

**North Dakota
Department of Transportation
(NDDOT)**



Erosion and Sediment Control Handbook

June 2004

North Dakota Department of Transportation (NDDOT)

Erosion and Sediment Control Handbook

Approved by:

Grant Levi, P.E., Deputy Director for Engineering

6/15/04
Date

Francis Ziegler, P.E., Director - Office of Project Development

6/14/04
Date

Gary Berreth, P.E., Director - Office of Operations

6/14/04
Date

TABLE OF CONTENTS

Preface.....	1
Introduction.....	2
Erosion and Sediment Control Measures.....	4
Bale Checks	5
Silt Fence Checks.....	10
Floating Silt Curtains.....	14
Rock Ditch Checks	19
Geotextile Triangular Dike	22
Inlet Protection.....	25
Sediment Trap.....	31
Surface Roughening.....	34
Mulching.....	35
Soil Retention Blanket.....	38
Temporary Slope Drain.....	42
Riprap.....	45
Seeding & Sodding	48
Sandbags	52
Other Measures.....	54
Inspection and Maintenance	55
NPDES Permits.....	57
Responsibilities within the NDDOT.....	65
Contacts.....	66
References.....	67

PREFACE

The purpose of this handbook is to provide designers, contractors, and inspectors the information to properly install, maintain, and implement a Storm Water Pollution Prevention (SWPP) Plan. The NDDOT is committed to controlling soil erosion and its resulting sedimentation during the design, construction, and maintenance of its highways.

No training is required to receive this handbook but personnel assigned to erosion and sediment control should have a thorough knowledge of the applicable specifications pertaining to this function. **This handbook is not intended to incorporate all the available methodologies of temporary erosion and sediment controls. Each project will present its own unique situations that will require the designer, inspector, contractor, etc., to use their best judgment when choosing the proper control methods.** The information contained in this handbook does not replace, supersede, or modify any specification, plan, or special provision of the NDDOT. If there are, any questions regarding the material in this handbook, contact the Design Division at the NDDOT.

Introduction

The purpose of the Erosion and Sediment Control Handbook is to identify Erosion Control Measures (ECM's), to be utilized by engineers, contractors, and inspectors when designing or implementing erosion and sediment control measures. Due to the complexity of highway construction in both rural and urban areas the NDDOT is attempting to raise the awareness of sediment and erosion control, by educating employees, contractors, and the public to better protect our waterways, lakes, and wetlands through proper erosion and sediment control measures.

The need for addressing erosion and sediment control is to comply with the Clean Water Act (CWA) and National Pollution Discharge Elimination System (NPDES). The Clean Water Act and the NPDES regulations specifically address point and non-point source discharges into the nation's waterways. In 1987, Congress established the Non-point Source Management Program under section 319 of the CWA. This program was initiated to help states address non-point source, or runoff pollution by identifying waters affected by such pollution and adopting and implementing management programs to control such pollution. These programs recommend where and how to use ECM's to prevent runoff from becoming polluted, and where runoff is already polluted, to reduce the amount that reaches surface waters.

Point source pollution is defined as pollution that can be attributed to a single source. Runoff from industrial or sewage treatment plants is an example of this type of pollution. Construction sites where five or more acres are disturbed are considered point sources of pollution and require a NPDES storm water permit under Section 402 of the CWA. In addition, the following types of storm water discharges are regulated under the NPDES permit program:

- Municipal Separate Storm Sewer System (MS4), Phase I, addressed discharges from municipal separate sewer systems serving populations of 100,000 or more.
- Phase I also addressed discharges associated with industrial activities, including construction sites of 5 acres or more.

- Any discharges identified by EPA or a state as needing an NPDES permit because they contribute to a water quality violation.
- MS4, Phase II, of the NPDES storm water regulations, came into effect in 2003. These regulations placed new requirements on approximately 5,000 small and medium-sized cities and towns nationwide and as many as 200,000 construction sites per year 1 to 5 acres. North Dakota cities that are affected include Bismarck, Dickinson, Fargo, Grand Forks, Jamestown, Mandan, Minot, West Fargo, and Williston. The number of communities with MS4 designation is expected to increase. Contact the North Dakota Department of Health (NDDOH) for updates on MS4 designations.

Non-point source pollution is pollution that comes from many sources and is harder to identify than point source pollution. It primarily comes from rainfall or snowmelt runoff across or through the ground. The runoff collects pollutants and transfers them to receiving waterways, lakes, and wetlands. Some of these pollutants include fertilizers used in urban and rural settings, improperly managed construction sites (1 to 5 acres), oil, grease, and other petroleum products. Cities install storm sewer systems that quickly channel this runoff from roads and other impervious surfaces. When it leaves the system and empties into a stream, large volumes of quickly flowing runoff erodes streambanks, damage streamside vegetation, and widen stream channels. In turn, this will result in lower water depths during non-storm periods, higher than normal water levels during wet weather periods, increased sediment loads, and higher water temperatures. Native fish and other aquatic life cannot survive in urban streams severely impacted by urban runoff.

The ECM's in this handbook were developed to control the velocity and volume of sediment load runoff throughout a construction site. These measures minimize the amount of erosion that occurs, while managing unavoidable sediment runoff. When properly utilized, ECM's can effectively reduce the amount of sedimentation and additional pollution entering into a water way or wetland. Additional information on erosion and sediment control measures and policies can be found in the NDDOT Design Manuel and through the North Dakota Department of Health (NDDOH).

EROSION AND SEDIMENT CONTROL MEASURES

Erosion and sediment control measures and practices are actions taken on an interim basis pre, during, and post construction to minimize the disturbance, transportation, and unwanted deposition of sediment. While many of these measures can be applied to the same application, one may work better than another. Additionally, more effective erosion control may be accomplished when two ECM's are utilized together.

Control Measure	Typical Applications
Bale Checks	Ditch Checks Slope Checks Inlet Protection
Silt Fence	Ditch Checks Slope Checks Inlet Protection
Rock Ditch Checks	Ditch Checks
Geotextile Triangular Dike	Ditch Checks Slope Checks
Inlet Protection	Inlet Protection
Sediment Trap	Intercept sediment-laden concentrated flow before leaving site
Surface Roughening	Slope Checks
Mulching	Temporary soil cover
Soil Retention Blanket	Slope Stabilization Erosion control used in conjunction with another measure. Do not place additional ECM's on top of blanket unless specified.
Slope Drain	Slope Protection
Riprap	Inlet Protection Outlet Protection Slope Protection
Seeding and Sodding	Exposed Soil Protection

BALE CHECKS

The purpose of bale checks is to intercept runoff. The sediment-laden runoff will pond behind the bales, slowing the runoff velocity and allowing most of the suspended sediment to settle out. Water is intended to flow over the bales, not around the sides. Bales should be used in conjunction with proper erosion control devices to optimize performance. **Bale checks should have sediment removed when the collected sediment level is one-half the height of the fence.**



Bale Checks

Materials

- Bale checks may be constructed of wheat straw, oat straw, prairie hay, or brome grass hay that is free of weeds declared noxious by the North Dakota State Board of Agriculture.
- The stakes used to anchor the bales should have the following minimum dimensions: 1.5 inches x 1.5 inches (2 inches x 2 inches nominal) by 6 feet long (wood) or 5 feet (steel).
- Twine should be used to bind bales. The use of wire binding is prohibited because it does not biodegrade readily.

Placement

Ditch Checks

- Bales should be placed on their side to avoid the twine contacting the ground. Bales last longer when the twine does not contact the ground.
- Bale ditch checks should be placed perpendicular to the flow line.
- Bale ditch checks should extend far enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. This prevents water from flowing around the check.

Insufficient
Check
Length



Improper installation of Bale Check

- Checks should not be placed in ditches where high volume or velocity flows are expected. Rock checks or an appropriate alternative should be used.
- Bales should be placed in ditches with slopes of five percent or less. For slopes steeper than five percent, rock checks or an appropriate alternative should be used.
- **Do not place a bale ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow.**

Bale Ditch Check Spacing	
Ditch Grade (Percent)	Check Spacing (Feet)
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
>5.0	Do not use Bales

Slope Checks

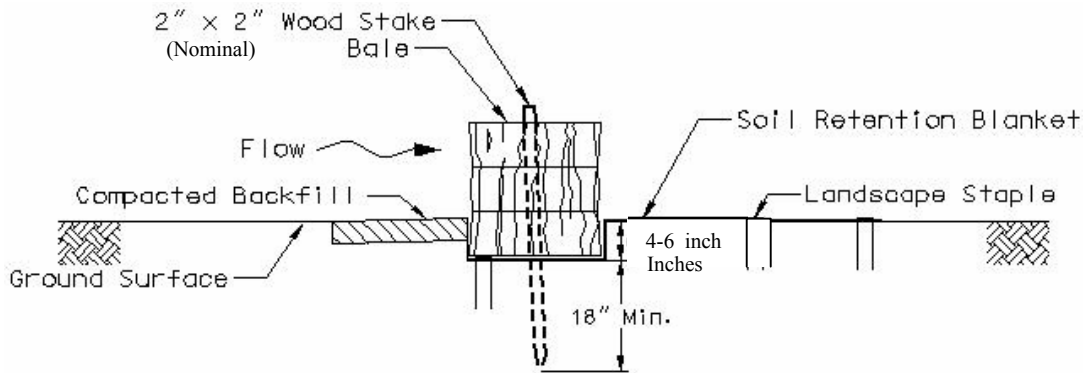
- Bale slope checks should be placed six feet from the toe of slopes to protect a ditch, stream, river, pond or sediment leaving the right of way (ROW).
- Checks should be placed along the contour.

Installation

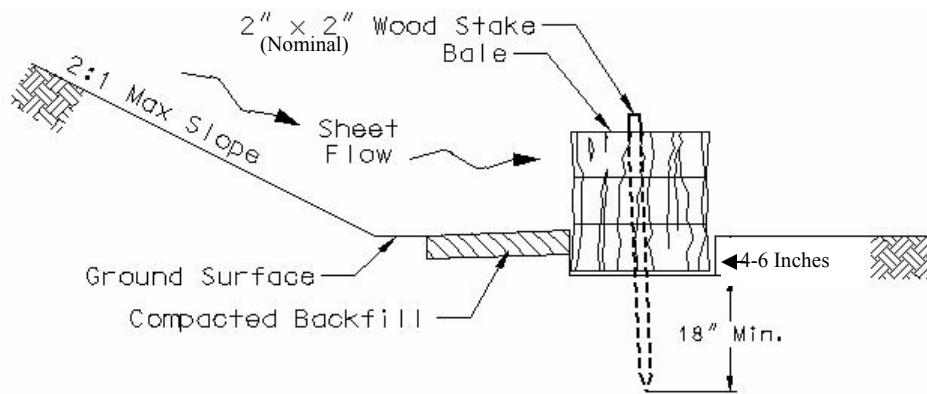
- Perpendicular to the flow line, excavate a trench that is four to six inches deep and a bales width wide. Place the soil on the upstream side of the trench to save for later use.
- Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale, at a slightly upstream angle, along the centerline of the ditch check, approximately 6 to 8 inches in from the bale ends. Stakes should be driven at least 18 inches into the ground.

Note: The following step pertains to Bale Ditch Checks.

- On the downstream side of the trench, roll out a length of erosion-control blanket (scour apron) equal to the length of the trench. Place the upstream edge of the erosion-control blanket along the bottom upstream edge of the trench. The erosion-control blanket should be anchored in the trench with one row of 8-inch landscape staples placed on 18-inch centers. The remainder of the erosion-control blanket (the portion that is not lying in the trench) will serve as the downstream scour apron. This section of the blanket should be anchored to the ground with 8-inch landscape staples placed around the perimeter of the blanket on 18-inch centers. The remainder of the blanket should be anchored using two evenly spaced rows of 8-inch landscape staples on 18-inch centers placed perpendicular to the flow line of the ditch.
- Stuff loose bale material in voids between abutting bales.
- Once all the bales have been installed and anchored, place the excavated soil against the upstream side of the check and compact it. The compacted soil should be no more than 3 to 4 inches deep and extend upstream no more that 24 inches.



Detail of Bale Ditch Check Installation



Detail of Bale Slope Check Installation

Maintenance

Problem	Required Maintenance
Bale Displacement	Replace or rearrange Reinforce with rock, bales, basins, or combinations
Undercutting of Bales	Replace, rearrange and/or regrade
Runoff escaping around bales	Lengthen the bale check
Gaps between bales	Replace or rearrange Stuff loose bale material in voids
Decomposing bales	Replace as necessary
Sediment level at one half the bale height	Clean out

Removal

Bale checks should be removed or wasted appropriately after all sediment-producing areas have been stabilized. **The site will be considered stabilized when 70% of preconstruction coverage has been established.** All sediment accumulation at the barrier trap should be removed and all excavation should be backfilled and properly compacted. Smooth the site to blend with the terrain. The disturbed areas must be seeded following removal.

SILT FENCE CHECKS

Specification 708.07

Silt fence checks operate by intercepting, ponding, and filtering sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle. As the ponded water percolates through the silt fence fabric, much of the remaining suspended sediment is filtered out. Silt fence checks work well in ditches with low flows and moderate slopes. **Silt Fences should have sediment removed when the collected sediment level is one-half the height of the fence.**



Silt Fence

Materials

- Filter fabric should have a minimum height of 36 inches.
- Wood posts should be treated and be a minimum of 6 feet long with minimum dimensions of 2 inches diameter for round posts or 1 ½ inches by 1 ½ inches (2 inches x 2 inches nominal) for rectangular posts
- Steel posts should be a minimum of 5 feet long, weigh a minimum of 1.3 lbs/ft, have a welded plate near the bottom, and have projections to aid in fastening the wire or fabric.
- When backing of the silt fence is required, a steel wire fence fabric should be used. The woven wire should be at least 32 inches high, have a maximum opening size of 6 inches by 6 inches, and be a minimum of 14-gauge grade 60.

- Prefabricated silt fences will not be allowed

Placement

- The silt fence should extend far enough so that the ground level at the ends of the fence is higher than the top of the low point of the fence. This prevents water from flowing around the check.
- For slope protection, the silt fence should follow the contours of the site as closely as possible.
- Checks should not be placed in ditches where high flows are expected. Rock checks or sediment basins should be used instead.
- Silt fence should be placed in ditches with slopes of five percent or less. For slopes steeper than five percent, rock checks or an appropriate alternative should be used.
- **Do not place a silt fence directly in front of a culvert outlet. It will not stand up to the concentrated flow.**

Silt Fence Ditch Check Spacing	
Ditch Grade (Percent)	Check Spacing (Feet)
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
>5.0	Do not use silt fence

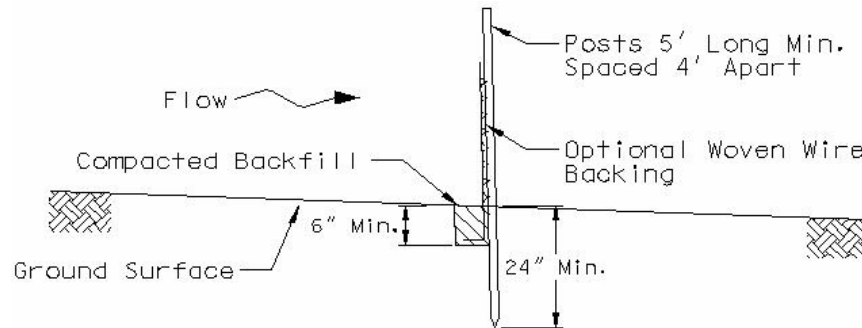
Installation

Trenched in Silt Fence

- Excavate a trench that is at least 6 inches deep. Place the soil on the upstream side of the trench for later use.
NOTE: Other common and less labor-intensive installation methods are slicing or chisel plowing to install the silt fence. These methods will allow the silt fence to last longer and is less likely to blow out underneath.
- Roll out a continuous length of silt fence on the downstream side of the trench.
NOTE: Splicing should only be done at support posts with a minimum of 18

inches of overlap and in such a manner to prevent silt from passing between the two ends.

- The fence fabric should be buried in a “J” configuration to a minimum depth of 6 inches.
- If woven wire support is used it should be buried a minimum of 2 inches deep.
- Posts should be spaced 4 feet apart and driven or placed a minimum of 24 inches in the ground.
- Geotextiles should be attached to posts by staples, wire, nails, or in accordance with the manufacturer’s recommendations.

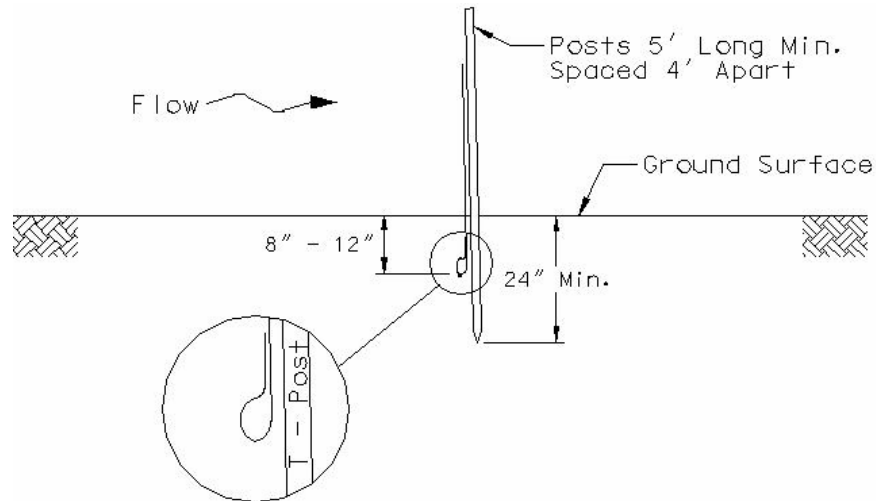


Detail of Silt Fence Installation (Steel Post)

Sliced in Silt Fence

- Sliced in silt fence should be installed with an approximate 6 inch cuff and into the soil a minimum of 8 inches.
- The post spacing, fastening requirements, and optional woven wire backing are the same as the trenched in silt fence.





Detail of Machine Sliced Silt Fence (Steel Post)

Maintenance

Problem	Corrective Maintenance
Undercutting of fence	Replace, rearrange and/or regrade
Fence collapsing	Replace or rearrange, Add bales, more stakes, wire or rock
Torn Fabric	Replace, Add bales, more stakes wire or rock
Silt fence sagging excessively	Decrease spacing between posts, Reinforce
Runoff escaping around fence	Lengthen the fence
Sediment level at one half the silt fence height	Clean out

Removal

After all sediment-producing areas have been permanently stabilized, all sediment accumulation at the silt fence should be removed, and all excavation should be backfilled and properly compacted. Smooth the site to blend with the terrain. The disturbed area must be seeded following removal of ECM's.

FLOATING SILT CURTAIN

A floating silt curtain is a silt barrier for use within a lake, pond, stream or other water. The floating silt curtain consists of a geotextile curtain weighted at the bottom and attached to a flotation device, or carrier, at the top. This structure is used to isolate an active construction area within a waterbody to prevent silt-laden water from migrating out of the construction zone.

Materials

Floating silt curtains should be constructed with the following materials and properties:

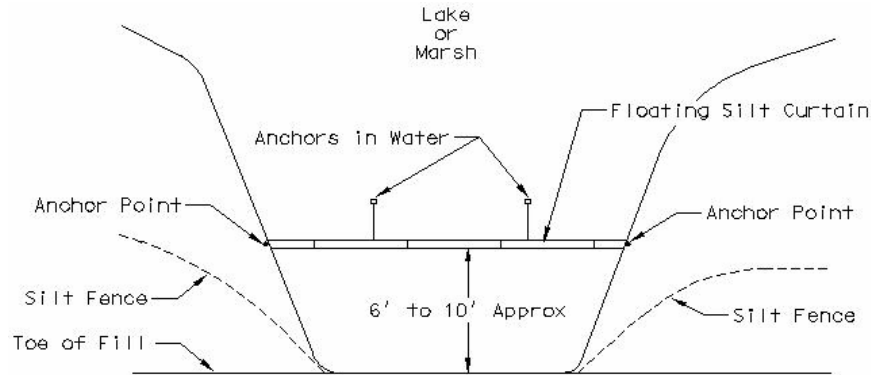
Materials and Properties	Still Water	Moving Water or Work Area
Curtain Fabric	Impermeable vinyl-nylon laminate	Impermeable vinyl-coated nylon
Mass/sq. yd.	18 oz.	22 oz.
Grab Tensile Strength	300 lbs	500 lbs
Depth of Curtain	2 – 10 feet	
Flotation	6" dia. Marine quality expanded polystyrene	8" dia. Marine quality expanded polystyrene
Net Buoyancy per foot	13 lbs	20 lbs
Top Load Carrying Components	Fabric only	Fabric + 5/16" galvanized steel cable 9800 lb min break strength
Ballast (min.)	1/4" galvanized chain	5/16" galvanized chain
Connections Between Sections	Laced grommets	Aluminum collar reinforced quick disconnects

Placement

Floating silt curtains are to be used as a last resort and should be used in conjunction with other protection measures.

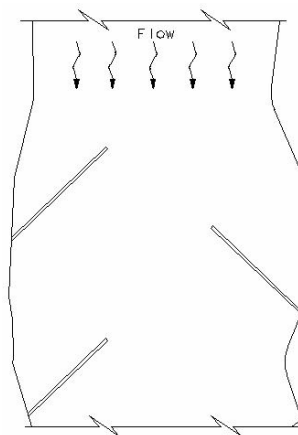
Still Water

The curtain needs to be anchored along its length with enough weight to hold it in place. Both ends need to be secured on land.



Still Water Floating Curtain Plan View

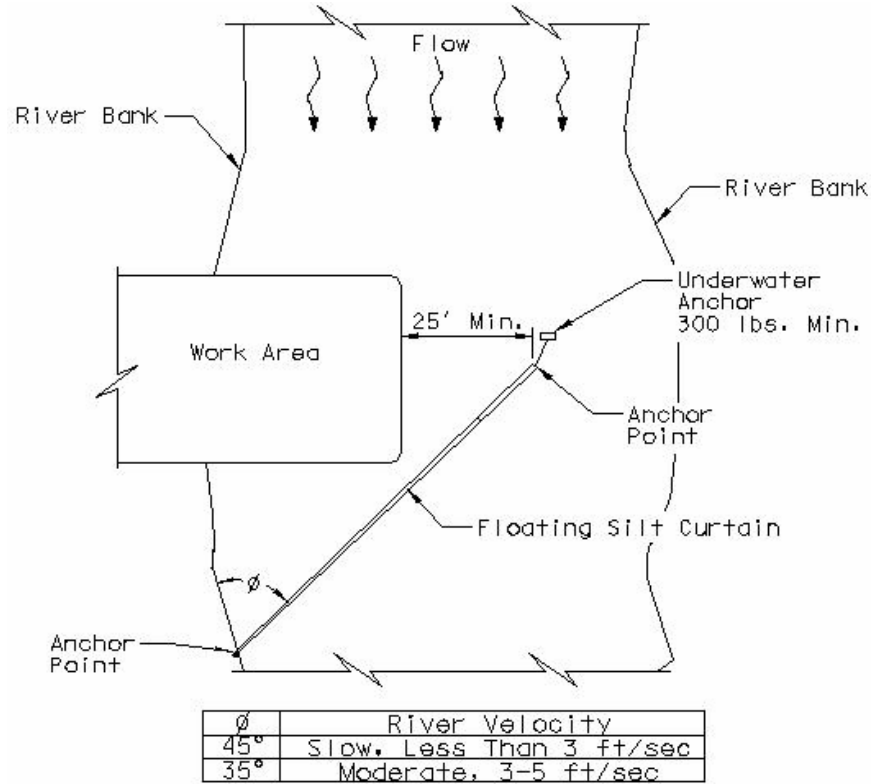
- If a silt curtain is necessary in flowing water to capture up-stream disturbance, place curtains diagonally alternating from banks.
- Do not extend the silt curtain out more than 1/3 of the stream width.
- Do not place the silt curtain across a flowing channel in its entirety. The channel bottom will suffer from major scouring



Floating Silt Curtain Diagonal Layout

Moving Water

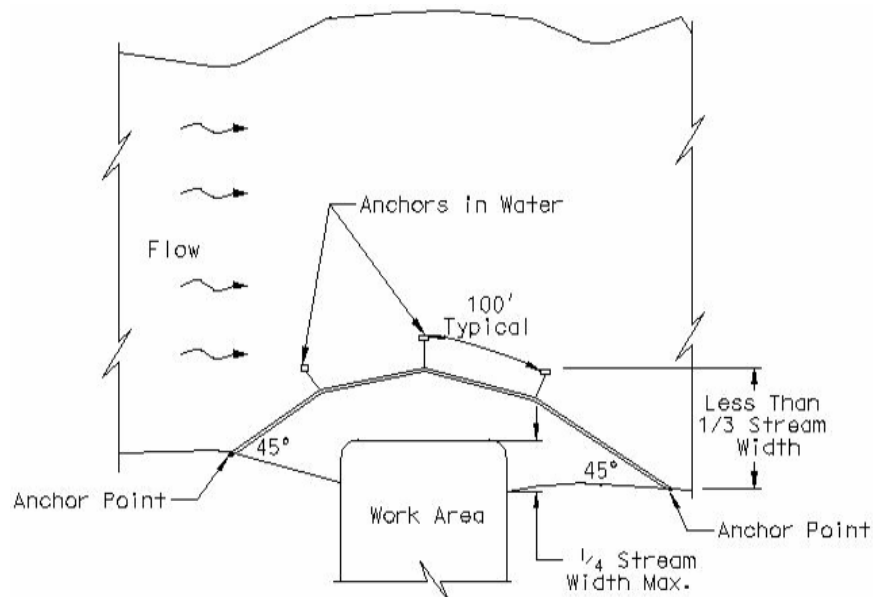
A buoy accompanies each anchor. The curtain should be anchored with a minimum 300 lbs out in the waterway, and placed a minimum 25 feet from the work area. This configuration should be used when the work area encroaches more than 1/4 but less than 1/3 of the stream width and the maximum water velocity is 5 ft/sec.



Moving Water Floating Curtain Plan View

Work Area

When the work area extends less than 1/4 of the stream width and has a velocity of 5 ft/sec or less, the area is enclosed with a silt curtain. The curtain should extend outward from shore at a 45 degree angle and should not extend more than 1/3 of the stream width. Anchor with a minimum 40 lbs at a maximum 100 ft interval.



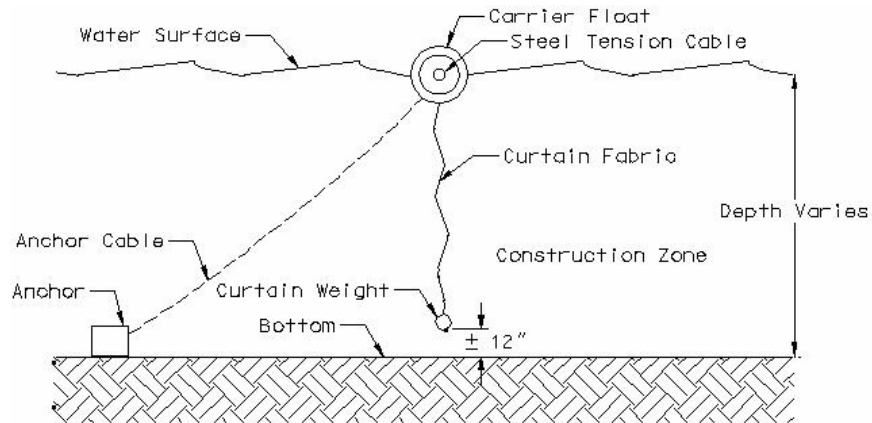
Work Area Plan View

Installation

- In still water lakes or ponds it is usually sufficient to merely set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furled condition out and attach it to these stakes or anchor points. Following this, any additional stakes or anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. The furling lines should be released to let the curtain skirt drop.
- In rivers or in other moving water it is important to set all the curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions, prior to putting the furled curtain into the water. Anchor buoys should be employed on all anchors to prevent the current from submerging the flotation at the anchor points. When the anchors are secure, the furled curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. At this point, and before unfurling, the “lay” of the curtain should be assessed and any necessary adjustments made to the

anchors. Finally, when the location is ascertained to be as desired, the furling lines should be released to allow the skirt to drop.

- Always attach anchor lines to the flotation device, not to the bottom of the curtain.



Floating Silt Curtain Detail

Removal

Silt curtain should be cleaned out before removal. Removal can take place after work areas are removed and/or final grading on above slopes is completed. Silt fence or similar sediment control device should be installed at the toe of the slope before the silt curtain is removed and remain in place until the vegetation is established. Silt fence is not necessary if the slope is covered with riprap.

ROCK DITCH CHECKS

Rock ditch checks operate by intercepting and ponding sediment-laden runoff. Ponding the water dissipates the energy of incoming flow and allows large portions of the suspended sediment to settle out. Water exits the ditch check by flowing over its crest. Rock ditch checks are ideal for ditches that eventually will have a riprap lining. Upon completion of the project, rock ditch checks can be spread out to form a riprap lined channel. **Rock ditch checks should have sediment removed when the collected sediment level is one-half the rock height.**



Rock Ditch Check

Materials

- Rock gradations and size should be specified in the plans or by the engineer.
- See the Soil Retention Blanket section for soil retention blanket information.

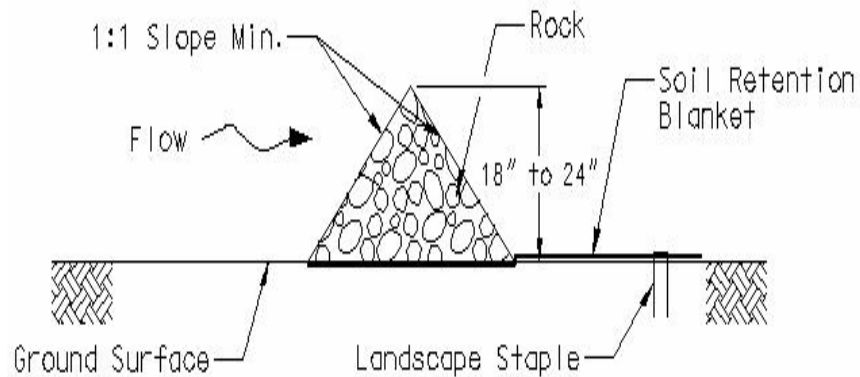
Placement

- Rock ditch checks should be perpendicular to the flow line of the ditch.
- Rock ditches must be designed so that water can flow over them, not around them. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the lowest point on the crest of the check.
- Rock ditch checks are best located in ditches that eventually will be lined with riprap, so that the rock will not have to be removed upon completion of construction.

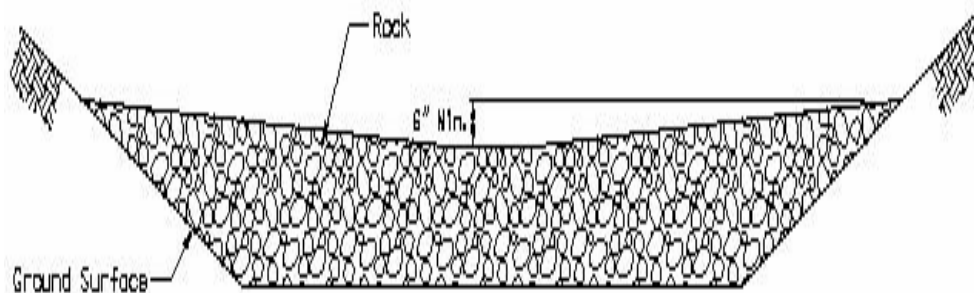
Rock Ditch Check Spacing	
Ditch Grade (Percent)	Check Spacing (Feet)
4.0	75
5.0	60
6.0	50
7.0	45
8.0	35
9.0	33
10.0	30

Installation

- The ditch check should be 18 to 24 inches high and have side slopes no steeper than 1:1. The rock ditch check must be constructed so that water can flow over the top, not around the ends.
- 8-inch landscape staples should be used as necessary to anchor the erosion control blanket.



Detail of Rock Check Installation



Profile of Rock Check



Rock Ditch Check

Maintenance

Problem	Corrective Maintenance
Scour beneath rock	Add rock or fabric Add ditch checks to slow water above the rock
Dislodged rock	Add rock or fabric Regrade
Sediment level at one half the rock height	Clean out

Removal

Rock ditch checks should be removed or placed where specified in the plans when the site has been stabilized. All sediment accumulated at the barrier should be removed and all excavation should be backfilled and properly compacted. The site should be graded to blend with the terrain. The disturbed area must be seeded following removal of ECM's.

GEOTEXTILE TRIANGULAR DIKE

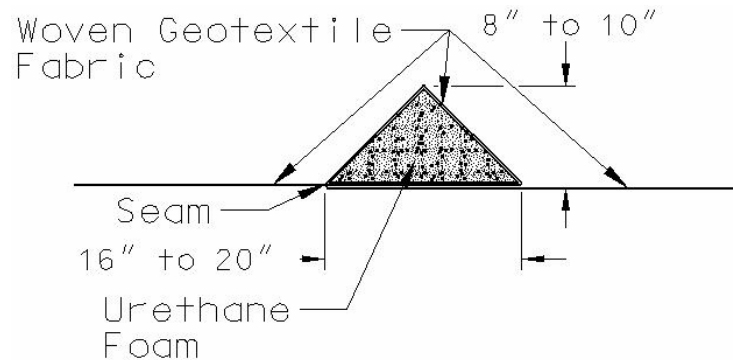
Geotextile Triangular Dikes (GTD) should be used as a continuous line barrier at the toe of slopes to contain sediment or as a ditch barrier placed perpendicular to the flow of water in a defined drainage ditch to minimize erosion and contain sediment. **Geotextile Triangular Dikes should have sediment removed when the collected sediment level is one-half the dike height.**



Geotextile Triangular Dike

Materials

- Woven geotextile fabric
- Triangular shaped inner material should be composed of urethane foam
- The metal landscape staples used should be at least 6 to 8 inches long



Geotextile Triangular Dike Profile

Placement

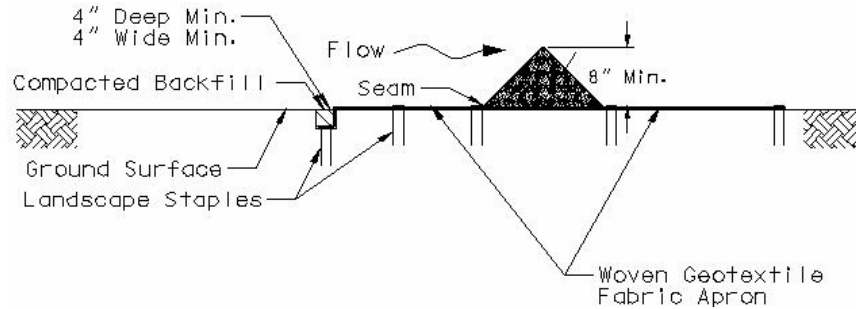
- The dike should extend far enough so that the bottoms of the ends are higher than the top of the lowest center. This prevents water from flowing around the dike.
- Dikes should not be placed in ditches where high flows are expected. Rock checks or an appropriate alternative should be used instead.
- Dikes should be placed in ditches with a slope of 4 percent or less. For slopes steeper than 4 percent, rock checks or an appropriate alternative should be used.

Geotextile Triangular Dike Spacing	
Ditch Grade (Percent)	Check Spacing (Feet)
1.0	200
2.0	100
3.0	65
4.0	50
>4.0	Do not use GTD

Installation

- Excavate a trench along the entire length of the dike that is at least 4 inches deep by 4 inches wide perpendicular to the flow line. Place the soil on the upstream side of the trench for later use.
- Each dike has two aprons: one upstream and one downstream. The upstream apron is the shorter of the two.
- Conform the flexible dike to the geometry of the ditch so that no space exists between the dike and the ditch bottom. Place the first 6 inches of the upstream apron into the trench and anchor it with one row of 6 inch to 8-inch landscape staples at 18-inch centers.
- Place 6 inch to 8-inch landscape staples on 18-inch centers between the trench and seam, along the seam on the upstream side, where the downstream apron meets the dike, and on the edge of the downstream apron.
- Each dike has an open sleeve at either end. Connect adjoining dikes with these sleeves and then repeat the anchoring procedure.
- Once all the dikes have been joined and anchored, fill in the upstream trench with soil and compact it.

- Do not place dikes directly in front of a culvert outlet because they will not stand up to the concentrated flow.



Geotextile Triangular Dike Detail

Maintenance

Problem	Corrective Maintenance
Runoff escaping around the dike	Lengthen the dike
Water flowing under the dike	Reanchor, add more as needed
Sediment level at one half the dike height	Clean out

Removal

The Geotextile Triangular Dikes should be removed when the site has been stabilized. All sediment accumulated behind the barrier should be removed and all the excavation should be backfilled and properly compacted. Smooth the site to blend with the terrain. The disturbed area must be seeded following removal of ECM's.



Geotextile Triangular Dike with Rock Backing

INLET PROTECTION

The purpose of inlet protection is to prevent sediment from entering storm drainage systems, prior to temporary or permanent stabilization of the disturbed area. This practice contains several types of inlet filters and traps that have different applications dependent upon site conditions and type of inlet. Other innovative techniques for accomplishing the same purpose are encouraged and should be submitted for approval of the on site engineer. **Sediment that is collected around the inlet should be removed when the sediment levels reach half the height of the ECM.**

Design Considerations

- The drainage area should be no greater than one acre. Runoff from larger disturbed areas should be routed to a Temporary Sediment Trap or a Temporary Sediment Basin.
- The inlet protection device should be constructed in a manner that will facilitate cleanout and disposal of trapped sediment and minimize interference with construction activities.
- The inlet protection devices should be constructed in such a manner that storm water will not cause excessive ponding.

Silt Fence Inlet Structure

Silt fence inlet protection structures intercept, pond and filter sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle. As the ponded water percolates through the silt fence fabric, much of the remaining suspended sediment is filtered out.

Materials

- The material used to frame the tops of the posts should be 2 inch x 4 inch (nominal). Use nails or screws for fastening.
- Woven wire



Silt Fence inlet protection structure

Placement

- When used as an inlet protection device the silt fence fabric and posts must be supported at the top by a wooden frame.

Installation

- Posts should be driven a minimum of 18 inches deep around the inlet.

**See Silt Fence section for all other details for materials, placement, installation, and removal.*

Fence Backed Bale Inlet Protection Structure

Fence Backed Bale inlet protection structures operate by intercepting and ponding sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle out.

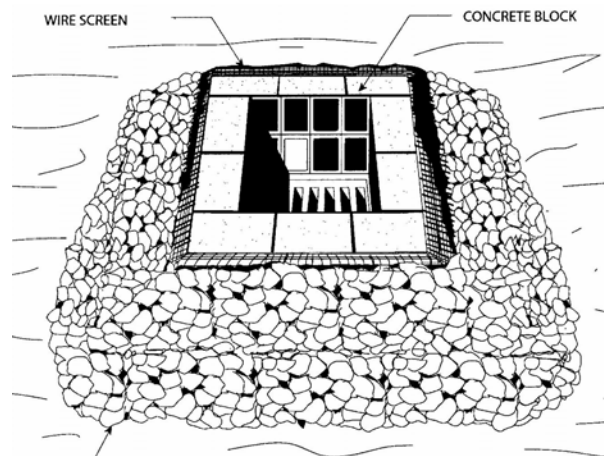
Installation

- Bales should be placed lengthwise in a single row surrounding the inlet with the ends of adjacent bales pressed together.
- The silt fence should be placed around the *outside* of the bales utilizing them for support.

**See Silt Fence and Bale Checks section for all other details for materials, placement, installation, and removal.*

Block and Gravel Inlet Barrier

Block and gravel inlet barriers operate by intercepting, ponding, and filtering the sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle. As the ponded water percolates through the Block and Gravel inlet barrier, much of the remaining suspended sediment is filtered out. Block and Gravel inlet barriers work well in areas of moderate flow and moderate slopes.



Block and Gravel inlet barrier

Materials

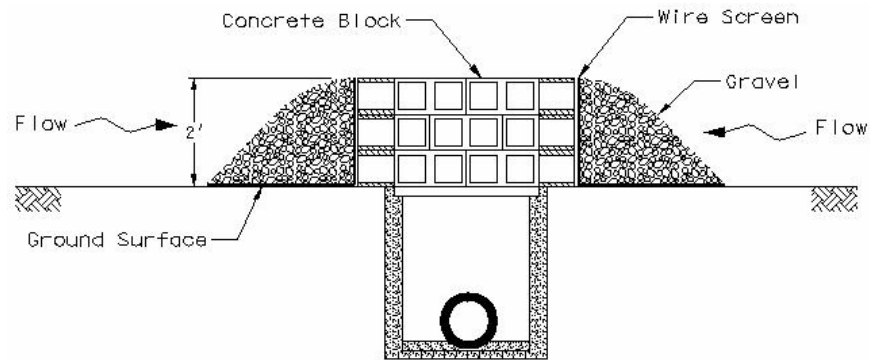
- Concrete masonry blocks – 8 inches x 8 inches x 16 inches
- ½ inch opening wire screen
- 1 ½ inch diameter maximum size gravel

Placement

- When the Block and Gravel inlet barrier is placed in a shallow median ditch, make sure the top of the barrier is not higher than the road. Otherwise, water may spread onto the roadway causing a hazardous condition.

Installation

- Place concrete blocks around the inlet structure to a height of 2 feet.
- Place the wire screen against the blocks. The wire screen may have to be secured to the blocks to allow placement of the gravel.
- Place gravel against the wire to the top of the barrier.



Block and Gravel Inlet Barrier Detail

Removal

The barrier should be removed and the area stabilized when the remaining drainage area has been properly stabilized. If possible, leave the gravel around the inlet to dissipate energy from the water. The gravel should be leveled out, so that the water does not pond once the site is stabilized.

Block and Gravel Curb Inlet Barrier

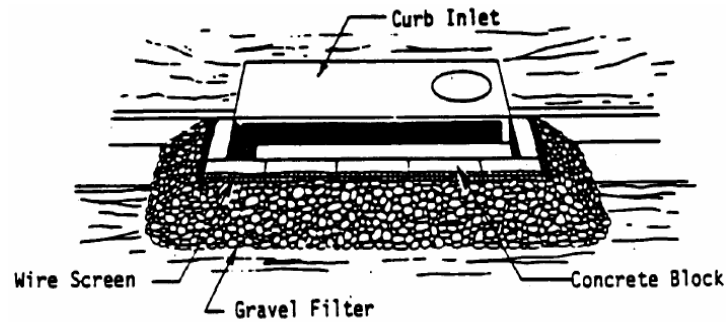
The block and gravel curb inlet barrier operates on the same concepts as the block and gravel inlet barrier.

Materials

- Concrete masonry blocks – 8 inches x 8 inches x 16 inches
- ½ inch opening wire screen
- 1 ½ inch maximum size gravel
- 2 inch x 4 inch (nominal) wood stud

Placement

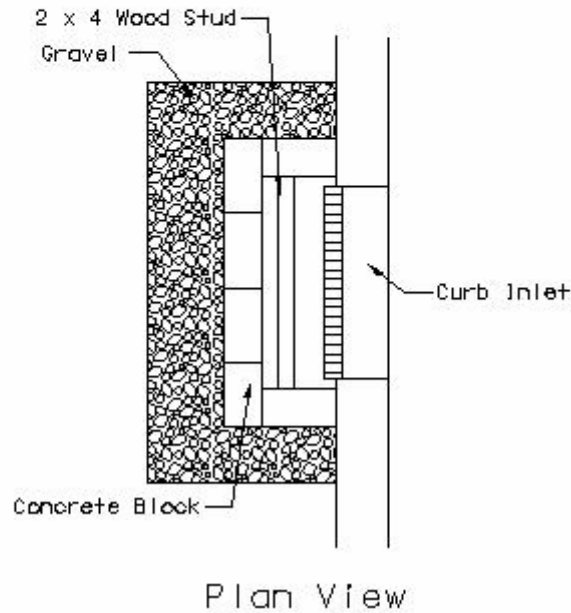
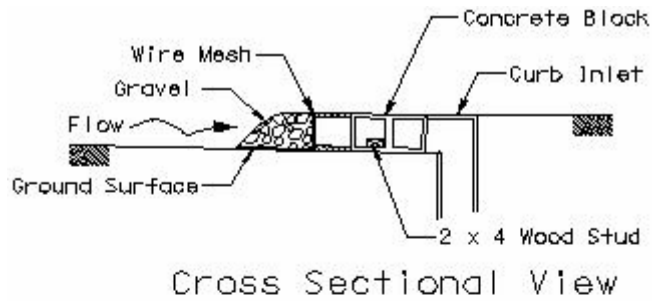
- This method of inlet protection is applicable at curb inlets where an overflow capability is necessary to prevent excessive ponding in front of the structure.



Gravel Curb Inlet Barrier

Installation

- Two concrete blocks should be placed on their sides abutting the curb at either side of the inlet opening.
- A 2 inch by 4-inch (nominal) stud should be cut and placed through the outer holes of each spacer block to help keep the front blocks in place.
- Concrete block should be placed on their sides across the front of the inlet and abutting the spacer blocks as illustrated.
- Wire mesh should be placed over the outside vertical face (webbing) of the concrete block to prevent stone from being washed through the holes in the blocks.
- Place gravel against the wire to the top of the barrier.



Block and Gravel Curb Inlet Barrier Details

Maintenance

Problem	Corrective Maintenance
Flooding around or below inlet. Stakes and fabric leaning/falling in toward grate.	Check grade Regrade or redesign Check for blockage in culvert or catch basin
Undercutting of bales or silt fence, bale displacement, torn fabric, etc.	Replace, rearrange and/or regrade
Sediment level at one half the ECM	Clean out

Removal

The curb barrier should be removed when the remaining drainage area has been properly stabilized.

SEDIMENT TRAP

The purpose of this practice is to detain sediment-laden runoff from small-disturbed areas for a sufficient period to allow the majority of sediment and other water-based debris to settle out. **Sediment traps should have sediment removed when the sediment level is more than ½ the depth or sediment is near the outlet elevation.**



Sediment Trap

Design Considerations

- The drainage area should be no greater than 5 acres.
- Runoff from larger disturbed areas should be routed to a Sediment Basin.

Materials

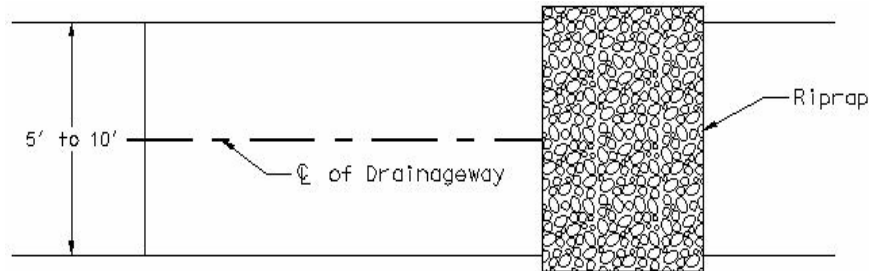
- Riprap
- Geotextile fabric should be placed underneath the riprap outlet

Placement

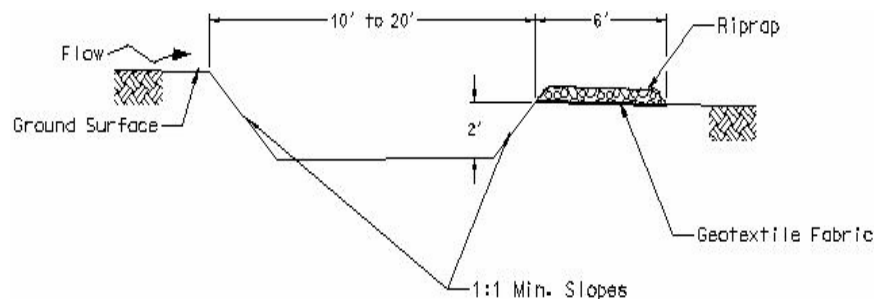
- Typical locations include ditch bottoms, and the downgrade end of a cut section, and areas where it becomes necessary to capture larger amounts of sediment where a silt fence continues to fail.

Installation

- Excavate the sediment trap to the appropriate dimensions and remove the soil and place it in an area and in such a manner that it will not erode. The trap should be at least twice as long as it is wide.
- Place geotextile fabric where the riprap is to be placed.
- Place riprap on the downstream side of the trap extending 6 feet downstream. The riprap should be placed the width of the trench plus ½ foot on each side.



Plan View of Sediment Trap



Profile of Sediment Trap

Maintenance

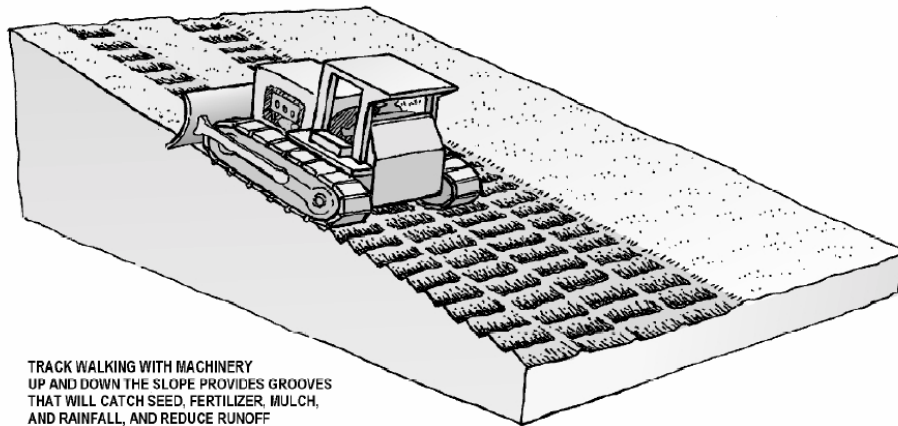
Problem	Corrective Maintenance
Obstructed outlet	Clean and Regrade
Damaged embankments	Regrade, Redesign
Spillway erosion	Regrade, Add rock
Excessive discharge to and from trap	Look for breaks in trap
Sediment storage zone fills to quickly	Add basins or traps Add ditch checks
Sediment level more than ½ the depth or sediment near outlet elevation	Clean out

Removal

Temporary sediment traps should be filled in and graded over at the time of final shaping. The rock should be removed or be buried in the hole first. The disturbed area must be seeded following removal of ECM's.

SURFACE ROUGHENING

Surface Roughening is a practice that abrades the soil surface with horizontal ridges and depressions across the slope, decreasing erosion by reducing runoff velocities. In addition, this practice also increases infiltration and fosters the establishment of vegetation.



Tracking

Tracking is a method that utilizes the depressions formed by the tracks from bulldozers and other construction vehicles. The vehicle is driven parallel to the slope leaving horizontal depressions. These depressions interrupt the runoff's flow, reducing its velocity and erosive capacity.

- Tracking should be performed on all slopes of 3:1 or steeper that can be mechanically climbed.
- The tracking vehicle is to be operated up and down the slope and leaves behind horizontal depressions in the soil.

MULCHING

Specification 708.02

Mulching is done primarily with Hydro-mulch or Straw Mulch. Mulching involves the application of straw or other organic materials to form a temporary, protective soil cover. Mulch protects the soil surface from the forces of raindrop impact and overland flow. Organic mulches foster the growth of vegetation, reduce evaporation, insulates the soil, and suppresses weed growth.

Hay or Straw Mulching



Machine Blown Mulch

Materials

- Mulch material should consist of native hay or the straw from oats or barley, and should be seed free to prevent introduction of weeds as defined by the rules and regulations of the North Dakota Department of Agriculture.
- At least 50% of the mulch by weight should be 10 inches or more in length.

Placement

- The mulch should be machine blown and should be uniformly distributed over the seeded areas. The machine should be of a design that minimizes cutting or breaking of the mulching material.
- Mulching operations should not be performed during periods of excessively high winds, which would preclude the proper placing of the mulch.
- Mulch containing excessive moisture which prevents uniform feeding through the machine should not be used.
- Bales should be broken up and loosened as they are fed into the blower to avoid placement of matted or unbroken lumps.

Installation

- The mulch should be placed within 24 hours after the seeding has been completed.
- The mulch should be placed uniformly over the seeded areas at the rate of 2 tons per acre.
- Approximately 10% of the soil surface should be visible through the mulch blanket before the mulch tiller (punching) operation.

Maintenance

Problem	Corrective Maintenance
Rills or gullies forming	Regrade and reseed, Add additional controls
Bare soil patches	Remulch and/or reseed
Sediment at the toe of the slope	Regrade, Add silt fence or filter dike if next to a body of water

Hydro-mulching



Hydro-mulching

Materials

Hydro-mulching is used when Class III seeding is specified. It contains a wood cellulose fiber that has not been treated with any germination or growth inhibitive substance but will be treated with a tackifier to enhance seed and mulch placement and adherence to the

soil. The mulch should be free of contamination from noxious weed seed and seed from competitive plants.

Placement

The mulch should be uniformly applied at a rate of one ton per acre and should cover a minimum of 95% of the seedbed area. After application, the mulch should permit percolation of water to the underlying soil.

Removal

Mulching does not need to be removed.

SOIL RETENTION BLANKET

Specification 708.03

Soil Retention Blankets are biodegradable materials that can be used to protect disturbed slopes and channel areas from wind and water erosion. The blanket materials are natural materials such as straw, wood excelsior, coconut, or are geotextile synthetic woven materials.



Straw-Coconut Fiber Mat

Materials

Wood Excelsior Fiber Mat

- The wood excelsior fiber mat should consist of a machine produced mat of cured wood excelsior in which 80% of the fibers are 6 inches or longer.
- The fiber should have a consistent thickness of fiber evenly distributed over the entire area.
- The top of each mat should be covered with a photo-degradable extruded plastic mesh with maximum openings of 1 inch by 3 inches.
- The wood excelsior fiber mat should be treated to be smolder resistant without using chemical additives.

Wood Excelsior Fiber Mat Physical Properties	
Width	Minimum 36 inches
Roll Length	Minimum 100 feet
Weight	Minimum 0.7 lbs/yd ²

Straw and Fiber Mats

A. Straw Mat

- The straw mat shall be machine produced of clean straw from agricultural crops and be sewn together with biodegradable cotton or nylon thread.
- The top side should be covered with a biodegradable plastic mesh or netting with maximum openings of 5/8 by 5/8 inches.

Straw Mat Physical Properties	
Width	Minimum 48 inches
Roll Length	Minimum 80 feet
Weight	Minimum 0.5 lbs/yd ²

B. Straw Mat with Mesh or Netting on Top and Bottom

- Material should coincide with the *Straw Mat* except that it should be furnished with mesh or netting on the top and bottom of the mat.

C. Straw-Coconut Fiber Mat

- Material should coincide with the *Straw Mat* except that the mat should consist of 70% straw and 30% coconut fibers.

D. Straw-Coconut Fiber Mat with Mesh or Netting on Top and Bottom

- Material should coincide with the *Straw Mat with Mesh or Netting on Top and Bottom* except that the mat shall consist of 70% straw and 30% coconut fibers.

E. Coconut Fiber Mat

- Material should coincide with the *Straw Mat with Mesh or Netting on Top and Bottom* except that the mat should be machine produced or 100% coconut fiber and shall be sewn together with biodegradable nylon (polyester) thread.
- Both the top and bottom should be covered with a biodegradable plastic mesh of netting.
- One side should be heavy duty mesh with a minimum weight of 2.5 pounds per 1,000 ft².
- Maximum size mesh openings should be 5/8 by 5/8 inches.

Placement

Soil Stabilization Mats may be suitable for:

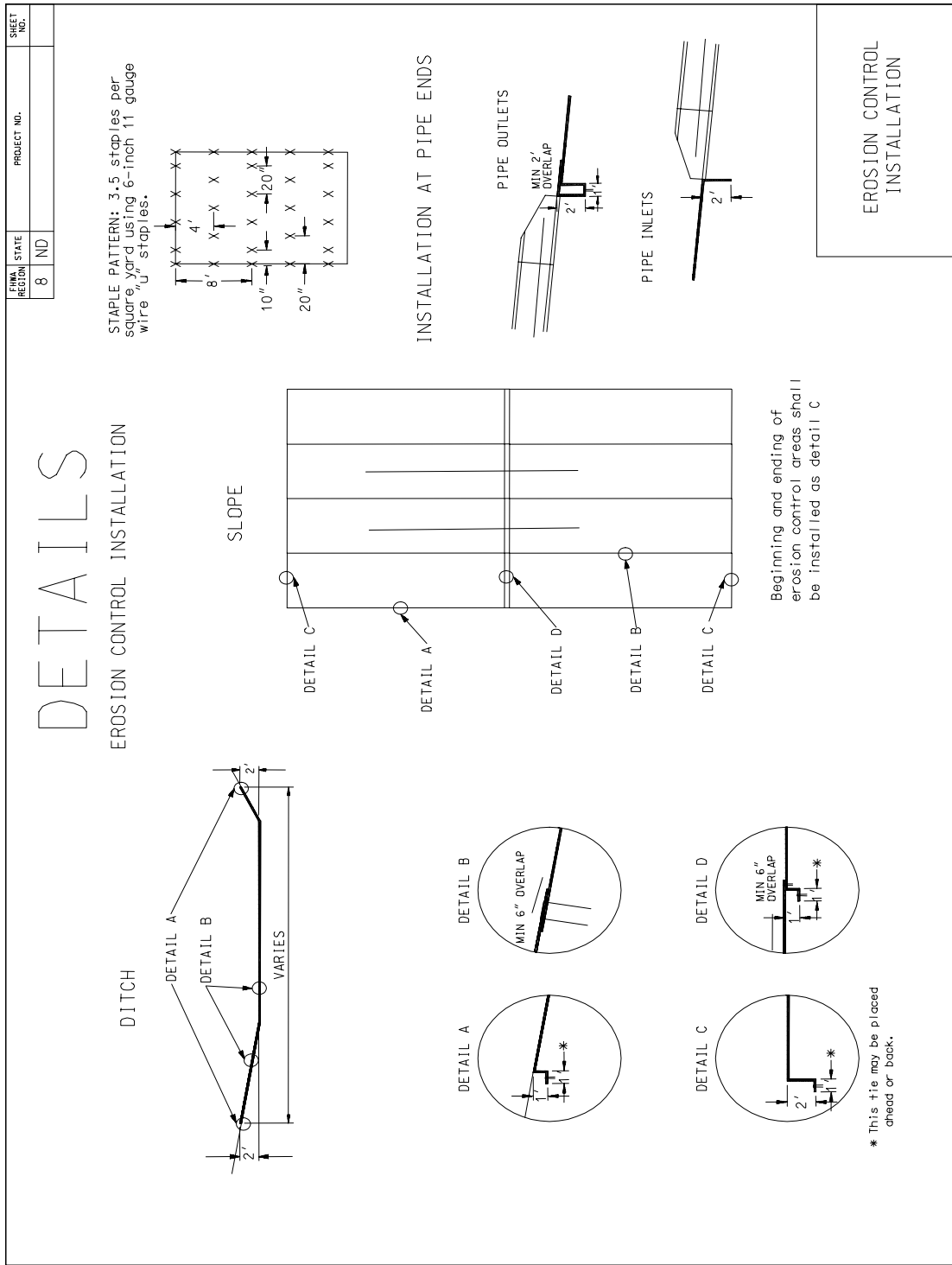
- Stabilization of steep to moderate slopes
- New landscaped areas
- Drainage swales and ditches that are to be planted or seeded



Retention Blanket in Ditch

Installation

- The area to be covered should be properly prepared and seeded before the blanket is applied. All rocks or clods of 1 ½ inches in diameter or greater, and all sticks and other foreign material should be removed.
- If netting is specified for one side only, the blanket should be placed with the netting on top and the fibers in contact with the soil.
- In ditches, blankets should be unrolled in the direction of water flow, and stapled every 5 feet at joints and edges or as specified in the plans. When multiple blankets are used, the upstream blankets should overlap the downstream blankets.
- On slopes, blankets may be unrolled either horizontally or vertically to the slope. Ends and sides shall be stapled. When multiple blankets are utilized, the upslope blanket should overlap the down slope blanket.



Example of a blanket installation detail. See the Design Manual for the correct detail.

Removal

Unless specified in plans soil retention blankets can be left in place to degrade naturally.

TEMPORARY SLOPE DRAIN

A slope drain is a flexible tubing or conduit extending from the top to the bottom of a cut or fill slope. Its purpose is to temporarily conduct runoff safely down the disturbed face of an embankment without causing erosion.



Slope Drains

Materials

- Heavy duty flexible tubing or conduit designed for this purpose
- The diameter of the tubing or conduit should be uniform over its entire length
- Hold down stakes
- Optional riprap for outlet protection

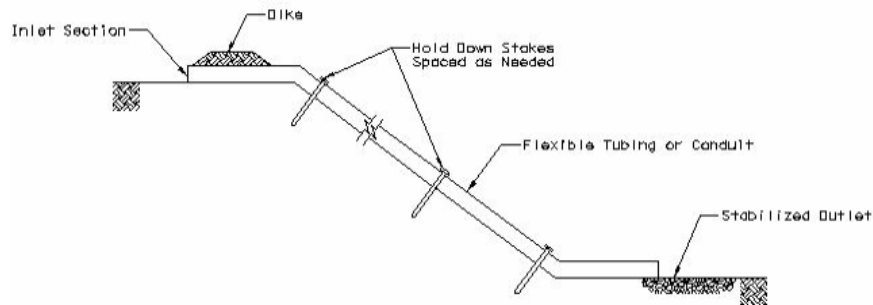
Placement

- On cut or fill slopes before permanent stormwater drainage structures are installed and before permanent erosion control vegetation is established.
- Place slope drains on undisturbed soil or well-compacted fill.

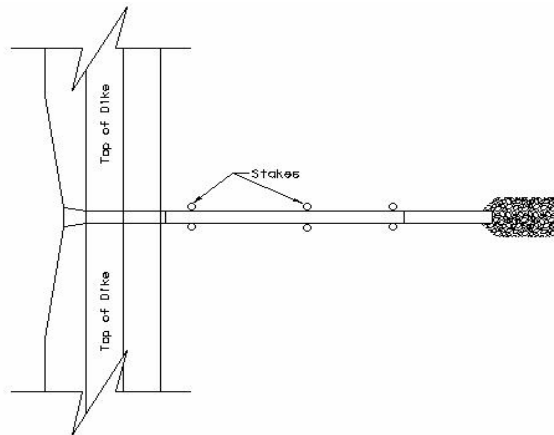
Installation

- The soil around and under the entrance section should be hand tamped to the top of the dike to prevent piping failure around the inlet.
- The inlet section may need to be modified for each situation
- The slope drain should be securely staked to the slope at the grommets provided.

- The slope drain sections should be securely fastened together and have watertight fittings.
- If the drain is conveying sediment-laden runoff, direct all flows into a sediment trap or other adequate sediment control device.
- Installation of temporary slope drains should be completed and their outlets protected before runoff is diverted to them.



Profile of Slope Drain



Plan View of Slope Drain



Slope Drain used with a combination or other measures

Maintenance

Problem	Corrective Maintenance
Blocked inlet or outlet	Unblock and regrade
Runoff bypassing inlet	Regrade
Erosion at outlet	Add rock

Removal

The Temporary slope drain can be removed once the reason for the drain is no longer necessary, i.e. permanent vegetation has been established or a permanent structure has been placed to address the water issue.

RIPRAP **Specification 708.04**

Riprap is used on slopes, riverbanks, drainage channels, and for outlet protection. Riprap significantly reduces the erosion and sediment movement.



Riprap at Culvert Outlet

Material

- Riprap must first be accepted by gradation, soundness, and abrasion.
- Riprap fabric used must meet specification 709.03 and 858.01.
- Sandstone, shale, and soft limestone will not be accepted, along with any rock that has cracks or flaws that would cause splitting during the placement process.
- Riprap should meet the following gradation:

Size (Inches)	Percent Smaller
28*	80-100
22*	30-80
16	20-50
10	0-5

*The maximum size of stone permitted for riprap installation should not exceed the specified thickness of the riprap blanket by more than 6 inches. Stone of this excess size may be placed providing it does not exceed 10% of the total stone and can be blended satisfactorily into the riprap.

- Aggregate Cushion – Class 8 Aggregate
- Wire Mesh when specified
- Grout when specified

Riprap may be suitable:

- Along a stream or within drainage channels, as a stable lining resistant to erosion.
- On lakefronts and riverfronts, or other areas subject to wave action.
- Around culvert outlets and inlets to prevent scour and undercutting.
- In channels where infiltration is desirable, but velocities are too excessive for vegetative or geotextile lining.
- On slopes and areas where conditions may not allow vegetation to grow.



Riprap

Installation

- Slopes should be excavated, shaped, and completed to the required cross section and elevation.
- Install an aggregate cushion to the specified depth and shape.
- When loose riprap is laid on a slope, placement must begin at the toe of the slope and work up the hill. At the toe, a trench should be dug to the specified size. If no size is specified, the trench will be at least one foot deep and the width of the area. The larger rocks are to be placed in the trench first.
- The riprap should be compacted throughout the process and the finished surface should have an even, tight surface. Any gaps will be filled with smaller rock.

- Rocks may be placed by mechanical means or by hand but should be distributed evenly.
- The area will not deviate from plan slope and grade by more than 6”.
- When wire mesh riprap is specified, a wire mesh will be placed above, below, and around the ends and sides of the riprap. The ends of strips will be tied every 18” at all abutting sections. End splices should be staggered at least 10’. No mesh under 10’ of length will be used. The lower layer of mesh will be tied to the upper layer at a minimum of 2’ on center each way.

Removal

Temporary riprap should be removed and disposed of in accordance with the plans or direction of the engineer.

SEEDING and SODDING

Specification 708.02

SEEDING



Tractor mounted seed drill

Material

- The species and variety of seed used should be specified in the plans and should meet or exceed Pure Live Seed requirements.
- Seed and seeding mixtures should be free of all prohibited noxious weed seed and should not contain more than ½ of 1% by weight of restricted noxious weed seeds as classified by the North Dakota State Seed Department.
- Seed will be accepted by certification after it has been tested by an approved laboratory within nine months of planting. Seed that has not been planted within nine months of testing will need to be retested.
- Seed that has become wet, moldy or damaged before it is planted will not be accepted.
- Fertilizer should be placed according to the class of seed as specified in the specifications.
- When hydro-mulch is used, the fertilizer should be in the slurry mixture.

Placement

- Areas to be seeded should be done as specified in the plans.

Installation

- Areas to be seeded should be cleared of all material that is detrimental to seedbed preparation.
- The cleared areas should be shaped to the plan cross sections, or to the cross section that best fits existing conditions.
- Grass seeds of the required mixture and quality shall be sown by a mechanical seeder or other method, which will sow a uniform quantity as required over the whole area to be seeded.
- No seed should be sown when the wind velocity exceeds 15 miles per hour.
- No seed should be sown in standing water or frozen ground.
- All slopes should be worked on the contour, or as directed by the Engineer.
- Seeded areas should be watered and mulched immediately following placement when specified by the project designer or site conditions dictate.

Maintenance

Problem	Corrective Maintenance
Rills or gullies forming	Regrade and reseed, Add additional controls
Bare soil patches	Remulch and/or reseed
Sediment at the toe of the slope	Regrade, Add silt fence or filter dike if next to a body of water

SODDING



Sod Installation

Material

- Sod shall consist of dense well-rooted growth of permanent and desirable grass, with uniform thickness that is adapted to the general location of which it is placed.
- Sodding must be accompanied by a certification of compliance (from an approved laboratory) stating that the soil upon which the furnished sod was grown does not contain more than 20% organic matter. The percentage of organic matter shall be determined according to the latest version of AASHTO test method T-267. If the sod comes from multiple locations, each location will require certification. The certifications for the fields are good for 5 years.
- All sod shall be free of weeds and undesirable grasses and shall be cut when the grass is less than two inches tall.
- Peat sod will not be allowed.

Placement

- Prior to placement, the area to be sodded shall be shaped to the required cross section and contoured in accordance with the plans.
- Stones larger than two inches diameter and other debris, which will interfere with proper placement or growth of the sod, shall be removed.

- Immediately prior to placing the sod, the soil shall be loosened and lumps, weeds and other undesirable materials shall be removed.
- Sod on slopes shall be laid in horizontal strips beginning at the bottom of the slope working upwards.
- In ditches, the long length of the strip shall be placed perpendicular to the flow.

Installation

- Each section of sod shall join the adjacent section without overlapping but shall abut snugly against the section previously laid. End joints shall be staggered and open joints or gaps shall be filled with sod cut to the proper size and shape.
- On slopes of 4:1 or steeper, the sod shall be anchored with stakes of at least 6 inches in length spaced 18 inches to 36 inches apart along the longitudinal axis of the sod strip.
- Fertilizer should be placed as specified in the plans.
- Maintenance and watering shall be done for 4 weeks after the sod is laid. Any sod that dies, washes out, is damaged, or contains excessive organic material during this maintenance period will be replaced at the contractor's cost.

SANDBAGS

Sandbags can be used to dike off an area, divert water, control a ditch grade, and be used as inlet protection.



Sand Bag Barrier

Materials

- Sandbags should be woven polypropylene, polyethylene or polyamide fabric.
- All sandbag fill material should be non-cohesive permeable material free from clay and deleterious material.

Placement

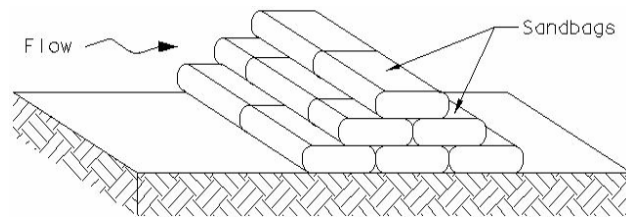
Sandbag barriers may be suitable:

- As sediment traps at culvert/pipe outlets
- Below the toe of slopes and erodible slopes
- Down slope of exposed soil areas
- Around storm sewer inlets.

Installation

- Sandbags need to be stacked tightly against one another in a pyramidal-type fashion.

- Generally a bag or two is left out of the top row to provide a spillway.



Pyramidal Stacking Pattern (Number of Rows Vary)

Removal

Remove sandbags when no longer needed. Remove sediment accumulation, clean, regrade if necessary, and stabilize the area. The disturbed area must be seeded following removal of ECM's.

OTHER MEASURES

FLOATING SILT CURTAIN

A floating silt curtain is a silt barrier for use within a lake, pond, stream or other water. The floating silt curtain consists of a geotextile curtain weighted at the bottom and attached to a flotation device, or carrier, at the top. This structure is used to isolate an active construction area within a water body to prevent silt-laden water from migrating out of the construction zone.

STABILIZED CONSTRUCTION ACCESS

A stabilized construction access is a defined point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles. Stabilized construction access is typically 50 to 100 feet in length and is comprised of large aggregate.

STRAW WATTLES

Straw wattles are permeable barriers used to detain runoff long enough to reduce flow velocity and allow sediment to settle out.



Inspection and Maintenance

Inspection

Inspect ECM controls at least **once every 7 days** and **within 24 hours after any storm event of ½ inch or more**. The following things should be evaluated:

- Ascertain whether controls are adequate and properly implemented according to the schedule of operations or whether additional control measures are required.
- Inspect disturbed areas and storage areas for potential or evidence of pollutants entering the drainage system.
- Inspect discharge locations to ascertain whether control measures are effective in preventing significant impacts to receiving waters.
- Inspect entrances and exits of site for evidence of off-site tracking.

Maintenance

All control practices will be maintained and repaired as needed to assure continued performance of their intended function. Each ECM previously discussed has maintenance issues, additional maintenance information is discussed below.

ECM	Problem	Corrective Measure
Outlet Protection	Erosion below outlet	Add Rock, Add ditch checks to slow the water
	Sediment leaving project	Add sediment basins, ditch checks, silt fence etc.
	Dislodged Rock	Add or rearrange rock
General Ditch Erosion and Sediment Problems	Loose soil	Regrade, Recompact
	Erosion of Ditch	Regrade, Add additional controls
	Gully on slope above ditch	Regrade, Add Slope Drains, Add Rock
	Sediment or debris in ditch	Clean Out, Regrade and add ditch checks and/or sediment basins
	Erosion of unlined ditch surface	Place ditch checks or to slow the water or sediment blankets
	Erosion of ditch blankets	Straighten, Regrade, Reline, and Repin more securely.

NPDES PERMITS

The National Pollution Discharge Elimination System (NPDES) is a program aimed to reduce and eventually eliminate pollution from point and non-point sources. In North Dakota, the NPDES is administered and enforced by the North Dakota Department of Health (NDDOH), where it is referred to as the North Dakota Pollution Discharge Elimination System (NDPDES). The forms required for individual permits can be found on the NDDOH's website located at [**http://www.health.state.nd.us/wq/Storm/StormWaterHome.htm**](http://www.health.state.nd.us/wq/Storm/StormWaterHome.htm).

An operator (a person in charge of day to day supervision and in control of activities occurring at the construction sites) or owner (NDDOT) of construction activity needs a permit:

- If land disturbance (clearing, grading, or excavating) is greater than or equal to one acre.
- If land disturbance is less than one acre and the site is part of a larger common plan of development or sale with the total land area disturbed in the development being equal to or greater than one acre. An example of this is a highway construction project that includes twelve half-acre sections that are not connected to each other but the combined total area of the twelve sites equals six acres.
- If there is potential for contribution to a violation of a water quality standard or potential for significant contribution of pollutants to waters of the state.

Permit Contents:

1. Storm Water Pollution Prevention (SWPP) Plan

The core of the permit process is the Storm Water Pollution Prevention Plan. This packet of forms is used to describe the scope of the project, erosion and sediment control measures, and other measures taken to prevent pollutants from leaving the site with storm water.

Elements of a SWPP Plan:

1. Project Description (SF 19388)
2. Site Map Development
3. Vegetative/Structural Practices (SF 19389)
4. Other Erosion Control Measures (SF 19390 and SF 19390-2)
5. Significant Materials (SF 19387)
6. Signatory Certification (SF 19137)

2. Notice of Intent (NOI):

Small Construction Activity - Land disturbance of equal to or greater than one acre and less than five acres and when the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale. **Erosion control measures must be implemented in order to prevent erosion and sediment runoff.**

An operator of a small construction activity must submit one single NOI form to the NDDOH to obtain coverage of the storm water discharges from all of their small construction sites. The NOI for small construction activity should contain, at a minimum, the following information:

- Name and mailing address of the owner or operator
- Contact name and phone number
- A brief description of the construction activity type
- The signature of the applicant(s)

The NOI for small construction should be submitted to the NDDOH prior to the start of construction. A SWPP does not need to be submitted for small construction activity unless requested in writing by the NDDOH.

Large Construction Activity – Land disturbance greater than or equal to five acres. Large construction activity also includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale, if the larger common plan will ultimately disturb equal to or greater than five acres. An example of this is a

highway construction project that includes twelve half-acre sections that are not connected to each other but the combined total area of the twelve sites equals six acres.

The operator of a large construction activity should submit a NOI and SWPP Plan to obtain coverage for storm water discharges for each construction project. The NOI for large construction activity should contain, at a minimum, the following information:

- Name and mailing address of the owner or operator
- Contact name and phone number
- The type of owner or operator of the construction site (federal, state, private, or other entity)
- Name of construction project
- A brief description of the construction activity
- List of contractors/subcontractors working at the site (if known)
- Construction project's Standard Industrial Code (SIC) code
- The anticipated starting date and the anticipated date of the completion for the project
- The estimated area of total disturbance in acres
- County and location of the construction site, including latitude and longitude or township, range, section, and ¼ section
- Name of receiving water(s) or the name of the receiving municipal storm sewer system and receiving water(s)
- The signature of the applicant(s)

The NOI and SWPP Plan for large construction activity should be submitted to the NDDOH 30 days prior to the start of construction.



**NOTICE OF INTENT TO OBTAIN COVERAGE UNDER NDPDES
GENERAL PERMIT FOR STORMWATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION ACTIVITY**
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF WATER QUALITY
SFN 19145 (11/02)

FOR DEPT. USE ONLY

Clear Entire Form

Application No.
Date Received

GENERAL INFORMATION

Name of Owner or Operator of Construction Project Seeking Authorization to Discharge		Contact Person/Contact Phone No.		Business Phone No.	
<input type="text"/>		<input type="text"/>		<input type="text"/>	
Mailing Address		City	State	Zip Code	
<input type="text"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>	
Type of Owner or Operator	<input type="checkbox"/> Developer/Builder	<input type="checkbox"/> General Contractor	<input type="checkbox"/> Municipality	<input type="text"/>	
	<input type="checkbox"/> State of ND	<input type="checkbox"/> Federal	<input type="checkbox"/> Other (Specify):	<input type="text"/>	
This NOI is to obtain coverage under Small Construction Activity (see Part I.C of permit):		<input type="checkbox"/> YES	<input type="checkbox"/> NO	There are special reporting requirements for Small Construction Activity in Part III.D of permit	
		<input type="button" value="Clear Buttons"/>			
Name of Construction Project (Large Construction Activity only - see Part I.D of permit)					
<input type="text"/>					
Brief Description of Construction Activity (Please fill out for both Small and Large Construction Activity)					
<input type="text"/>					

LARGE CONSTRUCTION ACTIVITY INFORMATION

Names of Contractors Working at Site (if known)					
1) <input type="text"/>					
2) <input type="text"/>					
3) <input type="text"/>					
Project Start Date: <input type="text"/>			Estimated Area of Total Disturbance in Acres <input type="text"/>		
Estimated Completion Date: <input type="text"/>			<input type="text"/>		
Facility Location	Street <input type="text"/>		City <input type="text"/>		
	OR	<input type="text"/> 1/4 <input type="text"/> 1/4	Section <input type="text"/>	Township <input type="text"/>	Range <input type="text"/> County <input type="text"/>
	OR	Latitude <input type="text"/> ° <input type="text"/> ' <input type="text"/> "	Longitude <input type="text"/> ° <input type="text"/> ' <input type="text"/> "	County <input type="text"/>	
Receiving Waters	<input type="checkbox"/> Natural Surface Drainage		Name or Description of Receiving Waters <input type="text"/>		
	OR	<input type="checkbox"/> Municipal Storm Sewer	Name of City <input type="text"/>		

Clear Buttons Above

SIGNATURE INFORMATION

RETURN COMPLETED APPLICATION TO: North Dakota Department of Health Division of Water Quality 1200 Missouri Ave., Rm. 203 PO Box 5520 Bismarck, ND 58506-5520 Telephone: 701-328-5210	I certify I am familiar with NDCC 61-28-08, and with the information contained in this application. To the best of my knowledge and belief, the information in this application is true, complete, and accurate.	
	Printed Name of Applicant(s)	Title
	Signature of Applicant(s)	Application Date

(Attach additional pages if needed)

Example of the NOI Form

3. Permit Certification:

Automatic Coverage – If the applicant does not receive a request for additional information or a notification of denial from the NDDOH within 10 days of receipt of the application by NDDOH, authorization to discharge in accordance with the conditions of this permit shall be deemed granted.

Request for Additional Information – The NDDOH shall have the right to request additional data and/or deny the authorization for any particular discharge.

Individual or Alternative General Permits – Refer to the NDDOH for individual or alternative general permits.

Local Authority – This permit does not preempt or supersede the authority of local agencies to prohibit, restrict, or control discharges or storm water to storm sewer systems or other water courses within their jurisdiction.

4. Continuation of Coverage

Facilities covered under this permit can continue coverage under the renewed permit, provided a satisfactory request is made. Any request to retain coverage under a renewal of this permit shall be made in writing to the NDDOH at least 15 days prior to the expiration date of this permit. If requested by the NDDOH, a new NOI should be submitted.

5. Transfer of Ownership or Control

- Coverage under this permit may be transferred to a new permittee if the existing and new permittees notify the NDDOH in writing, at least 48 hours before the transfer of ownership or control; and the notice includes a written agreement between the existing and new permittees containing a specific date of transfer of permit responsibility, coverage and liability between them. If requested by the NDDOH, a Notice of Termination should be submitted by the existing permittee and a NOI submitted by the new permittee. **Contractors will be responsible for**

transferring ownership to the NDDOT following the final project inspection and written acceptance. All erosion control measures must be installed properly and cleared of all sedimentation. Following final inspection and written acceptance, all maintenance operations will be performed by the NDDOT Districts and the SWPP Plan measures will be followed.

- The new owner or operator must comply with all regulations in this permit and with all provisions of the existing SWPP Plan until such time as the existing SWPP Plan is amended or replaced by a new SWPP Plan. If the personnel responsible for implementing the SWPP Plan change, these changes must be amended to the SWPP Plan within 30 days of transfer of ownership or control.

6. Notice of Termination (NOT)

Final Stabilization is reached when all construction activities that are authorized by this permit have been completed, and uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbed levels, or equivalent permanent, physical erosion reduction methods have been employed. The NDDOH has a form available on their website that must be completed for this step.

Operators of small construction activity are not required to submit a notice of termination for their individual small construction sites, however, final stabilization is required on all sites. If an operator ceased all of its small construction activity and has submitted Annual Location Records that certify final stabilization has been completed on its small construction sites, a notice of termination must be submitted to end permit coverage for small construction activity. The content of the notice of termination for small construction activity should contain the following:

- Permit number
- Name and mailing address of the owner or operator
- Contact name and phone number
- Certification that all small construction activity has been stabilized
- Signature of the applicant(s)



**NOTICE OF TERMINATION TO CANCEL COVERAGE UNDER
(NDPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION ACTIVITY**

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF WATER QUALITY
SFN 19146 (11/02)

FOR DEPT. USE ONLY

Clear All Form Fields

Date Received: ___/___/___

GENERAL INFORMATION

Name of Construction Project <input type="text"/>		Permit Number NDR03 - <input type="text"/>	
Name of Owner or Operator of Construction Project Which Received Authorization to Discharge <input type="text"/>		Contact Person <input type="text"/>	Telephone Number <input type="text"/> <input type="text"/>
Mailing Address <input type="text"/>		City <input type="text"/>	State <input type="text"/> Zip Code <input type="text"/>
This Notice is to terminate coverage for all Small Construction Activity (see Part I.C of permit): <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="button" value="Clear Selections"/> There are special reporting requirements for Small Construction Activity in Part I.H and III.D of permit			

LOCATION (for Large Construction Activity Only)

SITE LOCATION	Street <input type="text"/>		City <input type="text"/>			
	OR	<input type="text"/> 1/4 <input type="text"/> 1/4	Section <input type="text"/>	Township <input type="text"/>	Range <input type="text"/>	County <input type="text"/>
	OR	Latitude <input type="text"/> 0 <input type="text"/> I <input type="text"/> II	Longitude <input type="text"/> 0 <input type="text"/> I <input type="text"/> II	County <input type="text"/>		

CERTIFICATION STATEMENT

I certify under penalty of law that for the construction project(s) and permit described above:

As of , disturbed soils at the identified site(s) have been finally stabilized, seventy percent restored vegetative coverage as compared to preexisting vegetation, and temporary erosion control measures have been removed, or that all storm water discharges associated with construction activity from the identified site, authorized by a NDPDES general permit have been eliminated.

I understand that by submitting this Notice of Termination, that I am no longer authorized to discharge storm water associated with construction activity by the general permit, and that discharging pollutants in storm water to waters of North Dakota is unlawful under North Dakota Century Code 61-28 where the discharge is not authorized by a NDPDES permit.

Return Completed Application to: North Dakota Department of Health Division of Water Quality P.O. Box 5520 Bismarck, ND 58506-5520 Telephone: (701)328-5210	I certify I am familiar with NDCC 61-28-08 and with the information contained in this application. To the best of my knowledge and belief the information in this application is true, complete and accurate.	
	Printed Name of Applicant(s) <input type="text"/>	Title <input type="text"/>
	Signature of Applicant(s) <input type="text"/>	Application Date <input type="text"/>

(Attach additional page if needed)

Example of a NOT form

Operators of large construction activity should submit the following when the site has been stabilized:

- Permit number
- Name of construction site
- Name and mailing address of the owner or operator
- Contact name and phone number
- County and location of the construction site, including latitude and longitude or township, range, section and ¼ section
- Certification that the site has been stabilized.
- Signature of the applicant(s)
- **Once final stabilization has been established, Notice of Terminations will be prepared by the NDDOT District's.**

NOI's, SWPP's and Notice of Termination's should be submitted by mail, or hand delivery to:

North Dakota Department of Health
Division of Water Quality
1200 Missouri Avenue
PO Box 5520
Bismarck, ND 58506-5520

Responsibilities within the NDDOT

DESIGN

- Coordinate all MS4 activities
- Submit Annual Report to NDDOH
- Design project site plan for Erosion Control Measures (ECM).
- Develop a partnership with the five MS4 permittees to address common issues.
- Develop ECM's for pre and post construction runoff water quality control.
- Develop and review construction standards for onsite erosion and sediment control.
- Develop educational material and train personnel on the review of storm water management plans and inspection procedures.
- Develop penalties for contractors failing to comply with the storm water management plan.

CONSTRUCTION

- Pre-construction staking of ECM's
- Weekly and Storm Event Runoff (>.50in. /24hrs.) inspection of ECM's during construction.
- Enforcement of ECM's.
- Maintain inspections until final inspection and acceptance.
- Develop penalties for contractors failing to comply with the storm water management plan.

MAINTENANCE/DISTRICTS

- Responsible for overseeing compliance for insuring MS4 compliance on all NDDOT projects within MS4 municipalities and properties (State Owned Gravel Pits and maintenance yards), and submit reports to the Design Division.
- Following final inspection and acceptance the Maintenance/Districts will be responsible for maintaining and removing all ECM's until 70% coverage on disturbed areas is established.

- Develop and review construction standards in NDDOT Standard Specifications for Road and Bridge Construction, for onsite erosion and sediment control.
- Submit Notice of Termination's to NDDOH and a copy to Design Division.

CONTACTS

Permits

North Dakota Department of Health
Division of Water Quality
1200 Missouri Avenue
Bismarck, ND 58506-5520

Erosion and Sediment Control

North Dakota Department of Transportation
Design Division
608 East Boulevard Avenue
Bismarck, ND 58505-0700

REFERENCES

American Association of State Highway and Transportation Officials. *Guidelines for Erosion and Sediment Control in Highway Construction*. 1992.

Minnesota Department of Transportation. *Erosion Control Handbook*.

Minnesota Department of Transportation. *The Inspectors Erosion and Sediment Control Pocketbook Guide*. 2003

Montana Department of Transportation. *Erosion and Sediment Control Best Management Practices: Reference Manual*. 2003

North Dakota Department of Transportation. *Standard Specifications for Road and Bridge Construction*. Oct. 2002.

North Dakota Department of Health. *A Guide to Temporary Erosion-Control Measures for Contractors, Designers, and Inspectors*. June 2001.

Ohio Department of Transportation. *Handbook for Sediment and Erosion Control*. February 2000.