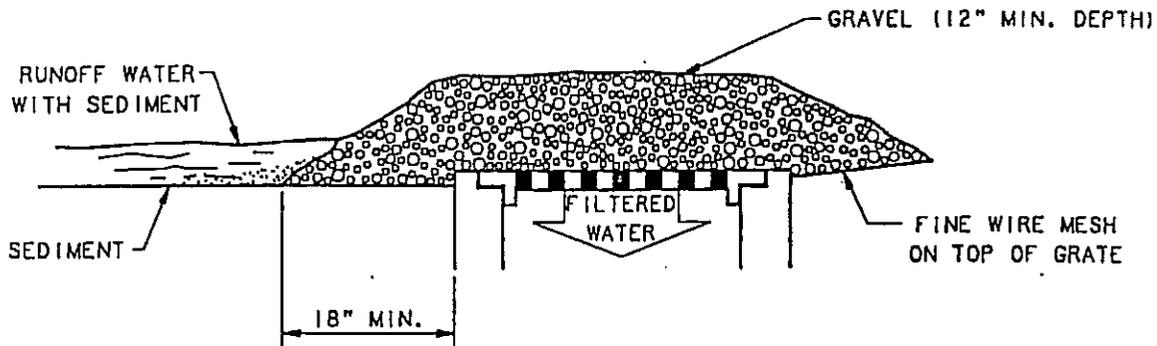


AREA DRAIN

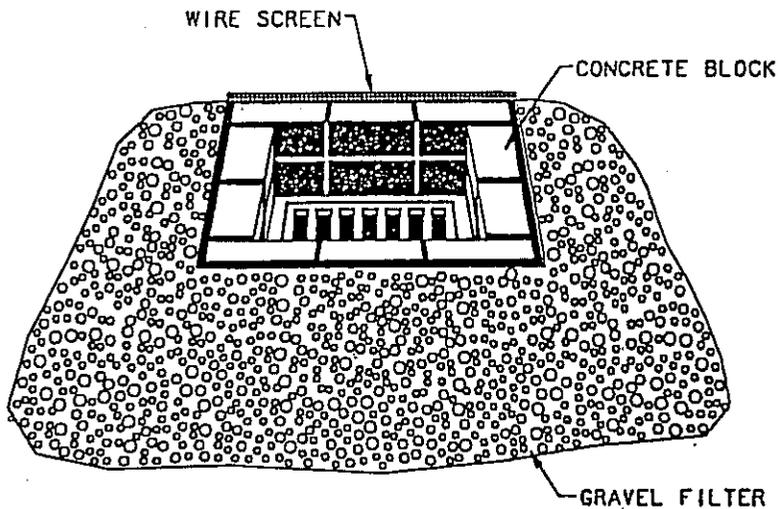
NTS

## **Biofilter Bags - Temporary**

Drawings courtesy of United Sewerage Agency of Washington County, Oregon



**Gravel & Wire Barrier**



**Block & Gravel Inlet Barrier**

Drawings courtesy of United Sewerage Agency of Washington County, Oregon

# Straw Bales

## What is it?

Baled straw weighing 50 to 120 pounds.

## Purpose

To reduce soil erosion by slowing water runoff speeds and providing a barrier to sediment. Not considered a sediment filter.

## How it works

Straw bales provide a barrier to water flows and slow water speeds. Slower water flows will not pick up as much soil and any soil or silt in the water has a better chance of settling out. Heavy soil flows will be stopped.

## Where to use it

- A. To protect slopes. Slopes should not be greater than 50% (2:1).
- B. A 100 foot length of straw bales will serve a 100 x 100 foot area.
- C. At the bottom or toe of stockpiles.
- D. As a temporary dam in drainage ditches or swales draining two acres or less in area.
- E. As a temporary measure - 3 months or less

## How to install

- A. Dig a trench along a slope contour at least 4 inches deep as wide as the bale width. Place bales in the trench in a single row with the ends of the bales tight against each other.
- B. Keep wire or string bindings on bales until bales are all installed.

C. Anchor bales with at least two stakes or rebars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force bales together. Stakes should be at least 3 feet long and, when driven, should not extend above the bales for safety.

D. Fill gaps between bales with straw and pack tight to prevent water from escaping between bales.

E. Build up excavated soil on upslope side of bales.

F. Scatter straw uphill of the bales to increase erosion protection.

G. Remove string or wire bindings after installation is complete.

Figure 1—Cross Section of Straw Bale Installation

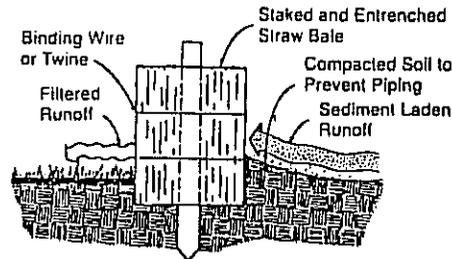
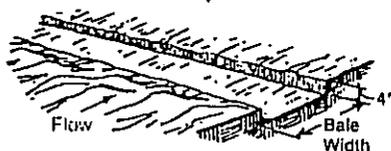


Figure 2—How to Install a Straw Bale Fence

1. Excavate a 4" deep trench.



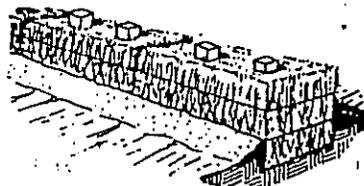
2. Place bales in trench with bindings around sides away from the ground. Leave no gaps between bales.



3. Anchor bales using two steel rebars or 2" x 2" wood stakes per bale. Drive stakes into the ground at least 8".



4. Backfill and compact the excavated soil.



Source: Michigan Soil and Sedimentation Control Guidebook, 1975.

# Straw Mulch

## What is it?

Straw mulch is cut straw that comes in bales, square or round of from 50 to a few hundred pounds. It is readily available from farm and landscape supply stores and some garden supply stores.

## Purpose

To reduce erosion by providing a protective cover over disturbed or reseeded soils.

To add nutrients to soil for better plant growth.

## How it works

The straw slows down the speed of water runoff and spreads out the flow. By slowing the speed, the water will not pick up as much soil. By spreading out water flow, the water cannot concentrate in gullies and pick up force and speed.

## Where to use it

- A. As a cover over unvegetated ground on gentle or moderate slopes.
- B. As a cover for stockpiles of soil, particularly topsoil.
- C. As a mulch to help establish vegetation in seeded areas.

## How to install it

- A. Straw should be spread to a thickness of at least 2 inches.
- B. Straw should be stabilized in place either by hand or by machine punching the straw into the soil.

C. On steeper slopes, cover with jute netting to hold straw in place.

Maintenance

Check at regular intervals and after rainstorms and spread new straw over thinning or washed-out areas.