

Berks County Conservation District

EROSION CONTROL FOR TIMBER HARVEST ACTIVITIES

Introduction

In an attempt to alleviate the continuing problems of controlling sediment pollution, the Commonwealth of Pennsylvania, through the Department of Environmental Protection (DEP), adopted Chapter 102, Erosion Control Rules and Regulations. Chapter 102 requires that anyone undertaking an earth disturbance activity develop and implement a written Erosion and Sedimentation (E&S) Control Plan for any earth disturbances 5,000 sq. ft. or greater as well as *any* earth disturbance when a project is located in a special protection watershed. The plan must be submitted to the County Conservation District for review if required by the local municipality, or if requested by the District. The E&S plan must be available at all times at the site of the earth disturbance activity, regardless of the size of the project. Failure to have an E&S plan on site is a violation of Chapter 102. It is important to remember that both landowners and contractors may be held responsible for any violation of the Chapter 102 Regulations.

Use of This Guide

This guide is intended to be used for timber harvest activities disturbing less than 25 acres. Timber harvests disturbing 25 acres or more require an Erosion and Sediment Control Permit. Contact your local Conservation District if there are any questions regarding the suitability of this guide for your project. In addition, check with your local municipality regarding specific ordinances.

IMPORTANT! - Any activity within 50 feet of a water course may require additional permitting with Chapter 105! Contact the Conservation District if your timber harvest crosses a stream / wetland or is located within 50 feet from a stream.

Considerations in Plan Development

*References to Standard Construction Details and Tables can be found in the DEP Erosion and Sediment Control Program Manual (abbreviated as 'DEP ESCPM' from hereon after)

HAUL ROADS

Haul roads for a timber harvest project typically run from the landings to the entrance(s). Every road system should be planned and developed as if it will be permanent. Many roads are initially considered to be temporary, but often these temporary roads are used again and again. Therefore, the entire road system should be designed before any road construction begins. This process may seem to take more time, but a well-planned road system will be more efficient, less costly, and easier to maintain.

The following points should be considered when laying out a road system:

- 1. Construct only as much road as necessary. Minimize clearing. Keep road width to the minimum necessary for safe and efficient operation.**
- 2. Terminal Points - Locate the start and end of the road system using the best access that is safe and visible from public roads. Locate landings away from streams and wet areas. Install stabilized entrances, as shown in Standard Construction Detail #3-1, at all exit points onto a public roadway. Install an entry gate or barricade to keep potentially damaging and unwanted traffic off the haul road. NOTE: A highway occupancy permit may be required.**
- 3. Grades - Roads with a maximum slope of 10 percent and a minimum of 2 percent are usually the easiest to maintain. Where absolutely necessary, grades of 15 to 20 percent can be used for short distances. Follow the contour as much as possible.**
- 4. Topography - Roads on moderate side hills are easiest to build and maintain. Avoid steep slopes wherever possible.**

5. **Drainage** - Construct roads to drain at all times, such as using crowned or insloped surfaces. Install ditch relief culverts at specified intervals, as shown in Table 3.3 or 3.4 (DEP ESCPM). Provide outlet protection at all culvert outfalls. Turnouts, as shown in Figure 3.3, may be used on low-side ditches to direct flow into vegetative filter areas.

6. **Grading** - Minimize cut and fill work, and keep slopes at stable angles. Remove trees from tops of cuts, and seed and mulch cut and fill slopes promptly. Do not place fill into open sinkholes, waterways, wetlands, floodways, or other sensitive areas.

7. **Obstacles** - Design the road system to go around springs, seeps, wetlands, poor drainage areas, ledges, and rocky areas wherever possible.

8. **Soils** - Be aware of soil texture, drainage class, and slope position as outlined in Appendix E. Some soils are poorly drained or seasonally wet and are difficult to log. Others are unstable when support is removed to make a road cut or when used as fill. The NRCS soils website should be consulted to identify soil limitations. Minimize the traffic areas. Running equipment over soil compacts it and damages its ability to infiltrate runoff.

9. **Distances from Streams** - Buffer areas should be maintained along stream corridors to provide sediment filtration and maintain stream temperatures. Wherever sufficient filter strips are not possible between roadways and receiving waters, install BMPs, such as wood chip berms, silt fence, etc., as the roadway progresses. See Table 14.1 (DEP ESCPM) for minimum filter strip widths.

10. **Stream Crossings** - Minimize the number of stream crossings. Cross at a 90-degree angle and approach the stream at as gentle a slope as possible. Consider all stream crossings temporary. Only bridge crossings, as shown in Figure 3.5 (DEP ESCPM), or culvert type crossings, as shown in Standard Construction Details 3-11, 3-12, and 3-13 (DEP ESCPM), may be used. Ford crossings are not acceptable. An encroachment permit or Army Corps of Engineers (ACOE) permit may be required.

11. **Old roads** - It is often possible to use existing roads and thereby lessen the soil disturbance. However, to avoid problems, carefully evaluate the road's suitability for upgrading.

12. **Size and duration of sale and the anticipated season of harvest.**

13. **Floodways and wetlands** - Avoid encroaching on wetlands. Roadway construction within floodways — typically 50 feet from top of streambank — and wetlands require encroachment permits.

14. **Water control structures** - Carefully plan the use of broad-based dips, waterbars, culverts, and ditches to maintain existing flow patterns and minimize the amount of runoff being conveyed by roadways and roadside ditches. Figure 14.1 (DEP ESCPM) shows a typical haul road layout.

SKID ROADS AND SKID TRAILS

The primary difference between a skid road and a skid trail is the degree of preparation for use. Main skid roads should be flagged, cleared, and graded. Skid trails, which are used for transporting logs from stump to main skid road, are usually not graded and need only minimal clearing. In developing a skid road and trail system, pay special attention to proper drainage and soil stabilization. The following items should be considered:

1. **Landings** - Locate landings in relation to the main haul road. Then, lay out the skid road and trail approaches on a low grade to the landings.

2. **Grades** - Keep grades as low as the topography will permit. Do not go straight up the slope; proceed across the slope as much as possible. Grades of 20% or more should be avoided. Where unavoidable, they should be kept to short distances and make use of waterbars.

3. **Avoid Streams, Wetlands, Rocky Slopes, and Steep Grades.** Skid trails and skid roads should be located at least 50 feet from stream channels and wetlands wherever possible.

4. **Stream Crossings** - Use temporary bridges or culverts and obtain all appropriate permits/authorizations.

5. **Use waterbars** wherever it is not possible to avoid going straight up or down slopes.

6. **NEVER SKID THROUGH OR ACROSS STREAM CHANNELS, WETLANDS, SPRINGS, OR SEEPS. SAVE EXISTING VEGETATION** - Vegetation cover is the best and most economical protection against soil erosion. Protect existing vegetation during the timber harvest activity process. Trees and shrubs should be marked and roped off to protect them from damage by construction equipment. Filling and soil compaction around trees should be avoided.

LOG LANDINGS

The number and size of landings should be kept to the minimum necessary to operate safely and efficiently.

Few erosion problems are associated with a properly located landing. Problems will occur, however, when water control is not considered in selecting a location. Only sites that will hold up under the anticipated use by heavy equipment should be chosen. Avoid sensitive areas such as riparian management zones, waterways, wetlands, caves, springs, seeps, and open sinkholes. Allow adequate undisturbed buffer strips between the landing and streams or sensitive areas, as shown in Table 14.1.

Disturb only the area needed for safe operations. If the topography warrants, use a diversion channel, as described in Chapter 6, above the landing to keep upslope runoff from entering the landing area.

The diversion channel should have a suitable protective liner and outlet to an existing waterway wherever possible. If no waterway exists, the discharge should be directed to a stable area. If leveling is necessary, cut and fill should not alter the natural drainage pattern of the area.

Heavy equipment quickly compacts soils on landings, preventing water from infiltrating. Therefore, the landing should be sloped so as to direct runoff to a sediment removal BMP such as a wood chip berm, silt fence, straw bales, etc.

Skid roads, skid trails, and haul roads approaching the landing from above should have a waterbar, broad-based dip, or other means of diverting flow into a stable area before it reaches the landing.

WINTER HARVESTS

Timber harvests are often conducted during the winter months to take advantage of frozen ground. While this practice is encouraged, there are a few concerns that should be addressed:

1. Before it snows, mark existing culverts and other drainage structures as well as waterways and wetlands, which can be obscured by snowfall. Keep all drainage structures open and functioning properly.
2. Wherever haul roads and skid roads are constructed over soils with low strength, as identified in Appendix E (DEP Erosion and Sediment Control Program Manual), hauling and skidding should be limited to periods when temperatures are below freezing unless these roads have been engineered to withstand the equipment weights involved.
3. During cold weather, snow should be plowed from haul roads and skid roads to facilitate freezing of the road grade before hauling.
4. Operations should be suspended during thaw cycles, winter rains, and during times of heavy snow melt when soils tend to be saturated.
5. During times of heavy snow, provide breaks in snow berms along plowed roads to facilitate drainage.
6. Compact skid trail snow before skidding logs. This will help protect soils that are not completely frozen.

RETIREMENT OF HAUL ROADS, SKID ROADS, SKID TRAILS, AND LANDINGS

When a tract or parcel within a harvest area has been completed, all haul roads, skid trails, and landings associated with that tract or parcel should be retired; even while timbering continues on other tracts and parcels. To do so, the following guidelines are recommended:

1. Regrade all road and landing surfaces to approximate original contour. Scarify compacted soils in preparation for seeding.
2. Remove ditch relief culverts and replace them with waterbars or broad-based dips.
3. Remove all temporary stream and wetland crossings and stabilize disturbed areas. Install or restore waterbars at appropriate distances on the approaches to the stream crossings.
4. Seed and mulch disturbed areas with seed mixtures appropriate for site conditions, such as shade tolerant, steep slope mixture, acid tolerant, etc. are further identified in Tables 11.4 and 11.5. Blanket disturbed areas within 50 feet of stream channels or wetlands.

PROTECT DITCHES, STREAMS, OR OTHER BODIES OF WATER – Maintain vegetated buffers where possible. Install temporary controls, such as compost sock, filter fabric fence, mulch berms, straw bale barriers, or rock filters to keep sediment pollution out of streams and other water bodies.

PLAN TO MAINTAIN EROSION CONTROL MEASURES – Straw bale barriers deteriorate; filter fabric fences clog, and seeded areas wash out. Schedule regular maintenance to ensure properly functioning control measures. Continuous maintenance problems and failure of E&S controls indicate a need to consider upgraded controls or assistance from a professional design consultant.

TEMPORARY STABILIZATION

Recommended Seed Mixtures for Temporary Stabilization

Mixture & Seeding Season	Species	Seeding Rate – lb/A
1 – Spring Seeding (up to June 15)	Annual ryegrass	40
	Or spring oats,	96 (3 bu)
	Or spring oats plus ryegrass,	64 (2 bu) plus 20 lb annual or perennial ryegrass
	Or winter wheat,	180 (3 bu)
2 – Late Spring and Summer Seeding (June 16 to August 15)	Or winter rye	168 (3 bu)
	Annual ryegrass,	40
	Or Japanese or foxtail millet	35
	Or sudangrass,	40
	Or spring oats,	96 (3 bu)
	Or winter wheat,	180 (3 bu)
3 – Late Summer and Fall Seeding (August 16 and later)	Or winter rye	168 (3 bu)
	Annual Ryegrass	40
	Or winter rye,	168 (3 bu)
	Or winter wheat,	180 (3 bu)
	Or spring oats (can be used, but winter kills)	96 (3 bu)

- **Mulching:** mulches alone help protect areas from erosion. Mulches also provide initial protection if area is to be seeded later. Use hay or straw at a rate of 3 tons per acre.
- **Site preparation:** Apply 1 ton of agricultural-grade limestone per acre, plus fertilizer at the rate of 05-50-50 per acre, and work in where possible. After seeding, mulch with hay or straw at a rate of 3 tons per acre.

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

PERMANENT STABILIZATION

TABLE 11.4

Recommended Seed Mixtures for Permanent Stabilization

*Utilize Table 11.5 to determine what seed mixture is most appropriate for the individual site

Mixture Number	Species	Seeding Rate - Pure Live Seed 1	
		Most Sites	Adverse Sites
1 ²	Spring oats (spring), or 64 96	64	96
	Annual ryegrass (spring or fall), or	10	15
	Winter wheat (fall), or	90	120
	Winter rye (fall)	56	112
2 ³	Tall fescue, or 75	60	75
	Fine fescue, or 40	35	40
	Kentucky bluegrass, plus 25 30	25	30
	Redtop4, or	3	3
	Perennial ryegrass	15	20
3	Birdsfoot trefoil, plus 6 10	6	10
	Tall fescue	30	35
4	Birdsfoot trefoil, plus	6	10
	Reed canarygrass	10	15
5 ⁷	Crownvetch, plus	10	15
	Tall fescue, or	20	25
	Perennial ryegrass	20	25
6 ^{5,7}	Crownvetch, plus	10	15
	Annual ryegrass	20	25
7 ⁷	Birdsfoot trefoil, plus	6	10
	Crownvetch, plus	10	15
	Tall fescue	20	30
8	Flatpea, plus	20	30
	Tall fescue, or	20	30
	Perennial ryegrass	20	25
9	Tall fescue, plus	40	60
	Fine fescue	10	15
10	Deertongue, plus	15	20
	Birdsfoot trefoil	6	10
11 ⁶	Switchgrass, or	15	20
	Big Bluestem, plus	15	20
	Birdsfoot trefoil	6	10
12	Orchardgrass, or	20	30
	Smooth bromegrass, plus	25	35
	Birdsfoot trefoil	6	10

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

1. PLS is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds PLS shown on the seed tag. Thus, if the PLS content of a given seed lot is 35%, divide 12 PLS by 0.35 to obtain 34.3 pounds of seed required to plant one acre. All mixtures in this table are shown in terms of PLS.

2. If high-quality seed is used, for most sites seed spring oats at a rate of 2 bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at 1 bushel per acre. If germination is below 90%, increase these suggested seeding rates by 0.5 bushel per acre.

3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.

4. Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.

5. Use for highway slopes and similar sites where the desired species after establishment is crownvetch.

6. Do not mow shorter than 9 to 10 inches.

7. Seed mixtures containing crown vetch should not be used in areas adjacent to wetlands or stream channels due to the invasive nature of this species.

TABLE 11.5
Recommended Seed Mixtures for Permanently Stabilizing Disturbed Areas

Site Condition	Nurse Crop	Seed Mixture (Select one mixture)
Slopes and Banks (not mowed) Well-drained Variable drainage	1 plus 1 plus	3, 5, 8, or 11 ⁶ 3 or 7
Slopes and Banks (mowed) Well-drained	1 plus 1 plus	2 or 9 2, 3, or 13
Slopes and Banks (grazed/hay) Well-drained		
Gullies and Eroded Areas	1 plus	3, 5, 7, or 11 ⁶
Erosion Control Facilities (BMPs)	1 plus	2, 3, or 4
Sod waterways, spillways, frequent water flow areas	1 plus	2, 3, or 4
Drainage ditches	1 plus	5 or 7
Shallow, less than 3 feet deep	1 plus	2 or 3
Deep, not mowed	1 plus	5 or 7
Pond banks, dikes, levees, dams, diversion channels, And occasional water flow areas	1 plus	3 or 12
Mowed areas		
Non-mowed areas		
For hay or silage on diversion channels and occasional water flow areas		

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

1. For seed mixtures 11 and 12, only use spring oats or weeping lovegrass (included in mix) as nurse crop.
2. Contact the Pennsylvania Department of Transportation district roadside specialist for specific suggestions on treatment techniques and management practices.
3. Seed mixtures containing crown vetch should not be used in areas adjacent to wetlands or stream channels due to the invasive nature of this species.

What to Include in a Timber Harvest Erosion & Sedimentation Control Plan

- The existing topography of the site – Roads, slope or grade of the land, location of any water (streams, ponds, wetlands, springs, etc.) and any other significant features of the site.
- The location and distance to any waters of the Commonwealth of which the project is located, including its classification pursuant to Chapter 93, which can be found at <http://www.depgis.state.pa.us/emappa/>
- **IMPORTANT!** - A watershed classification of HQ (high quality) or EV (exceptional value) is a special protection watershed requiring ABACT BMPs. These BMPs are identified in their descriptions.
- Types of soils on the site with depths, slopes, locations, and limitations – <http://websoilsurvey.nrcs.usda.gov/> (Web soil survey link) or refer to County Soil Survey, available at Conservation District office.
- A separate narrative description of the past/present land uses and proposed alterations to the site.
- The staging of earth disturbance activities. Determine the sequence in which the earth disturbance will occur, always keeping in mind that the most effective method of controlling erosion is to disturb only those areas necessary for harvesting timber. Disturbed areas should be stabilized immediately after earth disturbance has been completed or earth disturbance activities cease.
- Types of control measures, non-discharge or ABACT approved erosion control measures must be utilized in all special protection watersheds, both temporary (such as compost sock/log/tube, mulch berms, straw bale barriers, filter fabric fences, stone filters (with compost), etc.) and permanent (such as seeding and mulching, rock-lined or geotextile-lined channels). Provide calculations/table for demonstrated use. (see attached details/E&S manual)
- A maintenance plan for all of the control measures being used (see standard details)
- A Plan Drawing (template provided on last page) – The limits of the harvesting area must be shown on plan drawing(s). Such information as the limits of clearing and grubbing and the areas of cuts and fills for roads and landings, and other proposed disturbances for the timber harvesting area are to be included. Roads, skid roads, and landings located within 50 ft. of a stream bank may require a Department Chapter 105 Water Obstruction and Encroachment. The following should be clearly shown on the sketch map:
 - Dimensions
 - North Arrow
 - Landings
 - Haul Roads
 - Skid Roads
 - E&S BMP Installation Locations
 - Wetland Crossings
 - Stream Crossings
 - Equipment
 - Maintenance/Fueling Areas
 - Existing Roads
- Procedures to ensure the proper measures for recycling and disposal of materials associated with the project site will be managed lawfully. (see standard notes @ <http://berkscd.com/erosion-and-sediment-control-2/es-program-npdes/> go to bottom of page)
- If there are any potential thermal impacts to surface waters of the Commonwealth from the earth disturbance activities, they will need to be identified, along with any methods proposed for avoidance/mitigation of these thermal impacts.
- Identify any existing and proposed riparian forest buffers.

Example Sequence of Earth Disturbance Activity

1. Install a tire cleaning, rock construction entrance (see detail).
2. Install temporary control measures such as compost sock, waterbars, turnouts, etc. (see details)
3. Protect (flag/rope/fence) any sensitive areas such as tree protection, wetlands, springs and stormwater ditches.
4. Prepare site to the minimum needed, stockpile topsoil and provide temporary stabilization.
5. Conduct Timber Harvest Activities.
6. Finish grade and permanently stabilize (seed and mulch, sod, stone, etc.) the site. Maintain erosion controls until permanent stabilization has been achieved on all disturbed areas.

Seeding and Mulching Specifications

Time of Seeding – Through proper seed selection and seeding methods, disturbed sites may be re-vegetated at almost any time from spring to fall. Check for recommended spring and fall seeding dates in your area.

Surface Preparation – Spread topsoil and prepare smooth seed bed by rolling and/or raking.

Lime and Fertilizer – Lime and fertilizer should be applied in accordance with soil test recommendations. If soil test results are not available, apply at least 6 tons of agricultural grade limestone and 1000 pounds of 10-20-20 fertilizer per acre.

Seeding Methods – Apply seed at required rates. Seed may be broadcast on the surface and a layer of mulch applied at the necessary rates. Seed to soil contact is required for successful germination.

Mulching – All earth disturbance areas, regardless of seeding method, should be mulched to reduce erosion and aid seed germination. Hay or straw are the preferred mulches and should be applied to produce a layer $\frac{3}{4}$ to 1-inch deep. Generally, 3 tons of mulch per acre (approximately 3 bales per 100 sq.) is sufficient.

For more information – Consult the *Penn State Agronomy Guide* or your local Extension Office.



Erosion and Sediment Control (E&S) Plan Template for a Timber Harvesting Operation

This E&S Plan template only applies to timber harvest activities, as defined by 25 Pa. Code §102.1, which are not part of a larger development or conversion project.

1. GENERAL INFORMATION

A. Location _____			_____	
	Municipality		Date	
B. Timber sale area = _____ acres			_____	
			County	
C. Landowner/Agent _____			_____	
	Name		Home Phone	Work Phone
_____			_____	
Street Address			_____	
_____			_____	
City	State	Zip Code	Signature of Landowner/Agent	

D. Person(s) responsible for construction and maintenance of erosion and sediment control BMPs during and after earth disturbance activities.

(NOTE: If duties are assigned to more than one party, list all others under Section 12 of this plan.)

_____			_____	
	Name		Home Phone	Work Phone
_____			_____	
Street Address			_____	
_____			_____	
City	State	Zip Code	Signature of person(s) responsible	

E. Erosion and Sediment Control Plan prepared by:

_____			Phone _____	
	Name		_____	
_____			_____	
Street Address			_____	
_____			_____	
City	State	Zip Code	Signature of Plan Preparer	

2. TOPOGRAPHICAL MAP

The map must include the location of the project with respect to roadways, streams, wetlands, lakes, ponds, floodplains, type and extent of vegetation and other identifiable landmarks. A United States Geologic Service (USGS) quadrangle map may be used to show the existing topographical features of the project site and the immediate surrounding area. The map scale must be large enough to clearly depict the topographical features of the project. Enlargements of the USGS quadrangle map are sufficient. The scale and north arrow must be plainly marked. A complete legend of all symbols used on the map must also be included.

3. SOIL MAP

Soils information is available in soil survey reports or online at <https://websoilsurvey.nrcs.usda.gov/app/>. For additional information, contact your local county conservation district office. The soils drainage classes must be examined to determine areas with the best drainage for the placement of haul roads and log landings, and to determine proper retirement treatments. Provide the following soils information for all disturbed areas.

Map Symbols	Soil Series	Limiting Characteristics ¹ That May Apply to Timber Harvesting Activities (Check as Appropriate)		
		Slight	Moderate, severe	Seasonably Wet ³
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹Soils with a moderate or severe erosion hazard or are seasonably wet are poor choices for log landing and road locations, and, if possible, alternatives should be considered.
²The degree or ease by which soil particles can be detached from the soil surface. Moderate or severe ratings require additional consideration of soil erosion and sediment control BMPs during logging and road construction.
³Somewhat poorly drained soils remain wet for a longer period after rain and would be susceptible to disturbance. These soils may be hydric, indicating a possible wetland. They may have to be logged during dry seasons, when the profile may be relatively dry, or when the soils are frozen. They are poor choices for log landing and road locations, and, if possible, alternate areas should be considered.

4. SKETCH MAP

The characteristics of the earth disturbance activity. Sketch maps can be included on the topo map in Section 2. The limits of the harvesting area must be shown on the sketch map. Such information as the limits of clearing and grubbing and the areas of cuts and fills for roads and landings, and other proposed disturbances for the timber harvesting area are to be included. Earth disturbances located within a floodway (as defined by a FEMA map, or 50 ft. where not defined) may require a Chapter 105 permit. The following should be clearly shown on the sketch map:

- Project Boundary
- Stream Crossings
- Existing Roads
- Equipment Maintenance/Fueling Areas
- Wetland Crossings
- Landings
- Skid Roads
- North Arrow
- Haul Roads
- Section 8 BMPs

5. RECEIVING SURFACE WATERS

All streams in Pennsylvania are classified based upon their designated and existing uses and water quality criteria. Designated uses for waters of this Commonwealth are found in 25 Pa. Code §§ 93.9a-z, found online at <http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>. Existing uses of waters of this Commonwealth are found DEP's website (www.dep.pa.gov), Keyword Search: Statewide Existing Use. The county conservation district office can also supply this information. Identify the surface waters, including wetlands, likely to receive direct runoff within or from the timber harvest area:

<u>Name</u>	<u>Designated/Existing Use</u>
_____	_____
_____	_____
_____	_____
_____	_____

Has application been made for required Chapter 105 permits? Yes No Not Applicable

At all stream crossing locations, runoff must be directed to a sediment removal area (e.g. filter strip, straw bale, silt fence, sump, or trap for treatment). Waterbars and/or broad-based dips should be installed and maintained as required on the approaches to the stream crossing.

6. ESTIMATED DISTURBED AREA

	Total Length (ft)	x	Average Width (ft)	=	Area (sq ft)
Haul Roads	_____	x	_____	=	_____
Skid Roads	_____	x	_____	=	_____
Landings	_____	x	_____	=	_____
Total Area (sq. ft.) =				_____	÷ 43,560 sq ft/ac = _____
					*** Acres disturbed by earth disturbance activities

*** If the total area of earth disturbance activities (sum of area disturbed by haul roads, skid roads and landings) consists of 25 acres or more, a Chapter 102 Erosion and Sediment Control Permit (ESCP) must be obtained. Please contact the Department or authorized conservation district for assistance.

The following points should be considered when laying out a road system:

- **Construct only as much road as necessary.** Minimize clearing. Keep road width to the minimum necessary for safe and efficient operation.
- **Terminal points** – Locate the start and end of the road system using the best access that is safe and visible from public roads. Locate landings away from streams and wet areas. Install rock construction entrances as shown in Section 8.K. **NOTE: A highway occupancy permit may be required.**
- **Grades** – Haul roads with a maximum slope of 10% and a minimum of 2% are usually the easiest to maintain. Where absolutely necessary, grades of 15 to 20% can be used for short distances. Follow the contour as much as possible. Use waterbars (Section 8.B) on skid roads whenever it is not possible to avoid grades of 20% or more.
- **Topography** – Roads on moderate side hills are easiest to build and maintain. Avoid steep slopes wherever possible.
- **Drainage** – Construct roads to drain at all times, such as using crowned or insloped surfaces. Install ditch relief culverts as shown in Section 8.A or broad-based dips as shown in Section 8.E. Turnouts as shown in Section 8.C may be used on low-side ditches to direct flow into filter strips.
- **Grading** – Minimize cut and fill work, and keep slopes at stable angles. Remove trees from tops of cuts, when the root system is undercut, and seed and mulch cut and fill slopes promptly (Section 8.L). Do not fill into open sinkholes, waterways, wetlands, floodways or other sensitive areas.
- **Obstacles** – Design the road system to go around springs, seeps, wetlands, poor drainage areas, ledges, and rocky areas wherever possible.
- **Distances from Streams** – Filter strips should be maintained along stream corridors to provide sediment filtration and maintain stream temperatures (Section 8.F). Wherever sufficient filter strips are not possible between roadways and receiving surface waters, install BMPs, such as silt fence (Section 8.G) as the roadway progresses. See Section 8.F for minimum filter strip widths.
- **Stream Crossings** – Minimize the number of stream crossings. Cross at a 90 degree angle and approach the stream at as gentle a slope as possible. **NOTE: A Chapter 105 permit may be required.**
- **Old roads** – It is often possible to use existing roads and thereby lessen the soil disturbance. However, to avoid problems, carefully evaluate the road’s suitability for upgrading.
- **Landings** – Locate landings in relation to the main haul road. Then lay out the skid road and trail approaches on a low grade to the landings. Minimize the number and size of landings as much as possible.
- **Size and duration of sale** and the anticipated season of harvest.

- **Floodways and wetlands** – Avoid encroaching on wetlands. Roadway and landing construction within floodways and wetlands may require Chapter 105 permits.
- **Water Control Structures** – Carefully plan the use of broad based dips (Section 8.E), waterbars (Section 8.B), culverts (Section 8.8A), and ditches to maintain existing flow patterns and minimize the amount of runoff being conveyed by roadways and roadside ditches.
- **NEVER SKID THROUGH OR ACROSS STREAM CHANNELS AND AVOID WETLANDS, SPRINGS OR SEEPS.**

7. RUNOFF

The amount of runoff from the timber harvest area and its upstream watershed area. You do not have to provide runoff calculations, unless you plan to use BMPs different from those described in Section 8. If you use different BMPs, your calculations must include an analysis showing any impact that runoff may have on existing downstream watercourses and their resistance to erosion.

8. DESCRIPTION OF EROSION AND SEDIMENT CONTROL MEASURES

The following standard BMP drawings and recommended spacings (Sections 8.A-8.L) have been provided to fulfill the requirements of this plan and satisfy Chapter 102 regulations. If you plan to use any of these recommended BMPs, please check the appropriate boxes for Sections A through L and include their location on the sketch map (Section 4). If you plan to use alternative BMPs, you must provide drawings showing the details, specifications and spacing (Section 7). The standards and construction details referenced are from the Department's *Erosion and Sediment Pollution Control Program Manual* (Document #363-2134-008, March 2012). Additional approved BMPs and specifications can be found at DEP's website, Keyword Search: E&S Resources.

Timber harvesting projects that require a Chapter 102 ESCP and occur within a special protection watershed or EV wetland will be required to implement nondischarge alternatives and antidegradation best available combination of technologies (ABACT) BMPs. Refer to Chapter 17 of the *Erosion and Sediment Pollution Control Program Manual* for more information.

A. Ditch Relief Culvert (Cross Drains)

Design Standards

- Minimum diameter for any culvert is 12"; otherwise culvert shall be sized for anticipated peak flow. Place culvert so bottom is at same level as bottom of ditch or adjoining slope. Culverts shall be placed with a slope of 2 to 4%. Lower end shall be at least 2" below upper end and at ground level.
- Extend culvert 12" beyond base of road fill on both sides. Firmly pack fill around culvert, especially the bottom half.
- Provide suitable outlet protection and, where appropriate, inlet protection.
- NOTE: This detail may be used for ditch relief culverts and for crossings of roadside ditches. It is not appropriate for stream crossings.
- For steep slope (>2H:1V) outfalls, a minimum 20 foot long R-5 apron is recommended for temporary access roads where the recommended culvert spacing is used. For permanent access roads, a minimum R-6 rock size is recommended.

Maintenance

- Inspect culvert(s) weekly; remove any flow obstructions and make necessary repairs immediately.

Will this BMP be used? Yes No

Will recommended spacing be used? Yes No

Table 1. Ditch relief culvert spacing for temporary access roads

Road Grade (% Slope)	Recommended Spacing (ft)	Alternative Spacing (ft)*
2	300	_____
3	235	_____
4	200	_____
5	180	_____
6	165	_____
7	155	_____
8	150	_____
9	145	_____
10	140	_____
12	135	_____

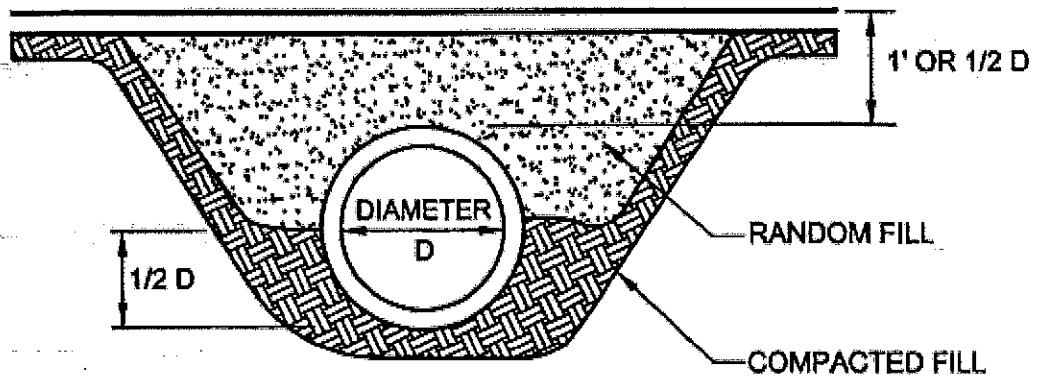
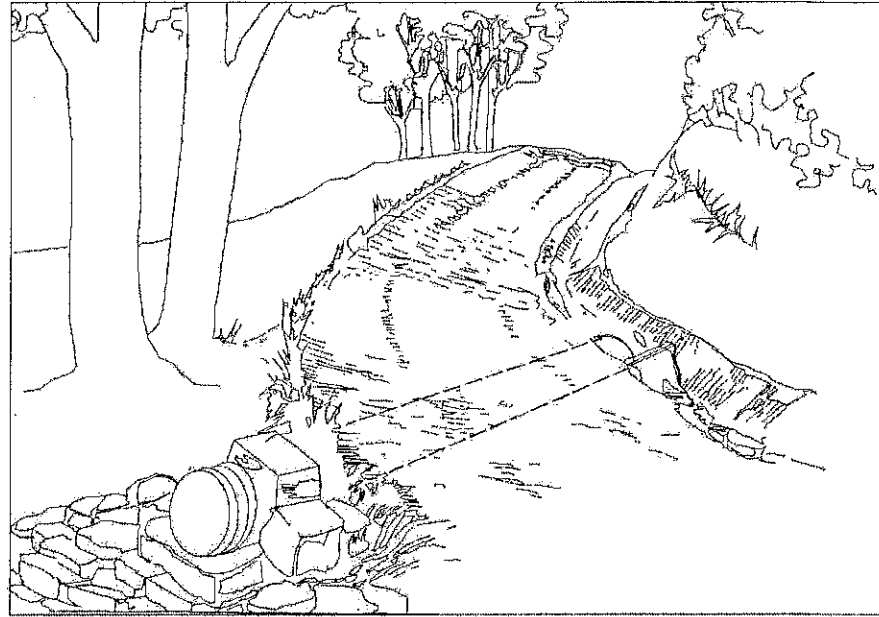
* If alternative spacings are used, please make sure reasons for their use are explained.

Table 2. Ditch relief culvert spacing for permanent access roads

Road Grade (% Slope)	Recommended Spacing (ft)	Alternative Spacing (ft)*
2	500	_____
4	400	_____
6	350	_____
8	300	_____
10	250	_____
12	200	_____
14	150	_____

* If alternative spacings are used, please make sure reasons for their use are explained.

Figure 1. Standard Construction Detail for Ditch Relief Culverts



B. Waterbars

Design Standards

- Waterbars are typically used to control stormwater runoff on retired access roads and skid trails. They are not recommended for active access roads or skid trails due to the difficulty of moving equipment over them as well as the need for continual maintenance due to damage from traffic.
- Where waterbars are not practical on active access roads or skid trails, other BMPs such as Water Deflectors (Section 8.D) or Broad-based Dips (Section 8.E) can be used to control runoff.
- Waterbars shall be placed at a slight angle to allow drainage and discharge to a stable area.

Maintenance

- Waterbars shall be inspected weekly (daily on active roads) and after each runoff event. Damaged or eroded waterbars shall be restored to original dimensions within 24 hours of inspection.
- Maintenance of waterbars shall be provided until roadway, skid road, or right-of-way has achieved permanent stabilization.
- Waterbars on retired roadways, skid roads, and right-of-ways shall be left in place after permanent stabilization has been achieved.
- Waterbars that need to be removed during operations should be replaced before leaving the site at the end of the day.

Will this BMP be used? Yes No

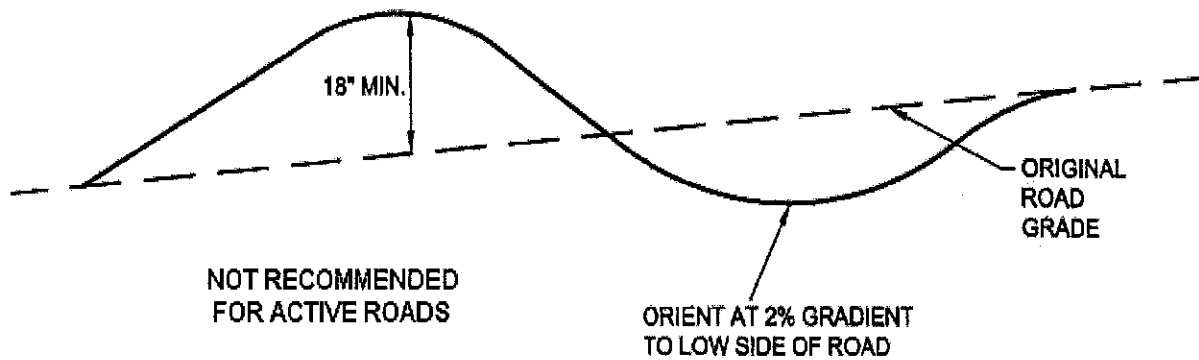
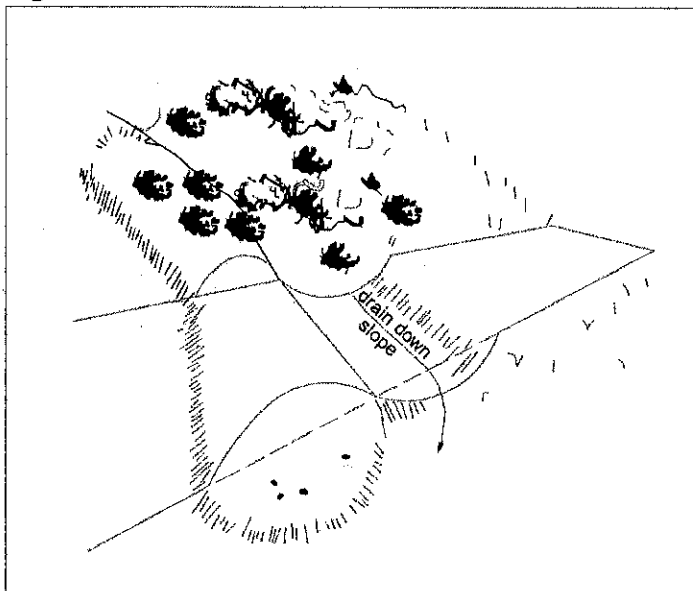
Will recommended spacing be used? Yes No

Table 3. Waterbar spacing

Road Grade (% Slope)	Recommended Spacing (ft)	Alternative Spacing (ft)*
0 - 5	250	_____
5 - 15	150	_____
15 - 30	100	_____
30 & above	50	_____

* If alternative spacings are used, please make sure reasons for their use are explained.

Figure 2. Standard Construction Detail for Waterbars



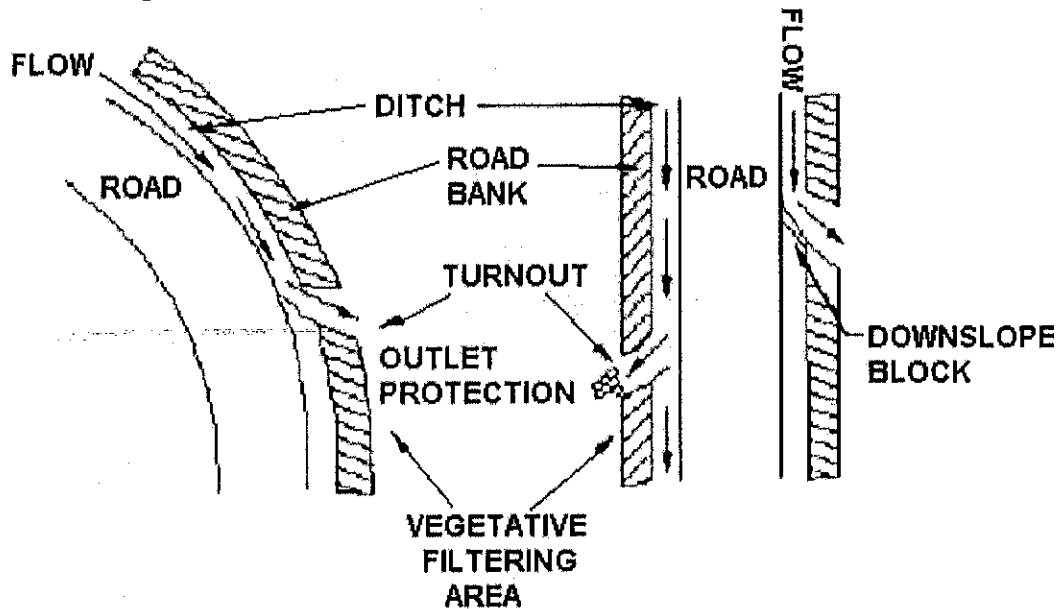
C. Turnouts

Design Standards

- Turnouts should be located so as to take advantage of natural drainage courses or filter strips whenever possible.
- An excavated sump at the end of the turnout can be effectively used to pond and settle out sediment prior to discharging to a vegetated buffer.
- Where a suitable filter strip is not available, a compost filter sock, rock filter or other sediment removal BMP should be installed at the outlet of the turnout.

Will this BMP be used? Yes No

Figure 3. Standard Construction Detail for Turnouts



D. Water Deflector

Design Standards

- Maximum spacing of deflectors shall be as shown in Table 4.

Maintenance

- Deflector shall be inspected weekly and after each runoff event.
- Accumulated sediment shall be removed from the deflector within 24 hours of inspection.
- Belt shall be replaced when worn and no longer effective.

Will this BMP be used? Yes No

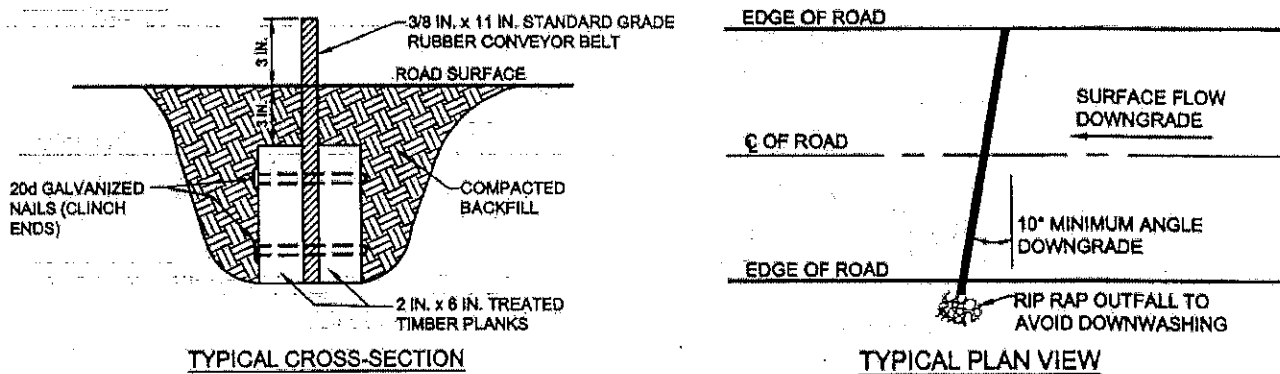
Will recommended spacing be used? Yes No

Table 4. Water Deflector Spacing

Road Grade (% Slope)	Recommended Spacing (ft)	Alternative Spacing (ft)*
< 2	300	_____
3	235	_____
4	200	_____
5	180	_____
6	165	_____
7	155	_____
8	150	_____
9	145	_____
10	140	_____

* If alternative spacings are used, please make sure reasons for their use are explained.

Figure 4. Standard Construction Detail for Water Deflectors



E. Broad-based Dips

Design Standards

- Broad-based dips shall be constructed to the dimensions shown and at the locations shown on the sketch map (Section 4).
- Dips shall be oriented so as to discharge to the low side of the roadway.
- Maximum spacing of broad-based dips shall be as shown in Table 5.

Maintenance

- Dips shall be inspected daily. Damaged or non-functioning dips shall be repaired by the end of the workday.

Will this BMP be used? Yes No

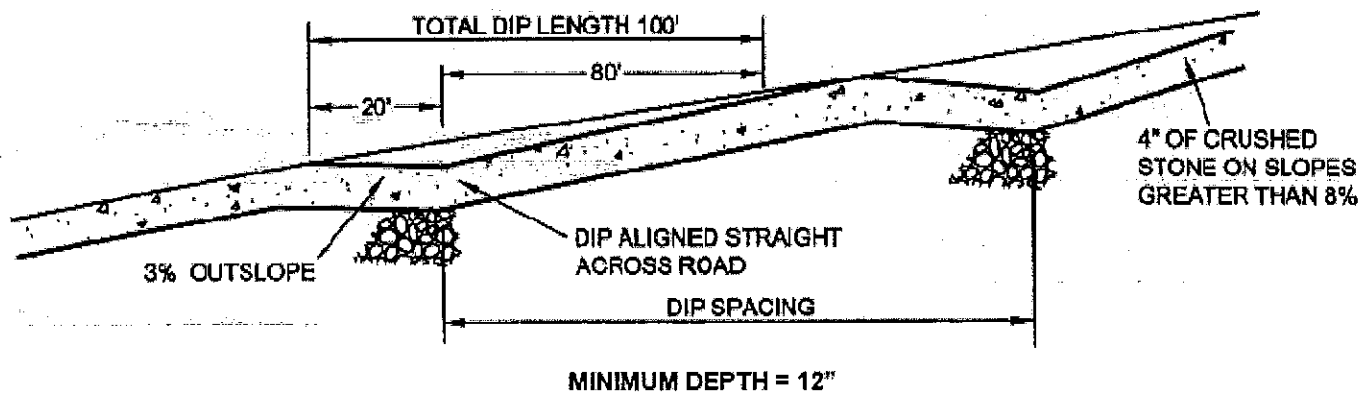
Will recommended spacing be used? Yes No

Table 5. Broad-based Dip Spacing

Road Grade (% Slope)	Recommended Spacing (ft)	Alternative Spacing (ft)*
< 2	300	_____
3	250	_____
4	200	_____
5	180	_____
6	170	_____
7	160	_____
8	150	_____
9	145	_____
10	140	_____

* If alternative spacings are used, please make sure reasons for their use are explained.

Figure 5. Standard Construction Detail for Broad-based Dips



F. Filter Strip

Design Standards

- A filter strip is a strip or area of vegetation used for removing sediment, organic matter, and other pollutants from runoff and wastewater.
- To be effective, runoff should be in the form of sheet flow and the vegetative cover should be established prior to the earth disturbance activity.
- The suitability of natural filter strips should be document by photo(s) as part of the plan.
- Meadow vegetation should be an existing, well-established, perennial grass.
- Forest filter strips consist of vegetation that is predominantly native trees, shrubs and forbs along surface waters that is maintained in a natural state or sustainably managed to protect and enhance water quality, stabilize stream channels and banks, and separate land use activities from surface waters. Trees can be harvested from forest filter strips, but should be winched or otherwise removed in a way that avoids soil disturbance within these areas. Log landings, haul roads and skid trails should be located outside of the filter strip except where stream crossing is necessary.

Maintenance

- If at any time, the width of the filter strip has been reduced by sediment deposition to half its original width, suitable replacement BMPs should be installed. The plan should specify what BMPs will be installed should this occur.

Will this BMP be used? Yes No

Will recommended spacing be used? Yes No

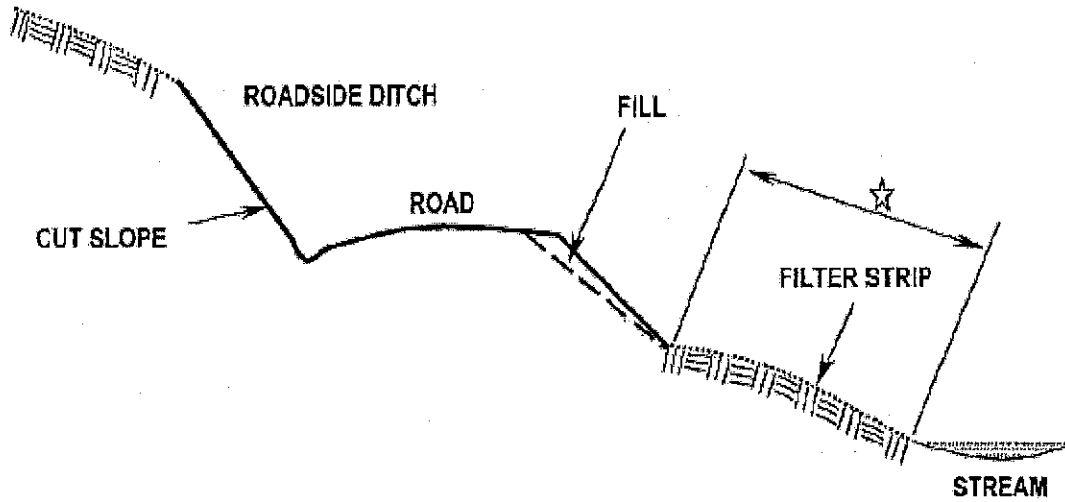
Table 6. Filter Strip Widths

Land Slope of Strip (%)	Recommended Width (ft) Meadow	Alternative Widths (ft)* Meadow	Recommended Width (ft) Forest**	Alternative Widths (ft)* Forest
≤ 10	50	_____	75	_____
20	65	_____	100	_____
30	85	_____	125	_____
40	105	_____	160	_____
50	125	_____	190	_____
60	145	_____	220	_____
70	165	_____	250	_____

* If alternative widths are used, please make sure reasons for their use are explained.

** Consideration should be given to placing a sediment barrier (e.g., wood chip berm, silt fence, straw bales, etc.) immediately below the disturbed area due to minimal sediment removal on typical forest floors.

Figure 6. Standard Construction Detail for Filter Strips



G. Silt Fence (Filter Fabric Fence)

Design Standards

- Fabric shall have the minimum properties as shown in Table 4.3 of the Department's *Erosion and Sediment Pollution Control Program Manual*.
- The maximum slope length above any silt fence shall not exceed that shown in Table 4.4 of the Department's *Erosion and Sediment Pollution Control Program Manual*.
- Fabric width shall be 30" minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes.
- Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment (see Figure 7).
- Fences should not be installed in streams, ditches or other areas of concentrated flow.

Maintenance

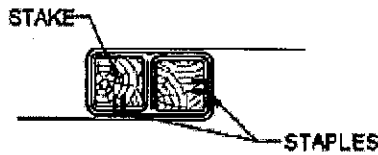
- Sediment shall be removed when accumulations reach half the aboveground height of the fence.
- Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet.
- Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

Will this BMP be used? Yes No

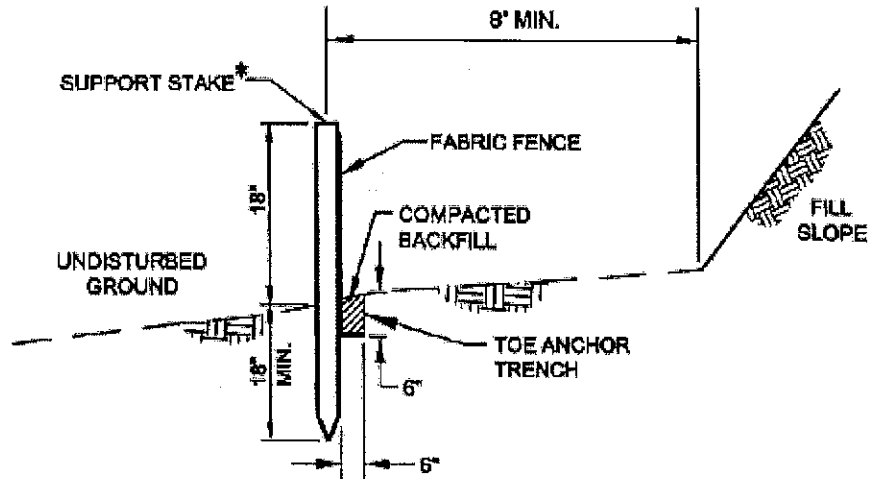
Will recommended spacing be used? Yes No

Figure 7. Standard Construction Detail for Silt Fence

*STAKES SPACED @ 8' MAX.
USE 2" X 2" (± 3/8") WOOD
OR EQUIVALENT STEEL
(U OR T) STAKES



JOINING FENCE SECTIONS



ELEVATION VIEW

H. Compost Filter Sock

Design Standards

- Sock fabric shall meet standards of Table 4.1, and compost shall meet the standards of Table 4.2 in the Department's *Erosion and Sediment Pollution Control Program Manual*.
- Compost filter sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (Figure 8). Maximum slope length above any sock shall not exceed that shown on Figure 4.2 in the Department's *Erosion and Sediment Pollution Control Program Manual*. Stakes may be installed immediately downslope of the sock if so specified by the manufacturer.

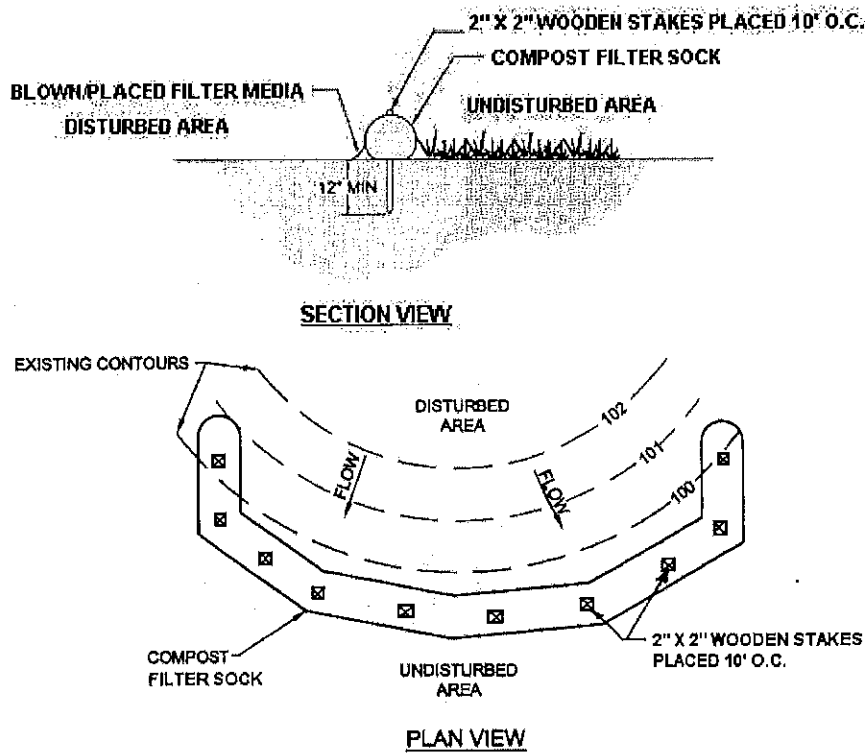
Maintenance

- Traffic shall not be permitted to cross filter socks.
- Accumulated sediment shall be removed when it reaches half the aboveground height of the sock and disposed in the manner described elsewhere in the plan.
- Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.
- Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.
- Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

Will this BMP be used? Yes No

Will recommended spacing be used? Yes No

Figure 8. Standard Construction Detail for Compost Filter Sock



I. Straw Bale Barrier

Design Standard

- The maximum slope length above any straw bale barrier shall not exceed that shown in Table 4.5 of the Department's *Erosion and Sediment Pollution Control Program Manual*.
- Straw bale barriers shall not be used for projects extending more than 3 months.
- Straw bale barriers shall be placed at existing level grade with ends tightly abutting the adjacent bales. First stake of each bale shall be angled toward adjacent bale to draw bales together. Stakes shall be driven flush with the top of the bale (see Figure 4.4 in the Department's *Erosion and Sediment Pollution Control Program Manual*). Both ends of the barrier shall be extended at least 8 feet up slope at 45 degrees to the main barrier alignment (see Figure 4.1 in the Department's *Erosion and Sediment Pollution Control Program Manual*).
- Compacted backfill shall extend approximately 4 inches above ground level.

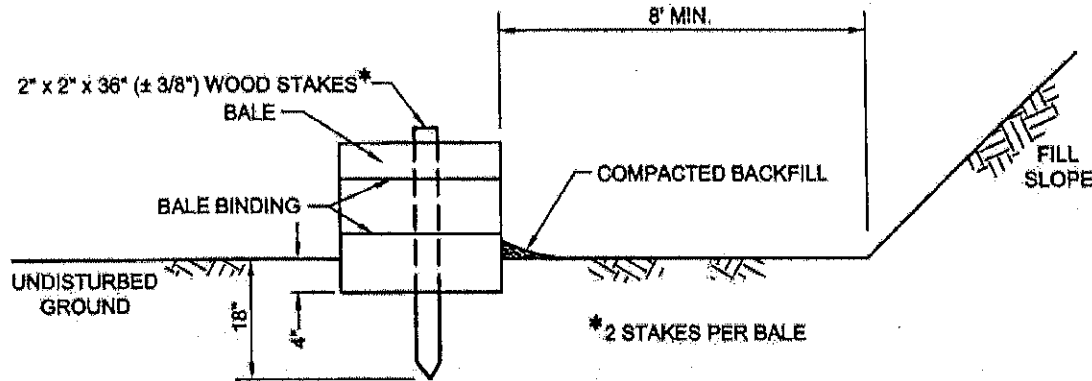
Maintenance

- Sediment shall be removed when accumulations reach 1/3 the aboveground height of the barrier. Damaged or deteriorated bales shall be replaced immediately upon inspection.
- Any section of straw bale barrier which has been undermined or topped shall be immediately replaced with a rock filter outlet.
- Bales shall be removed when the tributary area has been permanently stabilized.
- They should not be installed in streams, ditches or other areas of concentrated flow.

Will this BMP be used? Yes No

Will recommended spacing be used? Yes No

Figure 9. Standard Construction Detail for Straw Bale Barriers



J. Wood Chip Filter Berm

Design Standards

- The maximum slope length above any wood chip filter berm shall not exceed that shown in Table 4.5 of the Department's *Erosion and Sediment Pollution Control Program Manual*.
- Prior to placement of the berm, obstructions such as tree limbs, large rocks, etc. shall be removed.
- Wood chip filter berm shall be placed at existing level grade. Both ends of the berm shall be extended at least 8 feet up slope at 45 degrees to the main berm alignment (Figure 4.1 in the Department's *Erosion and Sediment Pollution Control Program Manual*). Wood chip berms shall not be located in areas of concentrated flow or used to construct sediment traps or other impoundments.

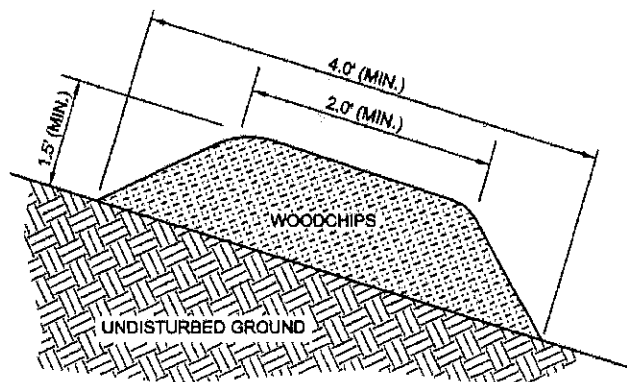
Maintenance

- Berms shall be inspected weekly and after each runoff event. Sediment shall be removed when accumulations reach half the height of the berm. Damaged or deteriorated portions of the berm shall be replaced immediately upon inspection.
- Berms may be leveled when the tributary area has been permanently stabilized or left in place.

Will this BMP be used? Yes No

Will recommended spacing be used? Yes No

Figure 10. Standard Construction Detail for Wood Chip Filter Berm



K. Rock Construction Entrance

Design Standards

- A rock construction entrance should be installed wherever it is anticipated that construction traffic will exit the project site onto any roadway, public or private.

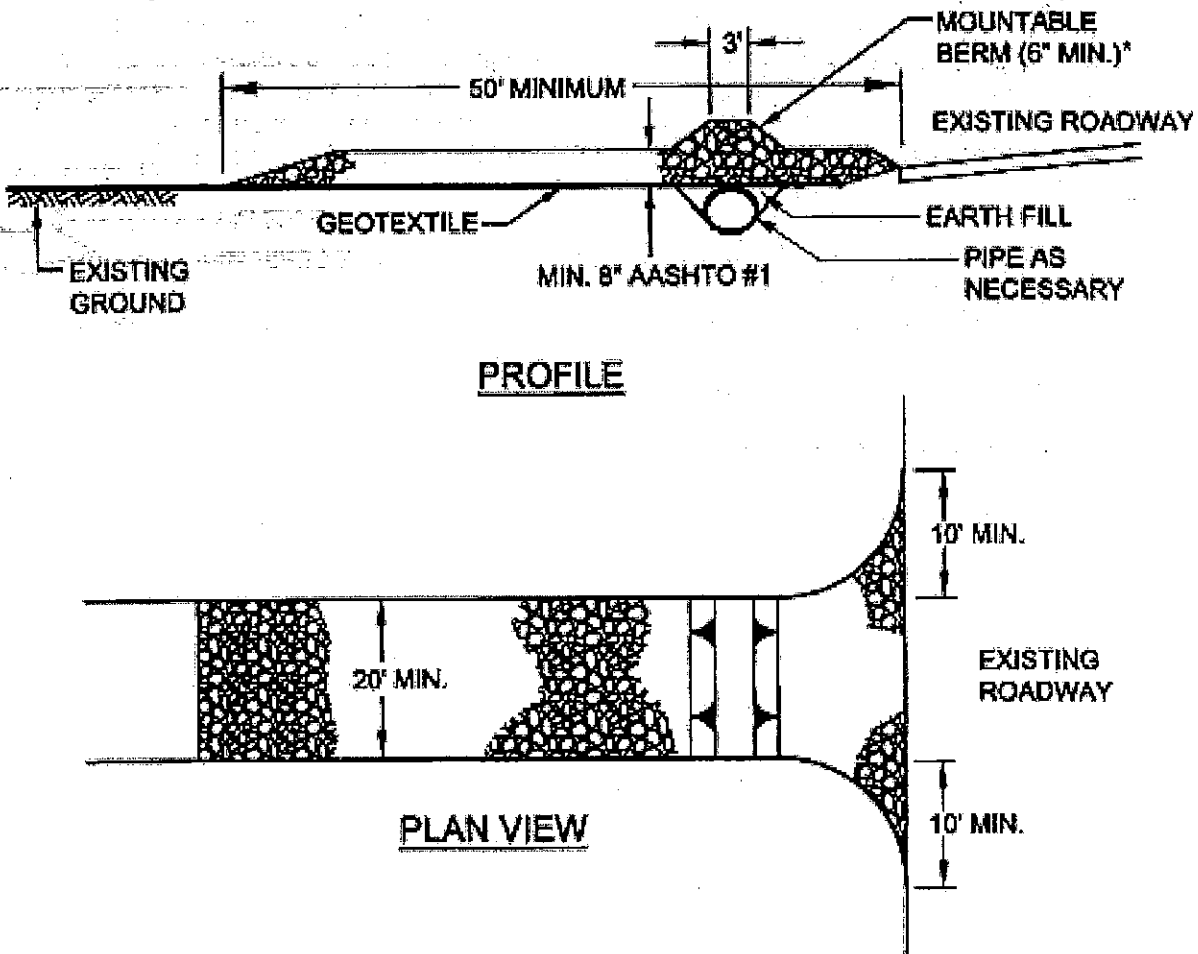
- A geotextile underlayment could be placed over the existing ground prior to placing the stone to prevent stone from being driven into the ground.
- Remove topsoil prior to installation of rock construction entrance. Extend rock over full width of entrance.
- Runoff shall be diverted from roadway to a suitable sediment removal BMP prior to entering rock construction entrance.
- Mountable berm shall be installed wherever optional culvert pipe is used and proper pipe cover as specified by manufacturer is not otherwise provided. Pipe shall be sized appropriately for size of ditch being crossed.

Maintenance

- Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile shall be maintained on site for this purpose. All sediment deposited on paved roadways shall be removed and returned to the construction site immediately. If excessive amounts of sediment are being deposited on roadway, extend length of rock construction entrance by 50 foot increments until condition is alleviated or install wash rack. Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

Will this BMP be used? Yes No

Figure 11. Standard Construction Detail for Rock Construction Entrance



* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

L. Disturbed Area Stabilization (check as appropriate)

	Seeding ^{1,2}	Natural Vegetation ²
Haul Roads ³	<input type="checkbox"/>	<input type="checkbox"/>
Skid Roads ³	<input type="checkbox"/>	<input type="checkbox"/>
Landings ³	<input type="checkbox"/>	<input type="checkbox"/>

¹ Areas to be seeded may require fertilization and liming. Soil testing will provide individualized recommendations for given sites. Recommendations of 500 lbs. of 10-10-10 fertilizer per acre and 2,000 lbs. of lime per acre should be considered to ensure 70% vegetative cover.

² Stabilization of disturbed areas is important. Disturbed areas shall be protected with such BMPs as straw bale barriers, filter fences, mulch, or filter strips, waterbars and other BMPs until vegetation is established. Critical areas such as: highly erodible soils, approaches to stream crossings and landings require establishment of permanent or temporary cover to ensure that erosion does not occur.

³ Indicates treatment for individual landings, haul roads or sections, and skid roads identified on the map.

Seed mix and seeding rate to be used on critical areas. Critical areas are defined as that part of the disturbed area which poses the greatest threat of sediment pollution to a receiving water; such as within floodways, within 50 ft of a wetland, slopes 3H:1V or steeper and erodible soils.(refer to Tables 7 & 8):

Table 7. Recommended Seed Mixtures ¹

Mixture Number	Species	Seeding Rate - Pure Live Seed ²	
		Most Sites	Adverse Sites
1 ³	Creeping red fescue, or	20	25
	Kentucky bluegrass, plus	20	25
	Redtop ⁴ , or	3	5
	Perennial ryegrass	15	20
2	Birdsfoot trefoil, plus	6	10
	Tall fescue	20	25
3	Orchardgrass, plus	15	20
	Perennial ryegrass, plus	15	20
	Birdsfoot trefoil	6	10
4 ⁵	Switchgrass, or	10	15
	Indiangrass, plus	10	15
	Partridge pea	5	10
5 ⁶	Birdsfoot trefoil, plus	6	10
	Timothy, or	20	25
	Perennial ryegrass	20	25

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

¹ Seed and mulch disturbed areas with recommended seed mixtures appropriate for site conditions and further identified in Tables 11.3, 11.4 and 11.5 of the Department's Erosion and Sediment Pollution Control Program Manual

² PLS is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds PLS shown on the seed tag. Thus, if the PLS content of a given seed lot is 35%, divide 12 PLS by 0.35 to obtain 34.3 pounds of seed required to plant one acre. All mixtures in this table are shown in terms of PLS.

³ This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.

⁴ Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds mix with equal parts sand or cat litter to ensure even spreading.

⁵ This mix contains only species that are native to Pennsylvania.

⁶ Do not mow shorter than 9 to 10 inches.

Table 8. Recommended Seed Mixtures for Stabilizing Disturbed Areas

Site Condition	Nurse Crop ¹	Seed Mixture (Select one mixture)
Slopes and Banks (not mowed) Well-drained Variable drainage	1 plus 1 plus	1, 2, 3, 4 or 5 1, 3 or 5
Slopes and Banks (mowed) Well-drained	1 plus	1 or 2
Slopes and Banks (grazed/hay) Well-drained	1 plus	3, 4 or 5
Gullies and Eroded Areas	1 plus	1 or 2
Erosion Control Facilities (BMPs)		
• Sod waterways, spillways, frequent water flow areas	1 plus	1 or 2
• Drainage ditches		
• Shallow, less than 3 feet deep	1 plus	1, 2 or 5
• Deep, not mowed	1 plus	1 or 2
• Pond banks, dikes, levees, dams, diversion channels, and occasional water flow areas		
• Mowed areas	1 plus	1, 2 or 3
• Non-mowed areas	1 plus	4 or 5
• For hay or silage on diversion channels and occasional water flow areas	1 plus	2 or 9

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

¹ Nurse Crops should be added to all mixes to improve soil stabilization and increase the chance of establishment. Nurse crops can be mixed in with the desired seed mix. When using in combination with another mix, they should be applied at a rate of 1 bushel (~30lbs) per acre. If used alone on a site, they should be applied at 2 bushels (~60lbs) per acre. Use Spring oats (*Avena fatua*) if seeding prior to August 15th and use Winter rye (*Secale cereale*) if seeding after August 15th. Annual rye (*Lolium multiflorum*) may be used instead of oats or winter rye if desired.

9. NATURAL GEOLOGIC FORMATIONS OR SOIL CONDITIONS THAT HAVE THE POTENTIAL TO CAUSE POLLUTION

This section addresses soils or geologic formations containing minerals in sufficient quantities that could result in discharges which do not meet water quality standards. All locations of known such instances should be noted on the plan, and appropriate measures taken to minimize impacts to those locations. This can include, but is not limited to, pyritic materials and slide-prone soils.

Will the timber harvest impact soils and geologic formations that could result in a pollution event?

Yes No

If the answer is yes, additional information must be included in the plan to address these features. This could include contingency plans, disposal plans, and treatment plans, dependent on the type of impact.

10. THERMAL IMPACTS TO SURFACE WATERS

This section addresses maintaining ambient temperature of Waters of the Commonwealth from impacts, primarily those associated with the removal of vegetation through timber harvesting activities which could cause detrimental impacts to aquatic resources. The best site practice/BMP to address thermal pollution is the maintenance or creation of a filter strip (Section 8.F) on surface waters and maintenance of vegetation in wetlands.

Will the timber harvest create thermal impacts to Waters of the Commonwealth, including cold water fisheries, wilderness trout streams, and exceptional value wetlands? Yes No

If the answer is yes, additional information must be included in the plan to address these features. This could include treatment and/or mitigation plans, dependent on the type of impact.

11. SCHEDULE AND SEQUENCE OF OPERATIONS

Starting Date _____ Completion Date _____

Pre-harvest: Necessary permits will be obtained. Erosion and sediment control BMPs will be installed as specified in this plan. Haul road, landings and skid roads will be constructed.

During harvest: Erosion and sediment control BMPs for haul roads, skid roads and landings shall be maintained. Tops, branches and slash will be removed from ponds, lakes and streams. This plan will be amended or revised to include other BMPs for special or unanticipated circumstances that may occur.

Post-harvest: Smooth and reshape roads and landings. Remove culverts and crossings. Install permanent waterbars as specified in this plan. Critical areas will be seeded, fertilized, limed and mulched and garbage/trash removed from the area.

If this schedule and sequence of operations will not be used, please provide additional information in Section 14.

12. MAINTENANCE

- BMPs will be inspected on a weekly basis and after each stormwater event.
- Written documentation of these inspections and any maintenance/repairs/replacements will be recorded.
- Follow the maintenance criteria for each BMP listed in Section 8.
- Protection should be maintained around seeps soaks and springs near earth disturbance areas.
- Haul roads and skid roads will be repaired where signs of accelerated erosion are detected.
- Seeding and mulching will be repeated in those areas that appear to be failing or have failed.
- Material removed from BMPs should be placed outside any floodways, wetlands, or Waters of the Commonwealth.

Other (describe)

Other party assigned to be responsible for construction and maintenance of the E&S BMPs

_____		_____	_____
Name		Home Phone	Work Phone

Street Address			
_____		_____	
City	State	Zip Code	Signature of person(s) responsible

13. SITE CLEANUP

Describe procedures which ensure the proper handling, storage, control, disposal and recycling of timber harvesting materials and waste, including but not limited to fuels, oil, lubricants and other materials brought to the timber harvest site or used in the process of timber harvesting.

- Garbage, fuels or any substance harmful to human, aquatic or fish life, will be prevented from entering springs, streams, ponds, lakes, wetlands or any water course or water body.
- Oils, fuels, lubricants and coolants will be placed in suitable containers and disposed properly.
- All trash and garbage will be collected and disposed properly.
- Preparedness, Prevention and Contingency (PPC) Plan prepared for the site.
- Other (describe):

Emergency Contact Numbers:

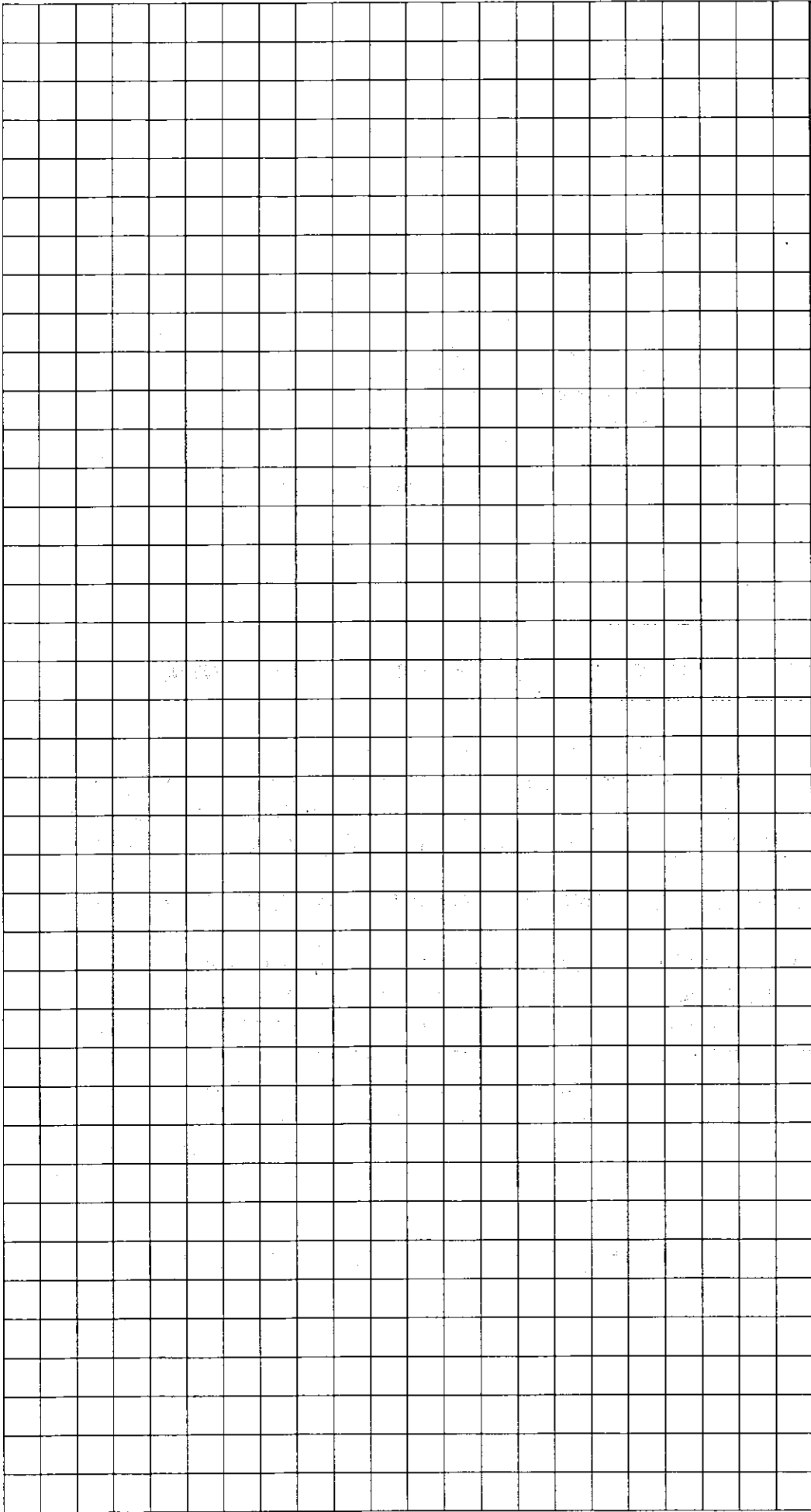
DEP:

PA Fish & Boat Commission:

Municipality:

Other:

14. ADDITIONAL EXPLANATION/COMMENTS (if needed)



Sketch Map Requirements
The following should be clearly shown on the sketch map:

- Dimensions (limits of harvest)
- North arrow
- Landings
- Haul and Skid Roads
- Cuts and fills for roads and landings
- Existing Roads
- E&S BMP Installation Locations
- Wetland & Stream Crossings
- Equipment Maintenance & Fueling Areas

PUBLIC ROAD ———
STREAM ...
PROPERTY BOUNDARY - - - -
SLOPE %

WATERBAR --W--
DIVERSION --D--
NORTH ARROW N

SKID ROAD ———
SKID TRAIL - - - - -
TURN-OUT

LANDING AREA

APPX. SCALE: 1" =

CULVERT

STRAW BALE BARRIER

FILTER FABRIC FENCE

ROCK FILTER BERM

LIMIT OF DISTURBANCE - - - - -
COMPOST SOCK ---CS---
WOODCHIP BERM ---WCB---

VEGETATED FILTER

ROCK CONSTRUCTION ENTRANCE

WETLANDS

POND

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-88925/363-2134-008.pdf>

This guide was developed in effort to assist landowners and consultants in the harvesting of timber from a property. This guide contains common BMPs for Timber Harvest Activities. A basic understanding of the principles of Erosion and Sediment Control (and environmental protection) will prove beneficial to anyone utilizing this guide for the purpose of submitting an E&S plan for review. The introduction section of the Erosion and Sediment Pollution Control Program Manual (web address above) is recommended reading for those not familiar with the program and its principles. Further information pertaining to the Clean Stream Laws and Environmental Protection can be found at the following web address

<http://www.pacode.com/secure/data/025/chapter102/chap102toc.html>

This guide references other sources of information that may need to be utilized in performing due diligence for your project and providing complete and accurate information for adequacy reviews. The Berks County Conservation District Website (below) provides additional sources of information (standard notes) that will need to be utilized to submit a complete submission.

<http://berkscd.com/erosion-and-sediment-control-2/>

For more information about Erosion and Sediment Control contact:

**Berks County Conservation District
1238 County Welfare Road
Leesport, PA 19533
Telephone: 610-372-4657
FAX: 610-478-7058
<http://berkscd.com/>**