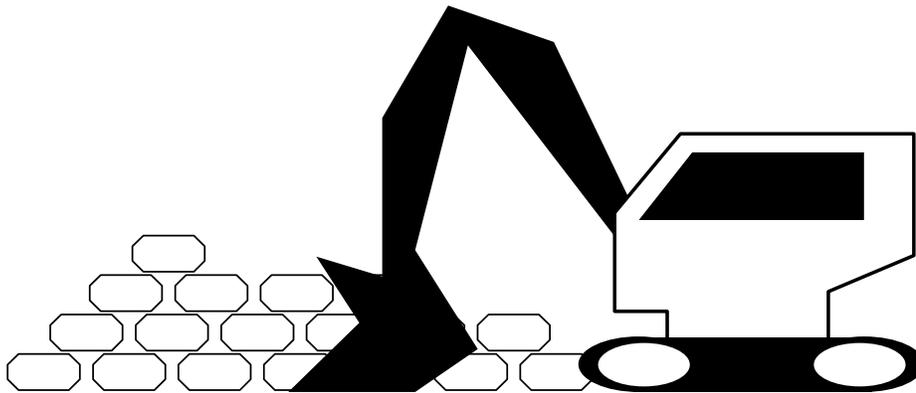


# UNDERGROUND UTILITY LINE CONSTRUCTION

## TYPICAL EROSION & SEDIMENT BMP's



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATERSHED MANAGEMENT  
HARRISBURG, PENNSYLVANIA

August 1, 2001



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**DEPARTMENT OF ENVIRONMENTAL PROTECTION**  
**BUREAU OF WATERSHED MANAGEMENT**

**DOCUMENT NUMBER:** 363-2134-012

**TITLE:** Underground Utility Line Construction Typical Erosion and Sediment Controls

**EFFECTIVE DATE:** August 1, 2001

**AUTHORITY:** Pennsylvania Clean Stream Law (35 P.S. §691.1 et seq.) and regulations at 25 Pa. Code Chapter 102.

**POLICY:** It is the policy of the Department of Environmental Protection (DEP) to provide guidance and procedures for those engaged in earth disturbance activities on ways to minimize accelerated erosion and resulting sediment pollution to the waters of the Commonwealth.

**PURPOSE:** The purpose of this guidance is to tell those engaged in earth disturbance activities related to underground utilities how to comply with Chapter 102 rules and regulations.

**APPLICABILITY:** This guidance applies to all those engaged in underground utility earth disturbance activities in the Commonwealth of Pennsylvania.

**DISCLAIMER:** The guidance and procedures outlined in this document are intended to summarize existing requirements. The policies and procedures herein are not an adjudication or regulation. There is no intent on the part of DEP to give this document that weight or deference. The guidance and procedures merely summarize how and on what basis DEP will administer and implement its responsibilities with respect to erosion and sediment control on earth disturbance sites. DEP reserves the discretion to deviate from the guidance and procedures in this document if circumstances warrant.

**PAGE LENGTH:** 42 pages

**LOCATION:** Volume 32, Tab 29

**DEFINITIONS:** See 35 P.S. §691.1 and 25 Pa. Code Chapter 102 & 102.1.

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## 1. INTRODUCTION

A. Background – Pennsylvania’s Erosion and Sediment Pollution Control Program has been developed under the authority of The Clean Streams Law, Act 393, P.L. 1987, passed on June 22, 1937, and amended through October 10, 1980 by Act 157. Under Section 402 of this law (Potential Pollution), rules and regulations were authorized and adopted by the Environmental Quality Board to implement the requirements of the act. These rules and regulations are found in Chapter 102 of the Administrative Code, Title 25, of the Pennsylvania Department of Environmental Protection (Department).

B. Chapter 102 – Section 102.2 of Chapter 102 requires persons conducting earth disturbance activities to develop, implement and maintain Best Management Practices to minimize the potential for accelerated erosion and sedimentation. A written Erosion and Sediment Control Plan is required where the earth disturbance is 5000 square feet or more or if the earth disturbance occurs in a Special Protection Watershed.

Chapter 102 is the technical standard for the review of the NPDES permit applications. Questions pertaining to Chapter 102 and the NPDES permitting program should be directed to the appropriate Department of Environmental Protection Regional Office or county conservation district.

Administration of the Erosion and Sediment Pollution Control Program is the responsibility of the Pennsylvania Department of Environmental Protection. Under Section 102.41 of its regulations, the Department may delegate portions of those responsibilities to county conservation districts, provided the district has adequate and qualified staff to review erosion and sediment control plans. The Department delegates these responsibilities to county conservation districts at one of three levels. The three levels are as follows:

Level I Program Administration

- Conduct educational programs
- Receive and refer complaints to the appropriate agency
- Issue newsletters and newspaper articles on the programs

Level II Program Compliance

- Level I duties
- Conduct site assessments and complaint investigations
- Inspect earthmoving activities
- Process permits
- Conduct erosion and sediment control technical plan reviews

Level III Program Enforcement  
Level I and II duties  
Initiate and resolve enforcement actions

The Pennsylvania Department of Environmental Protection is responsible for the administration of the National Pollutant Discharge Elimination System (NPDES) federal stormwater permitting program for construction activities affecting five or more acres of land over the life of the project. The Department has delegated responsibility of this program to many of the county conservation districts. NPDES permit applications “for discharges of stormwater from construction activities” should be submitted to the county conservation district in which the project is located if they have the NPDES delegation agreement with the Department. Otherwise, the NPDES permit application should be submitted to the Department Regional Office having that county responsibility. After the NPDES permit is issued and earth disturbance activities commence, the delegated county conservation district or appropriate Regional Office will conduct regular earth disturbance inspections of the site. Information concerning a particular county conservation district (or districts) is available from the Department’s regional office that serves that particular county.

C. Department of Environmental Protection  
Regional Offices – Soils and Waterways Section

<u>Regional Office</u>	<u>County Responsibility</u>
Northcentral Regional Office Soils & Waterways Section 208 West 3 <sup>rd</sup> Street Williamsport, PA 17701 570-327-3574	Bradford, Cameron, Centre, Clearfield, Clinton, Columbia Lycoming, Montour, Northumberland Potter, Snyder, Sullivan, Tioga & Union
Northeast Regional Office Soils & Waterways Section 2 Public Square Wilkes-Barre, PA 18711-0790 570-826-5485	Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming
Northwest Regional Office Soils & Waterways Section 230 Chestnut Street	Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson,

Meadville, PA 16335-3481  
814-332-6942

Lawrence, McKean,  
Mercer, Venango, Warren

Southcentral Regional Off.  
Soils & Waterways Section  
909 Elmerton Ave., 2<sup>nd</sup> Fl.  
Harrisburg, PA 17110-8200  
717-705-4707

Adams, Bedford,  
Berks, Blair,  
Cumberland, Dauphin  
Franklin, Fulton,  
Huntingdon, Juniata Lancaster,  
Lebanon, Mifflin, Perry, York

Southeast Regional Office  
Soils & Waterways Section  
Suite 6010, Lee Park  
555 North Lane,  
Conshohocken, PA  
19428-2233  
610-832-6130

Bucks, Chester,  
Delaware,  
Montgomery,  
Philadelphia

Southwest Regional Office  
Soils & Waterways Section  
400 Waterfront Drive  
Pittsburgh, PA 15222-4745  
412-442-4000.1

Allegheny, Armstrong,  
Beaver, Cambria,  
Fayette, Greene,  
Indiana, Somerset  
Washington, Westmoreland

Penna. Dept. of Environmental Protection  
Bureau of Watershed Management  
Division of Waterways, Wetlands & Erosion Control  
PO Box 8775  
Harrisburg, PA 17105-8775  
Phone No. 717-787-6827

## **2. GENERAL**

Earth disturbance activities that include exposed trench excavations and trench spoil piles have high potential for accelerated erosion and sediment pollution. Open trenches or their spoil piles may serve to intercept storm runoff, introduce or increase sediment to the runoff and convey the sediment-laden runoff to site boundaries or waterways. Access road stream crossings and utility line stream crossings also have high potential for sediment pollution. Some important erosion and sediment control considerations for utility line construction are: limiting the area of earth disturbance, limiting the time of exposure of disturbed areas, intercepting and removing runoff from exposed slopes at regular specified intervals, and properly conveying concentrated flows across disturbed areas.

The eleven items in the Department's Chapter 102, Section 102.4(b)(5), must be considered and included in the Erosion and Sediment Control Plan. They are as follows:

- A. The existing topographic features of the project site and the immediate surrounding area.
- B. The types, depth, slope, locations, and limitations of the soils.
- C. The characteristics of the earth disturbance activity, including the past, present, and proposed land uses and the proposed alteration to the project site.
- D. The amount of runoff from the project area and its upstream watershed area.
- E. The location of waters of the Commonwealth which may receive runoff within or from the project site and their classification pursuant to Chapter 93.
- F. A written depiction of the location and types of perimeter and on-site Best Management Practices used before, during and after the earth disturbance activity.
- G. A sequence of Best Management Practices installation and removal in relation to the scheduling of earth disturbance activities, prior to, during, and after earth disturbance activities.
- H. Supporting calculations.
- I. Plan drawings.
- J. A maintenance program which provides for inspection of Best Management Practices on a weekly basis and after each measurable rainfall event, including the repair of the BMP's to ensure effective and efficient operation.
- K. Procedures, which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site, will be undertaken in accordance with Department regulations.

The term "E. & S.C. Plan" as used herein means "Erosion and Sediment Control Plan."

The term "Manual" as used herein refers to the Pennsylvania Department of Environmental Protection "Erosion and Sediment Pollution Control Program

Manual,” No. 363-2134-008 (March, 2000), as amended and updated, unless otherwise noted.

The term “Department” as used herein refers to the Pennsylvania Department of Environmental Protection unless otherwise noted.

The term “BMP” as used herein means “Best Management Practice.”

### **3. PERMIT REQUIREMENTS**

Prior to the commencement of construction that includes earth disturbance activities that disturb 5 acres or more, a “National Pollutant Discharge Elimination System (NPDES) Permit for Discharge of Storm Water from a Construction Activity” must be obtained from the Department.

Prior to the start of any stream crossing or wetland crossing with an access road, utility line, etc., a Chapter 105 water obstruction/encroachment permit(s) must be obtained from the Department.

Department approval for the discharge of water used for hydrostatic testing may be required. Department approval for the source of water for the hydrostatic testing may also be required if the water source is a stream, river or waterbody.

A permit from the Pennsylvania Fish and Boat Commission (phone 717-657-4518) is required for in-stream blasting and for draining certain water impoundments.

Highway occupancy permits for utility line crossings of state highways are required from the PA Department of Transportation (phone 717-787-2838). A permit may also be needed where proposed access roads enter/leave a state highway.

Utility lines that cross or are within the right-of-way of a local municipal street or road may require a permit from the local municipality.

The “Pennsylvania One Call System, Inc.” (phone 1-800-242-1776) should be contacted prior to any trenching.

Other underground utility line construction activities may require a permit or permits or other approval. It is the responsibility of the underground utility line owner and/or the utility line contractor to determine all of the permits that are required and to secure these permits prior to commencing the construction activity.

#### **4. SPECIAL PROTECTION WATERS**

Earth disturbance activities within the watersheds of special protection waters (High Quality and Exceptional Value) shall incorporate special protection BMP's in accordance with Chapter 102, Section 102.4(b)(6). The Department's Chapter 93 "Water Quality Standards" designates the streams/rivers that are "High Quality" or "Exceptional Value."

#### **5. POTABLE WATER SUPPLY WATERSHEDS**

Where earth disturbance activities will occur within any potable water supply watershed, such watershed(s) should be identified on the plan maps and addressed in the narrative. Any streams, watercourses or ditches that will be crossed or impacted by the earth disturbance activity should be identified and addressed. The water purveyor(s) and their responsible contact person(s) should be identified (name, address, phone number, etc.) in the E. & S.C. Plan.

The water purveyor(s) should be notified at least 72 hours in advance of any earth disturbance activity within their watershed(s).

Hazardous materials should not be stored within any potable water supply watershed.

It is recommended that the water purveyor(s) be contacted during the design phase of the erosion and sediment controls for the project. Information on the location of potable water systems can be obtained from the DEP Regional Office with jurisdiction.

#### **6. SEQUENCE OF BMP INSTALLATION**

The sequence of BMP installation and removal of temporary BMP's (in relation to earth disturbance activities) in the erosion and sediment control plan should be followed. The sequence of BMP installation should require the installation of each BMP before the BMP is needed.

The following suggested sequence of BMP installation is provided for general guidance and is not applicable to all underground utility line projects. Usually, a rock construction entrance(s) for access to and from paved areas will be needed as one of the first items.

A. Rock construction entrance(s)

- B. Access road crossing(s) of paved road(s)
- C. Access road to utility construction site (sequence of BMP installation for this access road itself may be needed).

An access road along the proposed utility line will be needed unless the utility line is to be constructed in or along an existing roadway. If this access road crosses an existing paved road, stream, wetland, or swale/ditch/channel/waterway; then one or more of the following should be provided:

- D. Access road stream crossing(s) with pipe culvert(s) or bridge(s).
- E. Access road wetland crossing(s)
- F. Access road crossing(s) of a swale/ditch/channel /waterway

As areas are disturbed for the access road parallel to the utility line, there will be a need to control and treat runoff from these disturbed areas with the use of slope breakers, interceptor dikes, water bars, etc., and possibly sediment barriers in some areas.

- G. Install temporary slope breakers (interceptor dikes, water bars, etc.)
- H. Install filter fabric fence, reinforced filter fabric fence, straw bale barriers, rock filters.

After access to and along the proposed utility line has been provided together with the BMP's for the access (road) and other disturbed areas, general clearing and grubbing of the right-of-way for utility line trenching may commence.

- I. Excavate utility line trench
- J. String pipe (or other utility line materials) along trench.
- K. Install or provide BMP's for pumped water.
- L. Install utility line in trench
- M. Install trench breakers/trench plugs.
- N. Backfill trench

- O. Install permanent slope breakers (interceptor dikes, water bars, etc.)
- P. Install utility line wetland crossing(s).
- Q. Install utility line stream crossing(s) and install stream bank stabilization.
- R. Install storm inlet protection for utility line highway/roadway crossings (if required) and install utility line highway/roadway crossing(s).
- S. Apply lime, fertilizer, seed and mulch to all disturbed areas.
- T. Install erosion control blanket(s) on steep slopes
- U. After permanent stabilization is achieved, remove temporary erosion and sediment controls.

NOTE: Steps "P" through "T" should be installed in the order that best suits site conditions.

## 7. **BEST MANAGEMENT PRACTICES**

- A. Limiting Exposed Areas – "Earth disturbance activities shall be planned and conducted to minimize the extent and duration of the disturbance." [Section 102.4(b)(4)].

The length of time for constructing access roads, utility line trenching, trench back-filling, final grading and cleanup should be kept to a minimum. Good planning and scheduling of the various utility construction items, together with timely availability of materials, adequate equipment, and adequate manpower, will help reduce the time of exposure of disturbed land.

Pipelines with joints that allow a manufactured length of pipe to be placed in the trench with the pipe joint assembled/made in the trench require an open pipeline trench that is only slightly longer than the length of pipe being installed. The total length of excavated trench open at any one time should not be greater than the total length of pipeline/utility line that can be placed in the trench and back-filled in one working day. No more than 50 lineal feet of open trench should exist when pipeline/utility line installation ceases at the end of the workday.

Large diameter steel pipelines with welded joints where the pipe joints are welded while the pipe is out of the trench usually require a fairly long length of

open pipeline trench. The total time of earth exposure for this type of pipeline construction, including the access roadway parallel to the pipeline, should generally be limited to no more than 60 calendar days at any given point along the pipeline. This means, for example, that from the time that earth disturbance activities commence at Station 1+00 until final grading is completed and soil supplements, seed, and mulch are applied at Station 1+00, no more than 60 calendar days should expire.

#### B. Swale/Ditch/Channel/Waterway Crossings

Adequately sized pipe culverts should be installed for access roads at all locations where access roads cross a swale/ditch/channel or waterway whether or not flowing water is encountered. Where the utility line trench crosses a swale/ditch/channel or waterway with flowing water, then a temporary pipe culvert properly "sand bagged" should be installed prior to the trenching operation and maintained until the utility line is installed, the trench backfilled, and the swale/ditch/channel or waterway is restored and stabilized. Where a utility line crosses a "dry" swale/ditch/channel or waterway and the excavated trench must remain open for more than one working day, then a temporary pipe culvert properly "sand bagged" should be installed and maintained until the swale/ditch/channel or waterway is restored and stabilized. Flowing water needs to be properly handled where utility lines cross streams or wetlands.

#### C. Channel and Streambank Stabilization

Adequate stream bank stabilization must be provided at all locations where stream banks are disturbed. The stream bank stabilization should be designed to withstand the anticipated water flow velocities or the maximum anticipated shear stress. All existing swales/ditches/ channels or waterways that are disturbed need to be stabilized to withstand anticipated water flow velocities or maximum anticipated shear stress when they are reopened. Proposed ditches and channels should be provided with adequate stabilization to withstand design flow velocities or maximum anticipated shear stress when they are installed.

#### D. Permanent Stabilization

"Upon completion of an earth disturbance activity or any stage or phase of an activity, the site shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation" [Section 102.22(a)].

The installation of pavement, rock rip rap or gabions are some examples of stabilization. The standard for vegetative cover as stabilization is perennial

vegetation that is established with a uniform coverage or density of 70% across the disturbed area. The application of lime, fertilizer, seed, and mulch is usually done to achieve permanent stabilization. The mulch is considered to be an interim stabilization measure to assist in the establishment of the permanent vegetative cover.

#### E. Interim Stabilization

Temporary seeding with mulch cover for interim stabilization is a type of BMP that can usually be provided where the earth disturbance activity temporarily ceases.

The installation of an erosion control blanket or application of mulch upon seeded areas are both considered to be interim stabilization BMP's to protect the seedbed until vegetation is established.

#### F. Slope breakers/interceptor dikes/water bars

Temporary slope breakers/interceptor dikes/water bars should be installed across disturbed areas (access road, etc.) of the utility line right-of-way on all slopes greater than 5% to collect the runoff from the disturbed areas and to discharge this runoff to well vegetated areas for removal of sediment.

In conjunction with final grading, permanent slope breakers/interceptor dikes/water bars should be installed across the entire right of way on all slopes greater than 5% and discharge into well-vegetated areas. Permanent slope breakers/interceptor dikes/water bars not only collect runoff from the disturbed areas and discharge it to well vegetated areas until permanent vegetation is established, but also provide long-term erosion control on the completed right of way.

#### G. Solids Separation

Straw bale barriers, filter fabric fence, reinforced filter fabric fence, rock filter berms, rock filters and storm inlet protection are all examples of solids separation BMP's. They should remove sediment by either temporarily impounding the sediment laden runoff or by sufficiently slowing the velocity of the runoff to induce settling of the sediment particles.

The "pumped water filter bag" is used as a solids separation device to remove sediment from muddy water pumped from trenches or excavations.

#### H. Restoration of right-of-way in farm field

Special precautions and actions may be needed to restore farm fields to their pre-construction productivity. A booklet titled "Pipeline Right-of-Way Construction Projects, Agricultural Mitigation Through The Stages of Project Planning, Construction/Restoration and Follow-Up Monitoring" has been published by the New York State Department of Agriculture & Markets. The publication may be obtained from that Department. Their address is:

New York State Dept. of Agriculture & Markets  
1 Winners Circle  
Albany, NY 12235-0001  
Phone (518) 457-2713

This publication contains comprehensive discussions about all aspects of pipeline construction through farmlands. The use of the publication as a reference for projects in farmland is recommended.

#### 8. **MAINTENANCE OF BMPS**

"A maintenance program which provides for inspection of BMP's on a weekly basis and after each measurable rainfall event, including the repair of the BMP's to ensure effective and efficient operation". [Section 102.4(b)(5)(x)]

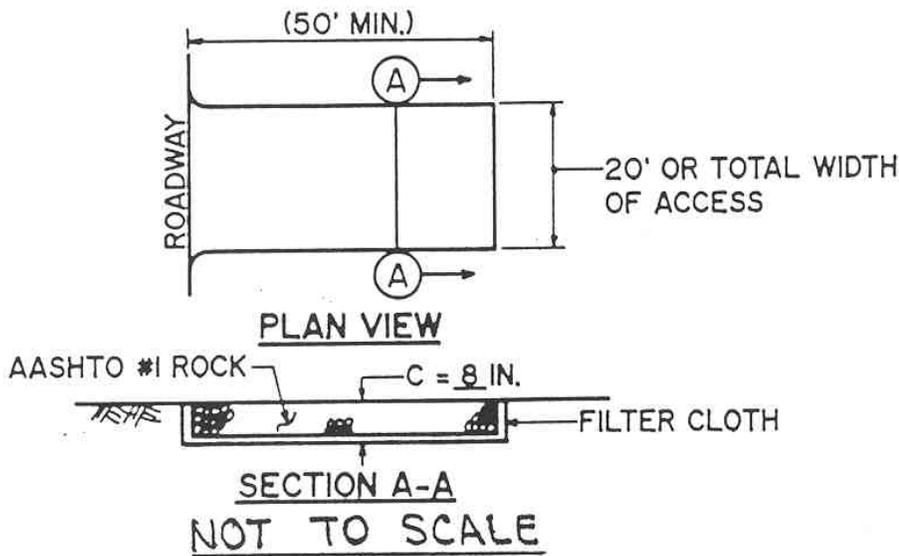
As a minimum, BMP's should be inspected on a weekly basis and after each measurable runoff event. Some BMP's, such as rock construction entrances, pumped water filter bags, etc., require more frequent inspection and maintenance, repair or replacement. When the maximum sediment storage elevation or level is reached in a BMP, the sediment should be removed and disposed of in accordance with the E. & S.C. Plan.

#### 9. **MEASURES FOR THE RECYCLING OR DISPOSAL OF MATERIALS FROM THE PROJECT SITE**

"Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be undertaken in accordance with this title." [Section 102.4(b)(5)(xi)].

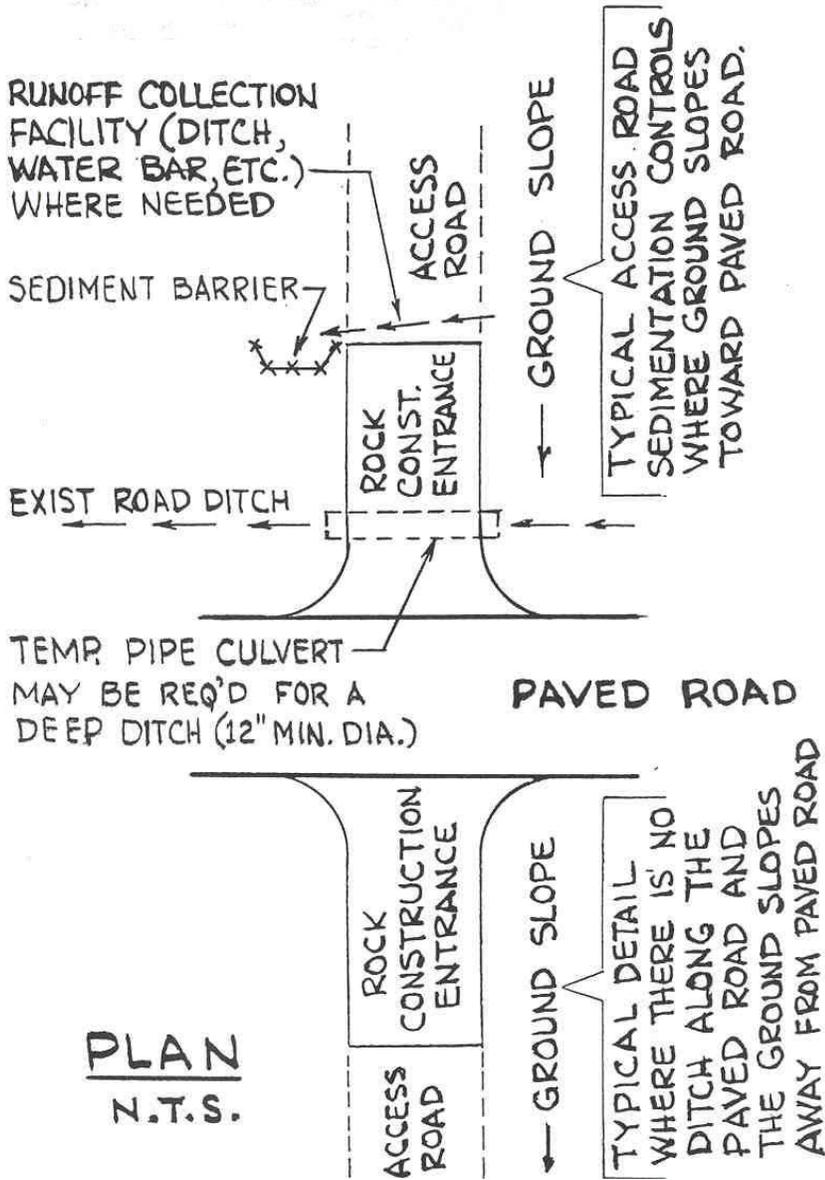
Project construction wastes should be recycled or disposed of in accordance with the E. & S.C. Plan. Soil and/or rock disposal areas should be provided with approved BMP's.

## 10. ROCK CONSTRUCTION ENTRANCE



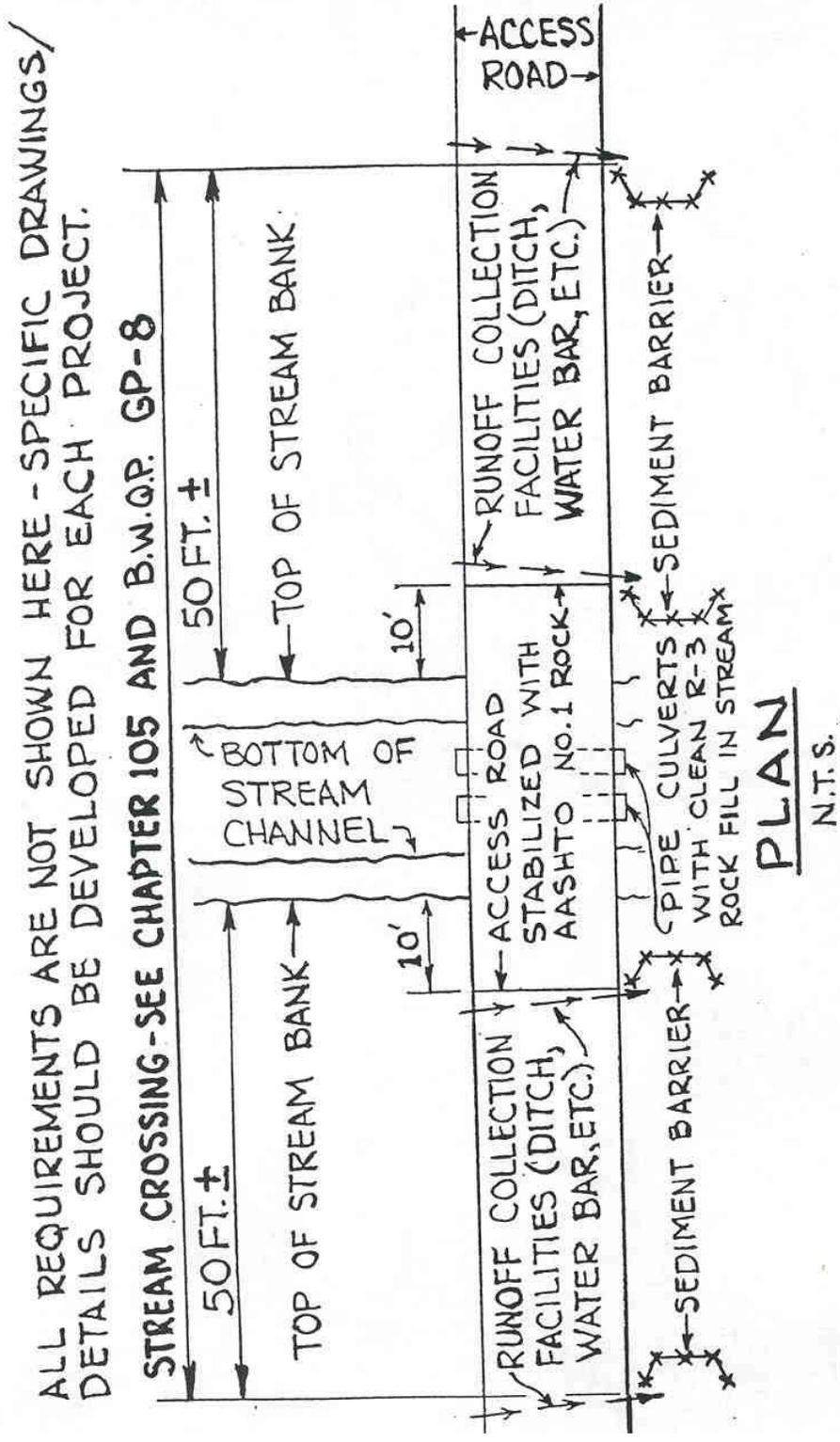
A ROCK CONSTRUCTION ENTRANCE SHOULD BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROADWAY. IT IS RECOMMENDED THAT A GEOTEXTILE FILTER CLOTH BE PLACED UNDER THE AASHTO #1 ROCK. ADDING ADDITIONAL ROCK TO THE ROCK CONSTRUCTION ENTRANCE DURING ITS USE IS USUALLY REQUIRED TO MAINTAIN ITS EFFECTIVENESS. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHOULD BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE. THE ROCK CONSTRUCTION ENTRANCE MUST REMAIN IN PLACE AND BE MAINTAINED UNTIL CONSTRUCTION TRAFFIC ACCESS IS NO LONGER NEEDED AND THE ACCESS POINT IS BLOCKED TO PREVENT VEHICLE MOVEMENT.

# 11. ACCESS ROAD CROSSING OF PAVED ROAD



THE RUNOFF COLLECTION FACILITY AND THE SEDIMENT REMOVAL FACILITY SHOULD BE PROVIDED FOR ACCESS ROAD CROSSINGS OF UNPAVED ROADS WHERE THE GROUND SLOPES TOWARD THE UNPAVED ROAD.

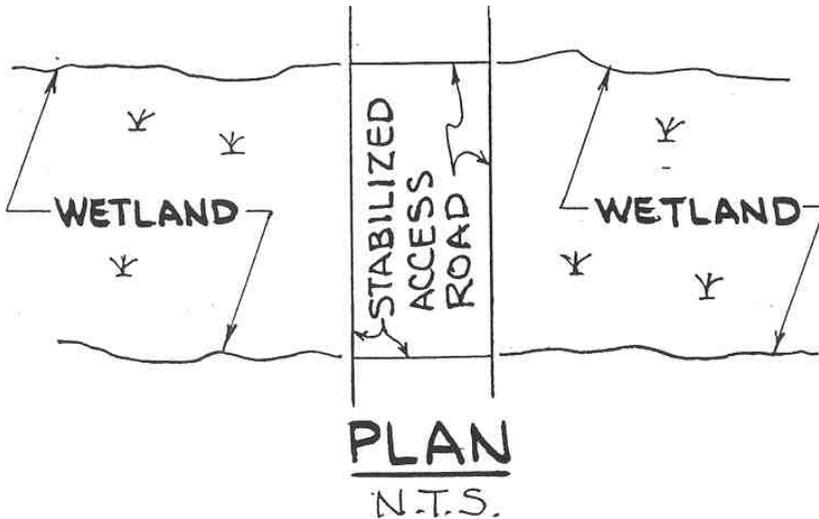
**12. ACCESS ROAD STREAM CROSSING WITH PIPE CULVERTS**



Crossing stream channels with any type of construction vehicle or equipment is unacceptable. A temporary road stream crossing should be installed before any construction equipment or vehicle crosses a stream channel. A temporary road stream crossing will usually consist of a pipe culvert or culverts or a temporary bridge. The use of fords for temporary stream crossings is not acceptable. Only clean rock fill (usually R-3 or larger rock) should be used in the stream channel where fill is needed (for pipe culverts, etc.) The roadway surface may be choked with AASHTO No. 1 rock. Rock smaller than AASHTO No. 1 is not recommended. Rock should be provided for the access road surface for a minimum distance of 10 feet back from the top of the stream bank on both sides of the stream. Surface runoff from the access road should be collected and treated for the removal of sediment before entering the stream. The access road runoff should be collected at a point 50 feet back from the top of the stream bank and conveyed to a sediment removal facility. If a water bar (or swale ditch) across the access road is used to collect road runoff it must be designed and constructed to withstand vehicle/equipment traffic (without breach) and maintain its flow carrying capacity. Mechanical reinforcement of such water bars or swale ditches is recommended. Access road surface runoff should also be collected at the edge of the roadway surface rock and conveyed to a sediment removal facility.

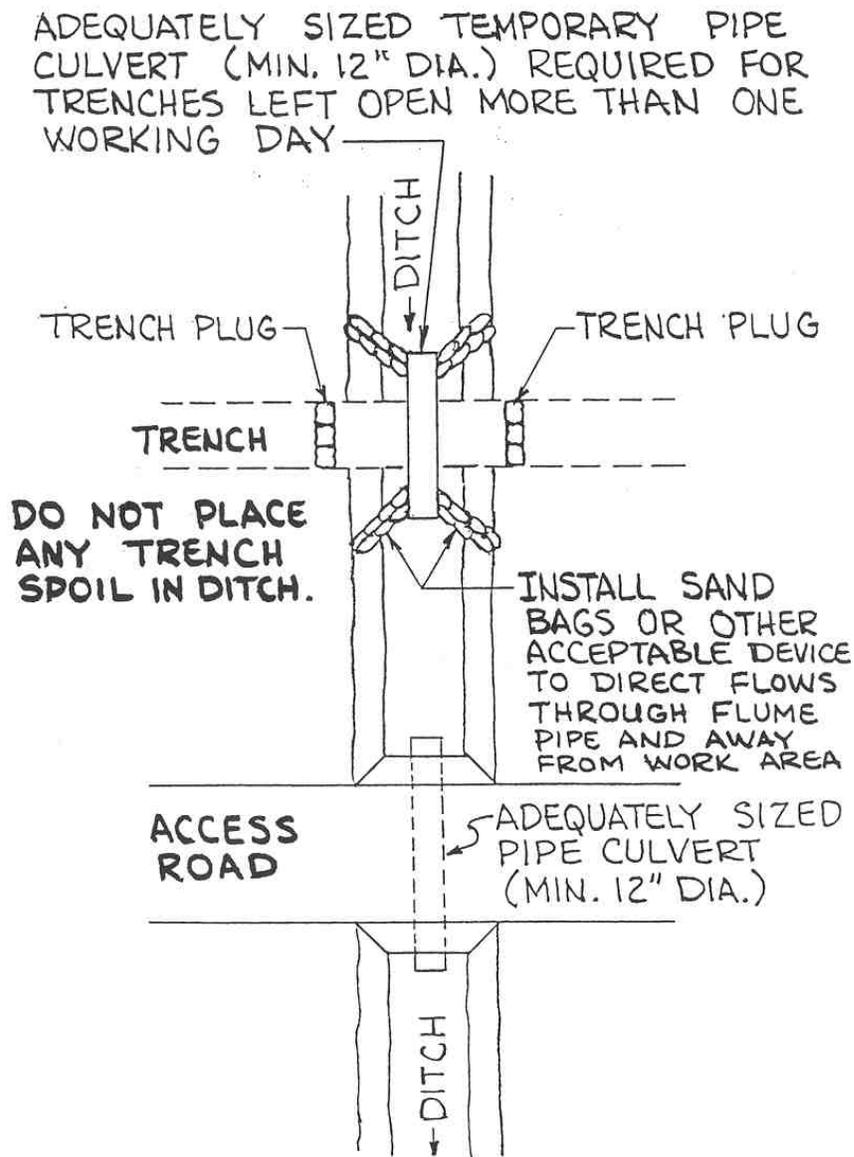
### 13. ACCESS ROAD WETLAND CROSSING

Removal of trees, tree stumps, brush and vegetation should be kept to a minimum in the wetland. Grading should be limited to the area directly over the trench to the extent possible. Where clearing of trees and vegetation is required for the equipment access areas, the tree and vegetation root mass is to remain undisturbed. Vegetation may be cut at/ near the ground line and should be removed from the wetland. Trees should be cut above the ground line with the stumps left in place, except where removal is required for safety reasons.



The movement of vehicles and/or equipment across wetlands, should be kept to an absolute minimum. The access road width should be kept to a minimum and be stabilized as specified in the erosion and sedimentation control plan. The access road may be stabilized by placing gravel or crushed aggregate upon geotextile fabric, or by placing timber rip rap or prefabricated swamp mats. The timber rip rap or prefabricated swamp mats should not be more than 2 layers thick. A properly designed plank road may also be utilized. Dirt, rock, stumps or brush shall not be used to stabilize the wetland. All material used to stabilize the access road must be removed from the wetland when utility construction is completed.

## 14. SWALE/DITCH/CHANNEL/WATERWAY CROSSING



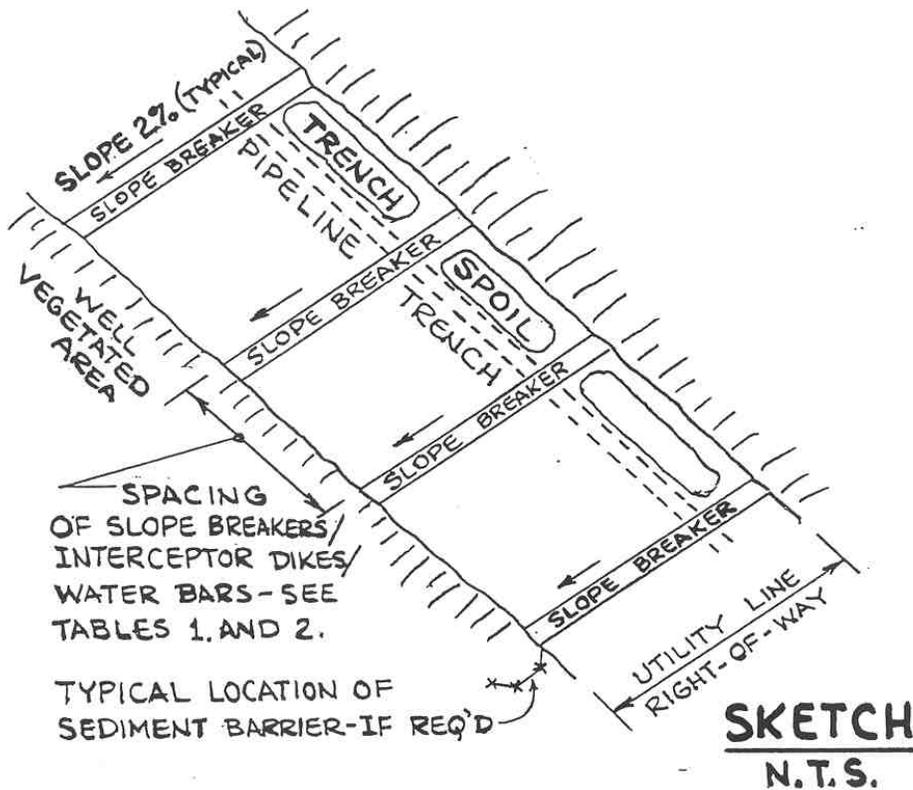
### PLAN NOT TO SCALE

Adequately sized pipe culverts should be installed for access roads at all locations where access roads cross a swale/ditch/channel or waterway whether or not flowing water is encountered.

An adequately sized flume pipe or culvert properly "sand bagged" to direct flows through the flume pipe and away from the work area should be installed across the utility line trench at all locations where the trench crosses a swale/ditch/channel or waterway. Trench spoil should not be placed in any swale/ditch/channel or waterway. If flow exists in the swale/ditch/channel or waterway at the time of trenching, then the pipe flume or culvert properly "sand bagged" must be installed

prior to the trenching operation. If the swale/ditch/ channel or waterway is dry at the time of trenching, then the pipe flume or culvert and sandbags may be installed immediately after the trench is completed in that area. If the utility line trench is excavated, the utility line installed and the trench backfilled on the same day, then a pipe flume or culvert is not needed providing that the swale/ ditch/channel or waterway is dry and is reshaped and stabilized immediately.

**15. SLOPE BREAKERS/INTERCEPTOR DIKES/WATER BARS**

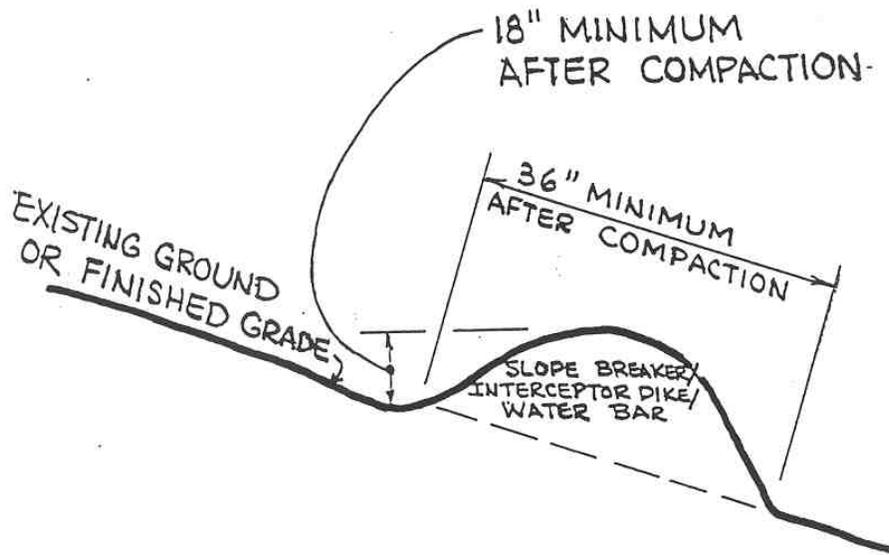


SLOPE BREAKERS/INTERCEPTOR DIKES/WATER BARS SHOULD BE CONSTRUCTED AT A SLOPE OF 2% AND DISCHARGE TO A WELL VEGETATED AREA.

SLOPE BREAKERS/INTERCEPTOR DIKES/WATER BARS SHOULD NOT DISCHARGE TO AN OPEN TRENCH.

DISCHARGES FROM SLOPE BREAKERS/ INTERCEPTOR DIKES/WATER BARS SHOULD NOT FLOW BACK ONTO R.O.W.

SLOPES GREATER THAN 30% MAY NECESSITATE THE INSTALLATION OF A PARALLEL COLLECTION DITCH AND SEDIMENT TRAP AT THE BOTTOM OF THE SLOPE IN LIEU OF SLOPE BREAKERS.



**TYPICAL SECTION OF SLOPE BREAKERS /  
INTERCEPTOR DIKES/ WATER BARS**

NOT TO SCALE

OBSTRUCTIONS SUCH AS STRAW BALES, SILT FENCE, ROCK FILTERS, ETC. SHOULD NOT BE PLACED IN ANY SLOPE BREAKER/INTERCEPTOR DIKE/WATER BAR.

Temporary slope breakers/interceptor dikes/water bars should be installed while the access road is under construction and maintained until the permanent slope breakers/interceptor dikes/water bars are installed. See table 1, for the required spacing of the temporary devices. These temporary devices should be installed on all slopes between 5 percent and 30 percent. They should also be provided at or near the bottom of slopes flatter than 5 percent where needed to intercept and divert runoff away from streams, roadways, railroads and waterways. Where a slope breaker/interceptor dike/water bar is continually broken down by vehicle or equipment traffic, then it should be mechanically reinforced to provide stability and reliability.

Permanent slope breakers/interceptor/dikes/water bars should be installed across the entire right-of-way on all slopes greater than 5 percent and discharge into well-vegetated areas. See table 2, for the required spacing of the permanent devices. They should be oriented and installed so that their discharge flows away from the right-of-way and not back onto the disturbed right-of-way. Permanent slope breakers/interceptor dikes/water bars should be provided near the bottom of slopes flatter than 5 percent as needed to intercept and divert runoff away from all streams, roadways, railroads and waterways.

TABLE 1. REQUIRED SPACING FOR TEMPORARY SLOPE BREAKERS/INTERCEPTOR DIKES/WATER BARS

PERCENT OF LAND SLOPE	SPACING IN FEET
<5%	*
5-15%	300
15-30%	200
>30%	**100

- \* Temporary slope breakers/interceptor dikes/water bars are required at all stream/river/waterbody crossings and upslope from roadway and railroad cut slopes – otherwise not required
- \*\* Temporary slope breakers/interceptor dikes/water bars are not required on slopes greater than 30% where safety is a concern if another type of sediment pollution control is provided.

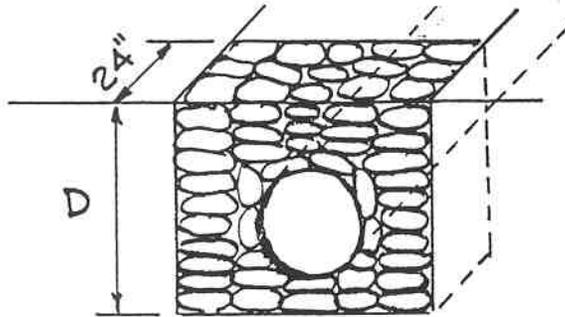
TABLE 2. REQUIRED SPACING FOR PERMANENT SLOPE BREAKERS/ INTERCEPTOR DIKES/WATER BARS

PERCENT OF LAND SLOPE	SPACING IN FEET
<5%	*
5-15%	150
15-30%	100
>30%	50

- \* Permanent slope breakers /interceptor dikes /water bars are required at all stream /river /waterbody crossings and upslope from roadway and railroad cut slopes – otherwise not required.

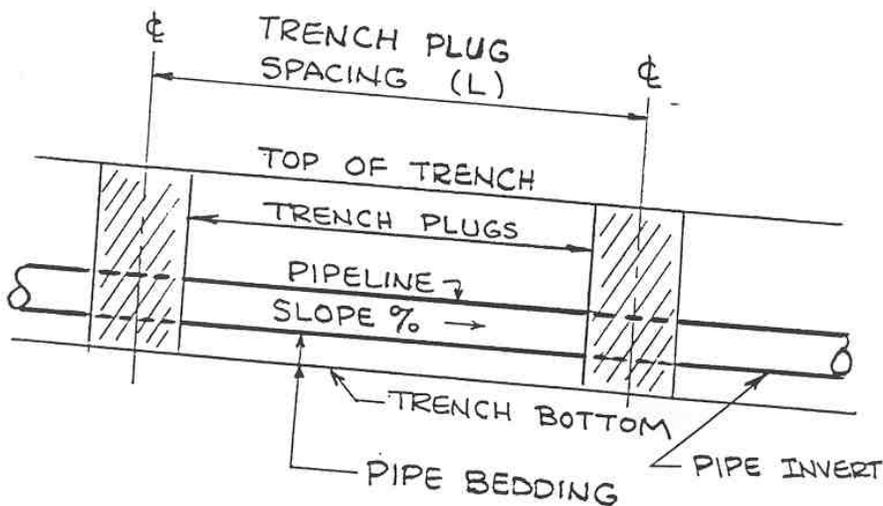
## 16. TRENCH BREAKERS / TRENCH PLUGS

TRENCH BREAKERS/TRENCH PLUGS SHOULD BE INSTALLED IN ALL UTILITY LINE TRENCHES PER TABLE 3. TABLE 3. INDICATES THE REQUIRED SPACING AND MATERIALS FOR THE TRENCH BREAKERS/TRENCH PLUGS.



D= TRENCH DEPTH TO BOTTOM OF TRENCH

**SECTION VIEW**  
NOT TO SCALE



**ELEVATION**  
NOT TO SCALE

TABLE 3. REQUIRED SPACING AND MATERIALS FOR TRENCH BREAKERS/TRENCH PLUGS

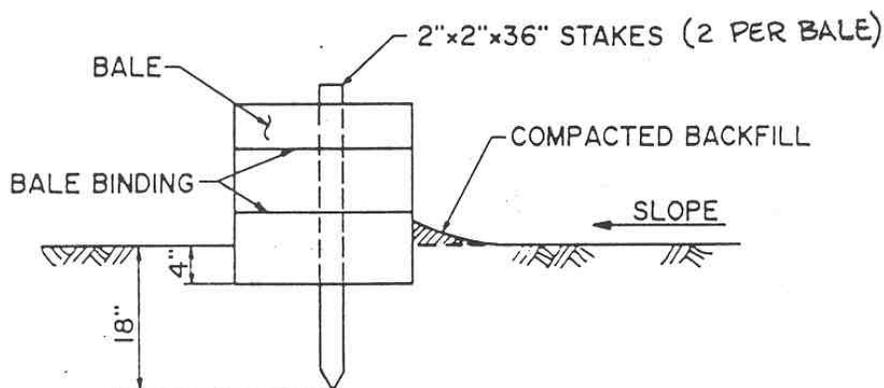
TRENCH SLOPE	SPACING (L) IN FEET	PLUG MATERIAL
0-5%	*	*
5-15%	500	**EARTH FILLED SACKS
15-25%	300	**EARTH FILLED SACKS
25-35-%	200	**EARTH FILLED SACKS
35-100%	100	**EARTH FILLED SACKS
OVER 100%	50	CEMENT FILLED BAGS (WETTED) MORTARED STONE

OR

\* TRENCH BREAKERS/TRENCH PLUGS (EARTH FILLED SACKS) ARE REQUIRED AT ALL STREAM/RIVER/WATERBODY AND WETLAND CROSSINGS REGARDLESS OF TRENCH SLOPE.

\*\* TO ENSURE PROPER TOPSOIL CONSERVATION, TOPSOIL SHOULD NOT BE USED IN EARTH FILLED SACKS.

## 17. STRAW BALE BARRIERS



STRAW BALE BARRIERS SHOULD NOT BE USED FOR MORE THAN 3 MONTHS.

STRAW BALE BARRIERS SHOULD NOT BE PLACED IN ANY AREA OF CONCENTRATED FLOWS SUCH AS CHANNELS, DITCHES, SWALES, PIPE OUTLETS, ETC.

STRAW BALE BARRIERS SHOULD NOT BE USED IN AREAS WHERE ROCK PREVENTS THE FULL AND UNIFORM DEPTH ANCHORING OF THE BARRIER.

STRAW BALE BARRIERS MUST BE PLACED AT LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO MAIN BARRIER ALIGNMENT.

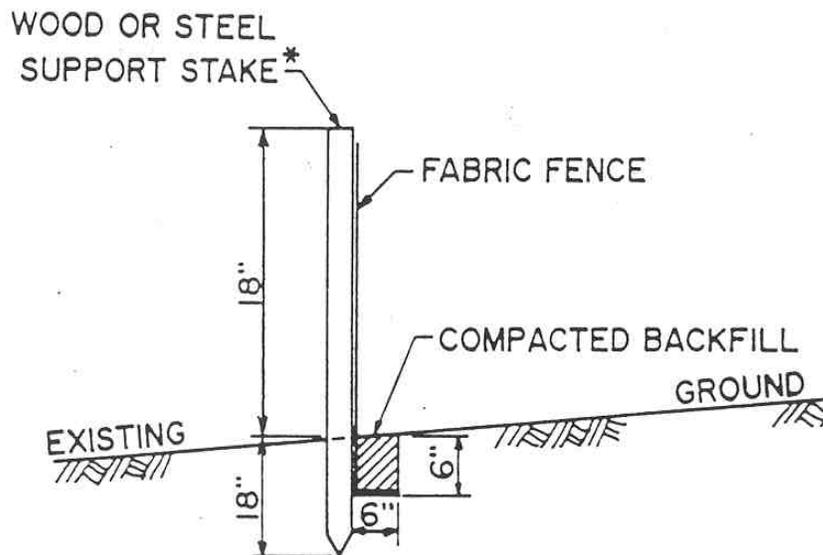
STRAW BALE BARRIERS SHOULD NOT BE USED WHERE THE MAXIMUM UPSLOPE LENGTH BASED ON LAND SLOPE IS EXCEEDED. SEE **TABLE 4** FOR MAXIMUM (ALLOWABLE) SLOPE LENGTHS.

SEDIMENT MUST BE REMOVED FROM STRAW BALE BARRIERS WHERE ACCUMULATIONS REACH 1/3 THE ABOVE GROUND HEIGHT OF THE BARRIER.

TABLE 4. MAXIMUM SLOPE LENGTHS FOR STRAW BALE BARRIERS AND FOR STANDARD FILTER FABRIC FENCE

<b>SLOPE PERCENT</b>	<b>MAXIMUM SLOPE LENGTH (FEET) ABOVE BARRIER</b>
<b>2 (OR LESS)</b>	<b>250</b>
<b>5</b>	<b>100</b>
<b>10</b>	<b>50</b>
<b>15</b>	<b>35</b>
<b>20</b>	<b>25</b>
<b>25</b>	<b>20</b>
<b>30</b>	<b>15</b>
<b>35</b>	<b>15</b>
<b>40</b>	<b>15</b>
<b>45</b>	<b>10</b>
<b>50</b>	<b>10</b>

## 18. STANDARD FILTER FABRIC FENCE



\* STAKES SPACE AT 8 FEET MAXIMUM. USE 2" X 2" WOOD OR EQUIVALENT STEEL STAKES

Filter fabric fence should not be placed in any area of concentrated flows such as channels, ditches, swales, pipe outlets, etc.

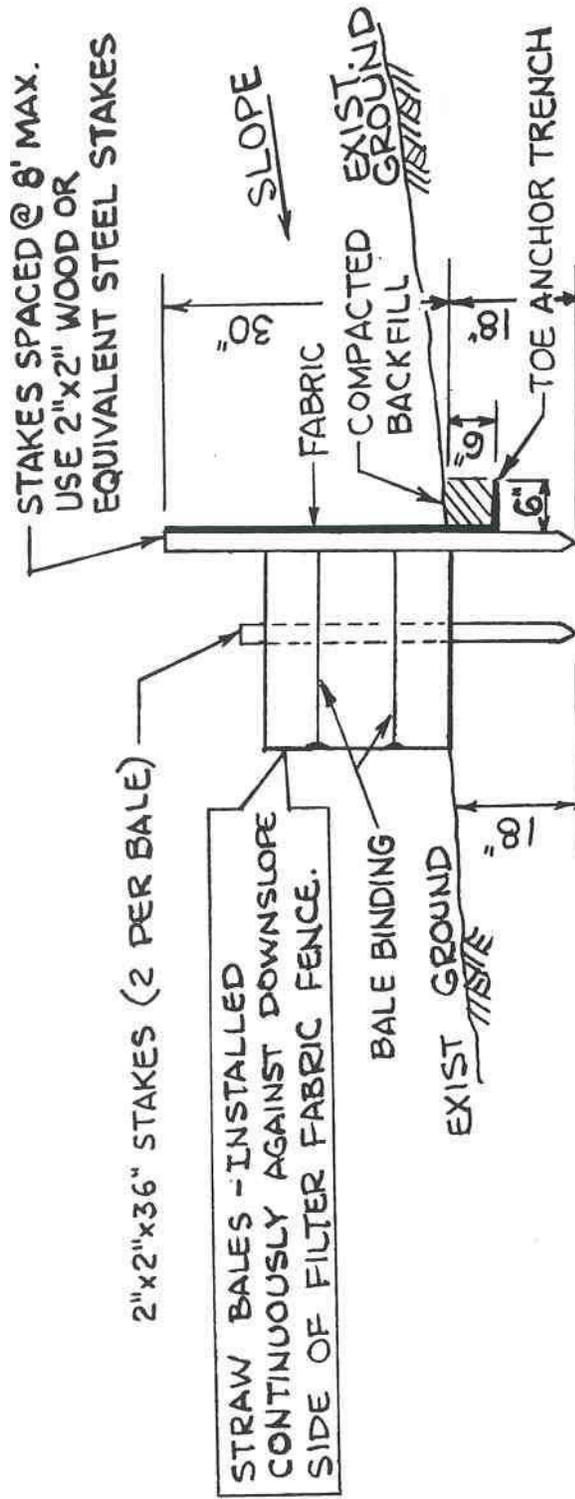
Filter fabric fence should not be used in areas where rock prevents the full and uniform depth anchoring of the filter fabric.

Filter fabric fence must be installed at level grade. Both ends of each fence section must be extended at least 8 feet upslope at 45 degrees to main fence alignment.

Standard filter fabric fence should not be used where the maximum upslope length based on land slope is exceeded. See **table 4** for maximum (allowable) slope lengths.

Sediment must be removed where accumulations reach  $\frac{1}{2}$  the above ground height of the fence.

**19. REINFORCED FILTER FABRIC FENCE – WITH STRAW BALE BARRIER SUPPORT**

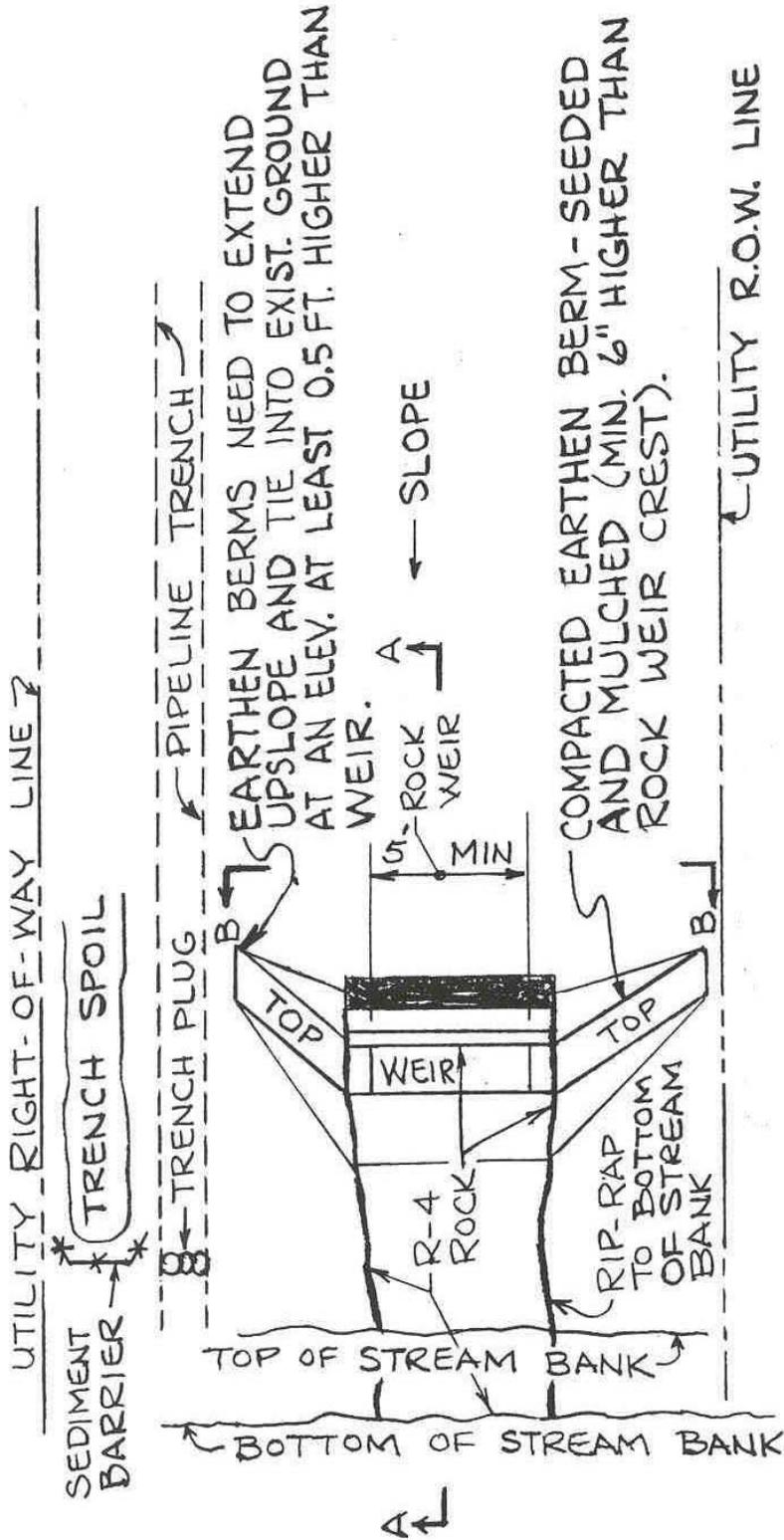


SEE TABLE 5 FOR THE MAXIMUM (ALLOWABLE) SLOPE LENGTHS FOR THIS REINFORCED FILTER FABRIC FENCE. ALL THE OTHER NOTES FOR THE STANDARD FILTER FABRIC FENCE APPLY TO THE REINFORCED FILTER FABRIC FENCE.

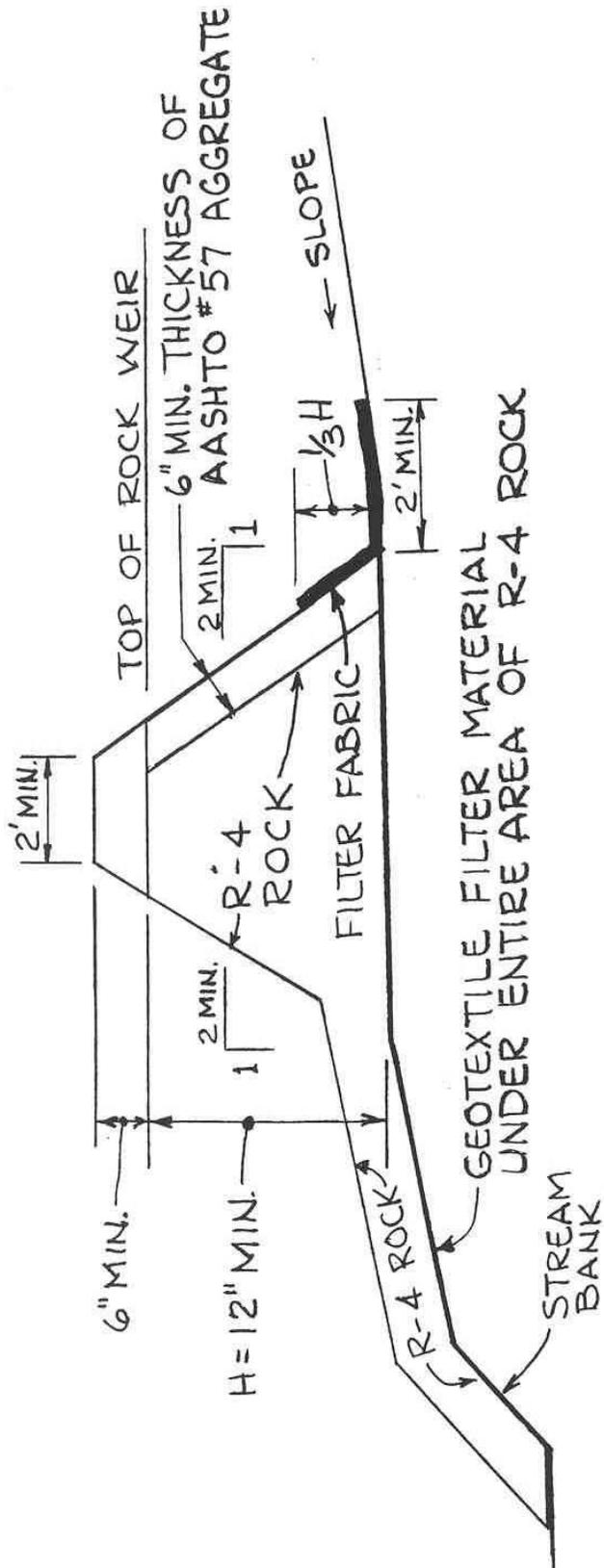
**TABLE 5. MAXIMUM SLOPE LENGTHS  
FOR REINFORCED FILTER  
FABRIC FENCE**

<b>SLOPE – PERCENT</b>	<b>MAXIMUM SLOPE LENGTH (FEET) ABOVE REINFORCED FILTER FABRIC FENCE</b>
<b>2 (OR LESS)</b>	<b>500</b>
<b>5</b>	<b>250</b>
<b>10</b>	<b>150</b>
<b>15</b>	<b>100</b>
<b>20</b>	<b>70</b>
<b>25</b>	<b>55</b>
<b>30</b>	<b>45</b>
<b>35</b>	<b>40</b>
<b>40</b>	<b>35</b>
<b>45</b>	<b>30</b>
<b>50</b>	<b>25</b>

## 20. ROCK FILTER BERM

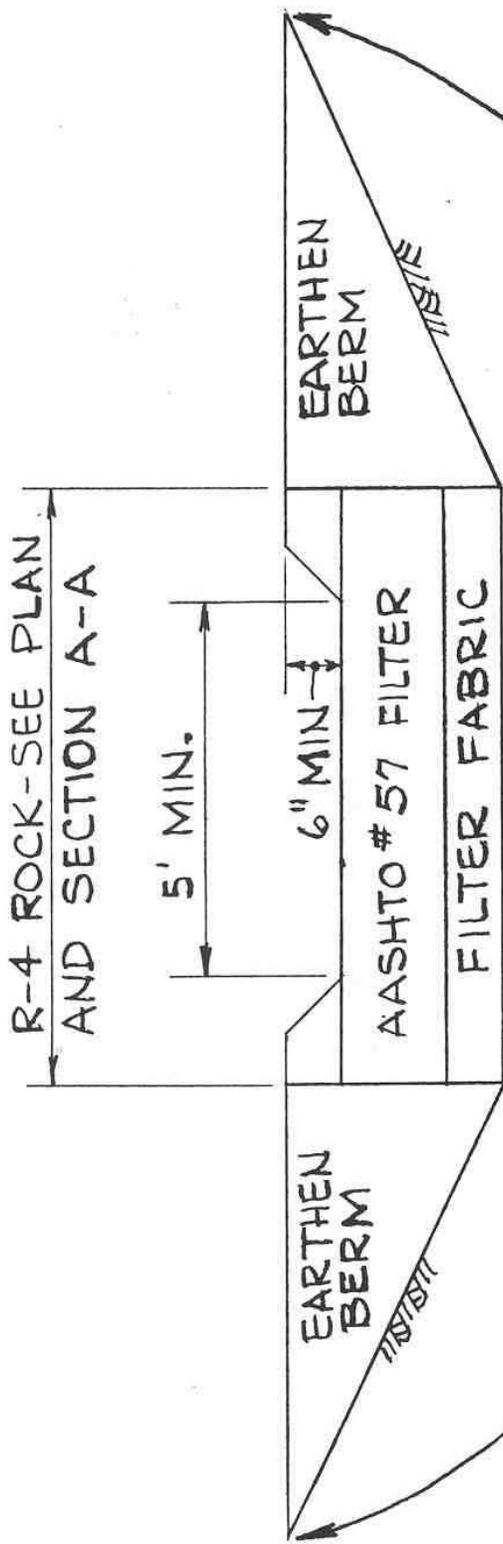


PLAN - NOT TO SCALE



**SECTION A-A- ROCK FILTER BERM**

NOT TO SCALE



EARTHEN BERMS NEED TO EXTEND UPSLOPE AND TIE INTO EXISTING GROUND TO FORM AN "IMPOUNDMENT" OR "TRAP" FOR RUNOFF FROM DISTURBED AREAS.

**SECTION B-B- ROCK FILTER BERM**  
NOT TO SCALE

The “rock filter berm” should only be used at the bottom of very steep utility line slopes that discharge directly to a stream or river and where there is not sufficient area to install conventional sediment pollution controls (sediment traps, etc.).

Geotextile filter material should be placed under the entire area of the R-4 rock. R-4 rock should be placed in the flow path from the rock filter to the bottom of the stream bank. If the stream bank is too steep to properly place the R-4 rock, then the geotextile material alone should extend down over the stream bank and be secured to prevent its movement or displacement.

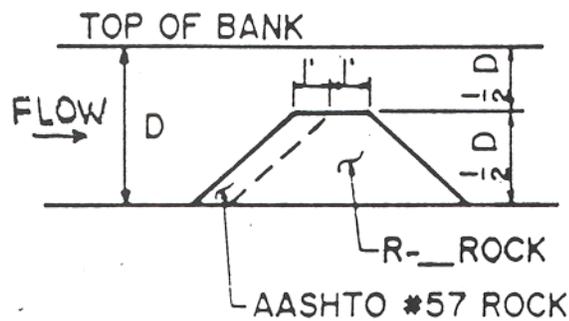
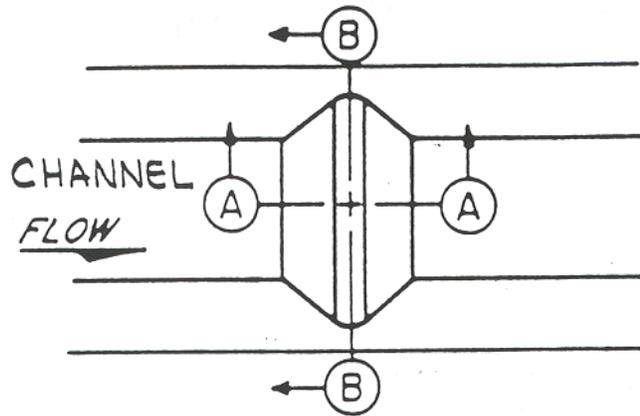
The earthen berms need to extend upslope and tie into existing ground at an elevation at least 0.5 feet higher than the rock weir crest. The objective is to collect runoff from disturbed areas and make that runoff flow through the filter media.

If an access road parallel to the trench is needed, the affected earthen berm should be designed and installed so that traffic can safely pass over it. Also, the berm should be “reinforced” to prevent “breakdown” from heavy vehicles.

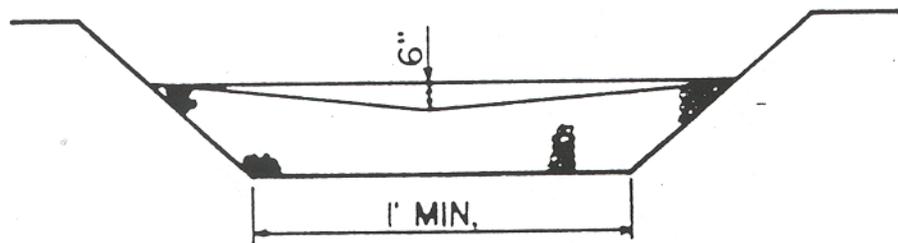
All of the areas that are disturbed to install the rock filter berm should be seeded and mulched.

Sediment should be removed from the filter when it reaches the top of the filter fabric on the upslope side of the filter. The removed sediment should be disposed of at a location that prevents sediment from discharging to a stream.

## 21. ROCK FILTERS



SECTION A-A



SECTION B-B

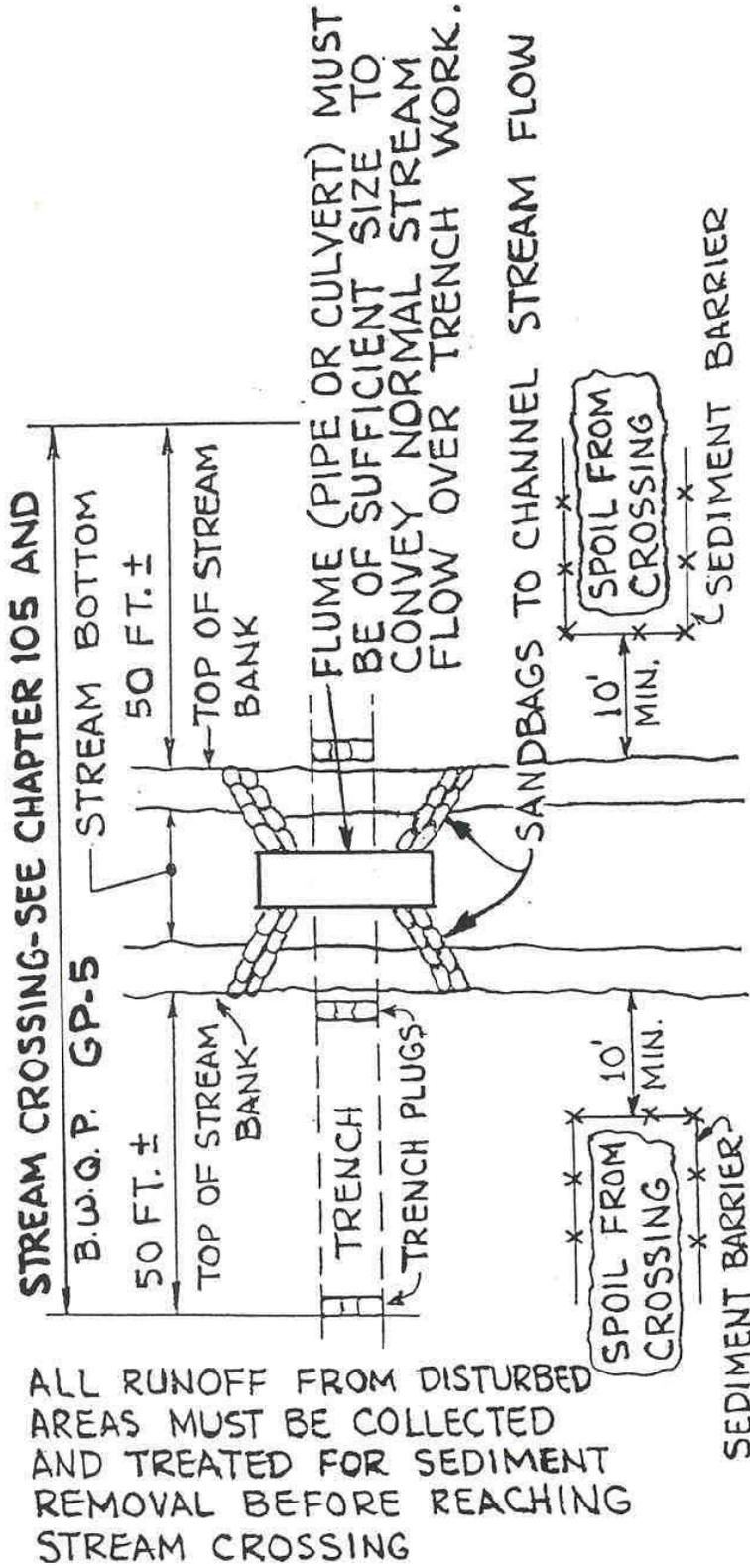
- FOR  $D \geq 3'$  - USE R-4
- FOR  $2' \leq D < 3'$  - USE R-3
- FOR  $1' \leq D < 2'$  - USE R-2

Rock filters should not be the primary sediment control in any area. Rock filters may be used in channels designed and intended to convey sediment laden runoff when it is demonstrated that the rock filter will not cause discharges to overtop the channel banks.

Rock filters are not suitable for channels less than one foot total depth.

Rock filters need to be removed when clogged with sediment and replaced with clean rock.

**22. UTILITY LINE STREAM CROSSING WITH PIPE FLUME**

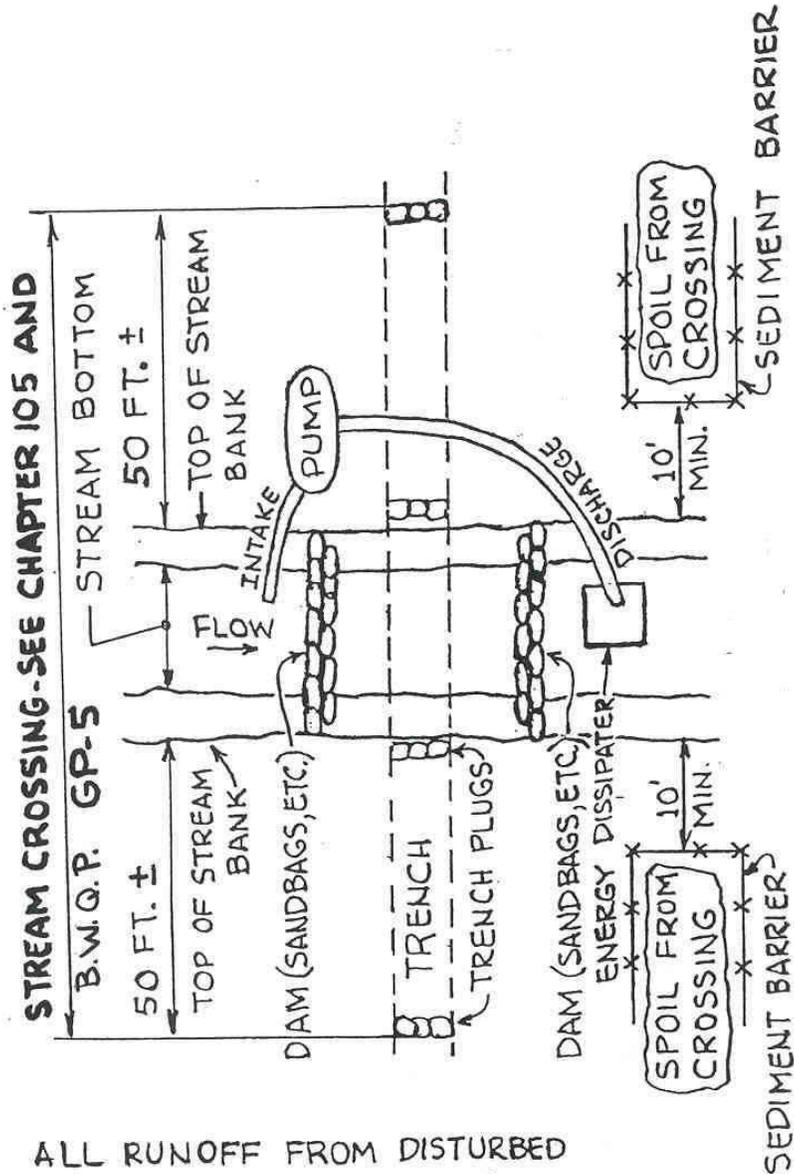


ALL RUNOFF FROM DISTURBED AREAS MUST BE COLLECTED AND TREATED FOR SEDIMENT REMOVAL BEFORE REACHING STREAM CROSSING

**PLAN**  
NOT TO SCALE

### 23. UTILITY LINE STREAM CROSSING WITH DAM AND PUMPING

A STANDBY PUMP SHOULD BE AVAILABLE AT THE STREAM CROSSING SITE DURING PUMPING OPERATIONS.



ALL RUNOFF FROM DISTURBED AREAS MUST BE COLLECTED AND TREATED FOR SEDIMENT REMOVAL BEFORE REACHING STREAM CROSSING

**PLAN**  
NOT TO SCALE

These comments apply to both “utility line stream crossing with pipe flume” and “utility line stream crossing with dam and pumping”.

Utility line stream crossings are considered to begin (or end) 50 feet back from the top of the stream bank on both sides of the stream per the department’s chapter 105 definition. Pipelines with the pipe joints assembled/made in the trench should maintain a 50 ft. Buffer on both sides of the stream until the stream crossing commences. Large diameter steel pipelines with welded joints where the pipe joints are welded while the pipeline is out of the trench should maintain a 10 ft. Buffer on both sides of the stream until the stream crossing commences.

A utility line stream crossing of a stream 10 feet in (bottom) width or less should be completed within 72 hours (from start to finish) including the trench backfilling, stabilization of stream banks and stabilization of the area 50 feet back from the top of each stream bank.

Facilities for removing sediment from pumped water should be available at the utility line stream crossing site before trenching commences and maintained until trench backfilling is completed.

Assembly areas, temporary equipment and non-hazardous material storage areas should be located at least 50 feet back from the top of stream bank.

Hazardous or pollutive material storage areas should be located at least 100 feet back from the top of stream bank.

All excess excavated material shall be immediately removed from stream crossing.

## **24. UTILITY LINE WETLAND CROSSING**

Staging areas or work areas required to make the wetland crossing should be located in an upland area at least 50 feet from the wetland edge and indicated on the site drawings. Stream/river crossings must be carefully planned and constructed where wetlands are adjacent to the stream/river crossing. Where trench spoil from the stream/river crossing must be temporarily placed/stored on an adjacent wetland, sufficient right-of-way should be furnished for the trench spoil and the stream/river crossing work and precautions should be taken to prevent the trench spoil from intermingling with the wetlands soils. It may be necessary to place a layer of geotextile material or other cover on the wetland to temporarily store the stream crossing trench spoil.

Here grading and trench excavation occur within the wetland, the wetland topsoil (with the vegetation root mass) shall be carefully removed and stockpiled

separately from the subsoil. The foregoing will not be required where there is standing water or the topsoil is saturated to the point that it cannot be segregated. Shortly after the pipeline is installed and the trench backfilled, the topsoil should be restored to the graded areas.

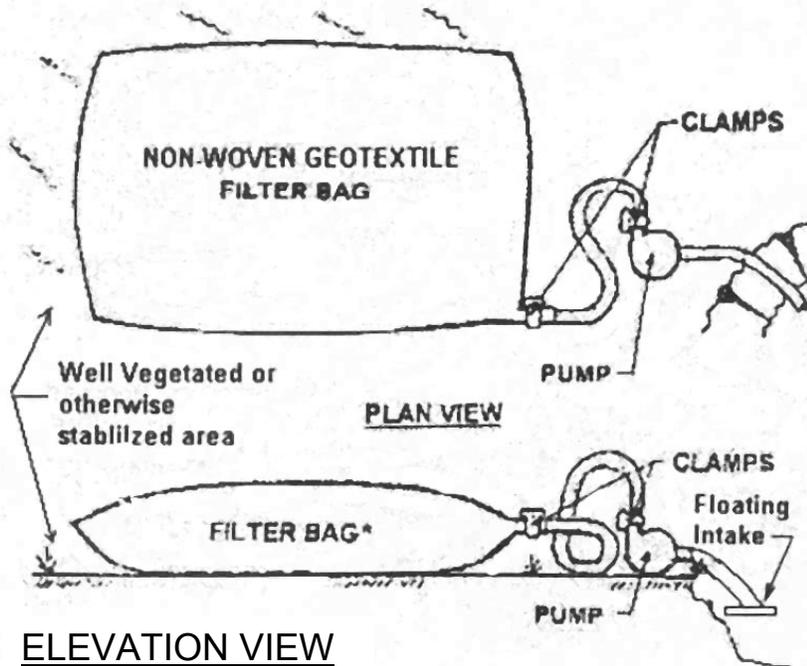
Sediment pollution controls should be provided as necessary to prevent sediment discharges from disturbed upland areas into wetlands and off the right-of-way from wetland construction. Water pumped or removed from trenches shall not be discharged into wetlands without proper sediment removal treatment.

Restoration of disturbed areas within wetlands should be addressed in the E.&S.C. plan. BMP's (trench plugs, etc.) should be implemented to prevent the trench from permanently draining the wetland or changing the site hydrology. The stockpiled wetland topsoil should be returned to its original horizon. All temporary right-of-way stabilization for the access road should be removed.

Original contours and cross drainages should be restored. All excess spoil must be removed from the wetland and properly disposed of.

Revegetation of disturbed areas within wetlands should be addressed in the E.&S.C. plan. Fertilizer or lime should not be used or applied within wetlands. In general, annual ryegrass at the rate of 40 pounds per acre should be applied to all disturbed areas where standing water is not prevalent. Other seed types and rates of application may be required by other applicable state or federal permits or regulations. Straw mulch, without binding agents, should be applied at the rate of 3 tons per acre on areas seeded with annual ryegrass. Fuels or hazardous material should not be stored within 100 feet of a wetland. Application of herbicides or concrete coating of pipes should not be used within 100 feet of a wetland.

## 25. PUMPED WATER FILTER BAG



Filter bags may be used to filter water pumped from trenches prior to discharging to waters of the Commonwealth.

Filter bags shall be made from non-woven geotextile material sewn with high strength, double stitched "j" type seams. They shall be capable of trapping particles larger than 150 microns.

The maximum pumping rate should be specified on the plan drawings next to the typical detail. The pumping rate shall be no greater than 750 gpm or  $\frac{1}{2}$  the maximum specified by the Manufacturer, whichever is less. Pump intakes should be floating and screened.

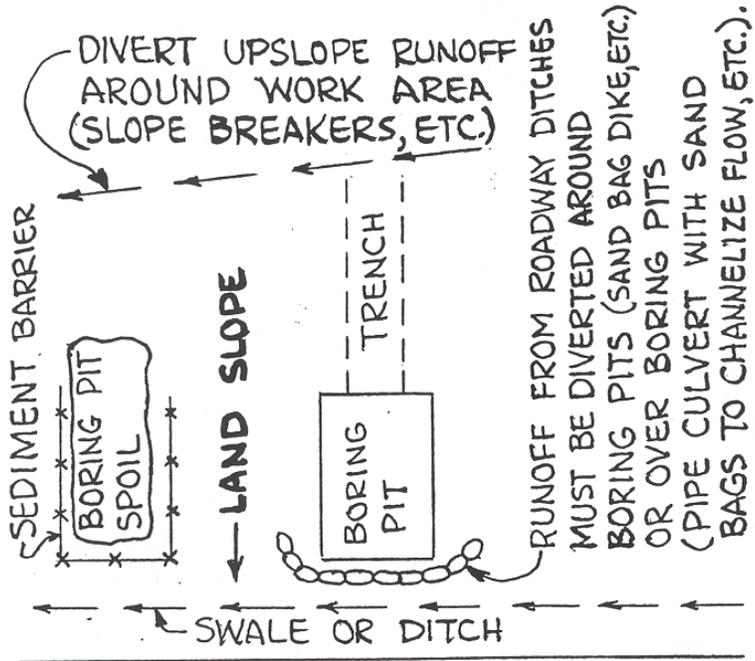
Filter bags shall be located in well-vegetated (grassy) areas and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile flow path shall be provided. Bags shall not be placed on slopes greater than 5%.

The pump discharge hose shall be inserted into the filter bag in the manner specified by the manufacturer and securely clamped.

A suitable means of accessing the bag with machinery required for disposal purposes must be provided. Filter bags shall be replaced when they become  $\frac{1}{2}$  full. Spare bags shall be kept available for replacement of those that have failed or are  $\frac{1}{2}$  full.

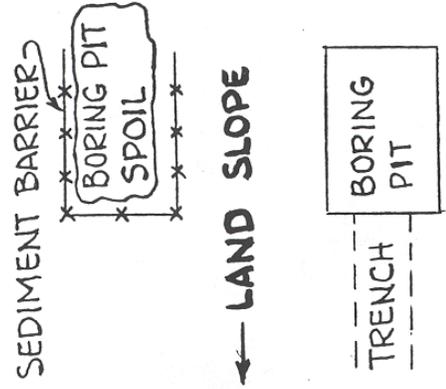
Filter bags shall be inspected daily. If any problem is detected, pumping shall cease immediately, and not resume until the problem is corrected.

26. UTILITY LINE HIGHWAY/ROADWAY CROSSING – BORING METHOD



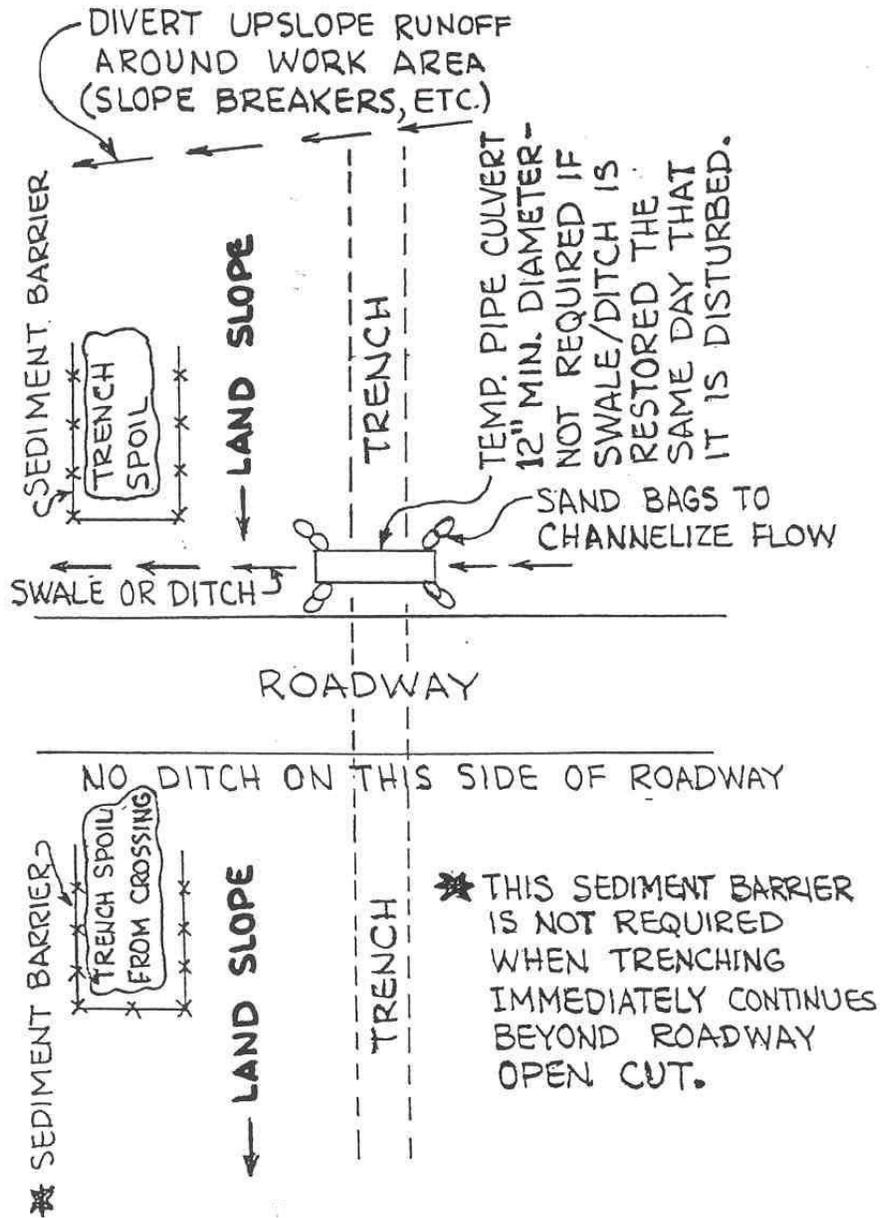
ROADWAY

NO DITCH ON THIS SIDE OF ROADWAY



**PLAN**  
NOT TO SCALE

**27. UTILITY LINE HIGHWAY/ROADWAY CROSSING – OPEN CUT METHOD**



**PLAN**  
NOT TO SCALE

These comments apply to both “utility line highway/roadway crossing – boring method” and “utility line highway/roadway crossing – open cut method”.

The BMP’s that are required for utility line highway/roadway crossings will be determined by the direction of existing land slope (toward the roadway or away from the roadway) and by the location of existing roadway drainage facilities (roadway swales, ditches, channels, pipe culverts, storm sewers, storm inlets, etc.)

Where the land slopes toward the roadway, upslope runoff should be diverted around the work area by the use of slope breakers/ interceptor dikes/water bars, etc.

Sediment barriers should be located down-slope from trench or boring pit spoil.

Provision to convey runoff around or through the work area from existing roadway culverts, storm sewers, swales, ditches, channels, etc. Should be provided prior to any disturbance or disruption of the roadway drainage facility.

Some type of storm inlet protection should be provided at storm inlets that would receive runoff from a disturbed area. The storm inlet protection should be installed before earth disturbance activities commence within the drainage area to the inlet. See pages 40 and 41 for information on storm inlet protection.

Trench or boring pit spoil should not be placed in any roadway swale, ditch, channel, etc.

Facilities for removing sediment from pumped water should be used to treat pumped water when pumping is required.

Traffic safety items should be provided per requirements of roadway governing agency.



Storm inlet protection should be provided at storm inlet locations where runoff from a disturbed area or areas can get into the storm inlet.

Geotextile sediment collection sacks or bags that are made to fit inside a storm inlet may be used for storm inlet protection. The geotextile should be able to trap fine sand and larger sediment. When installed, the geotextile sacks or bags should be securely held in the storm inlet and the inlet grate should be in place. The items needed for removal of the geotextile sacks or bags should be provided and the sacks or bags should be removed and cleaned out or replaced before they become 1/3 full of sediment. Geotextile sediment collection devices must be installed in accordance with manufacturer's recommendations.

## **29. STREAM BANK STABILIZATION**

The stabilization of stream bank areas disturbed by the utility line stream crossing and related activities must be properly designed and installed to withstand stream flow velocities. 2.75 cubic feet per second per acre of drainage area or the 10 year frequency storm for the drainage area, should be used to determine the design flow and the design velocity. An accurate cross section of the stream will be required at the point of utility line crossing. The stream bed profile for a minimum distance of 200 feet upstream and 200 feet downstream should be used to determine the stream gradient. Manning's equation may then be employed to calculate the stream flow design velocity.

The type of stream bank stabilization selected must have a maximum permissible velocity equal to or greater than the calculated design velocity or if a flexible stream bank lining design procedure is used, then the permanent lining allowable shear stress must equal or exceed the calculated shear stress. Biotechnical engineering may be used for stream bank stabilization. Chapters 16 and 18 of the Natural Resource Conservation Service Engineering Field Manual contains biotechnical engineering information.

Stream banks that are to be stabilized with vegetation will require some type of "erosion control blanket" until the permanent vegetation is established. Installation details should be specified for the material to be used.

**TABLE 6. - MAXIMUM PERMISSIBLE  
VELOCITIES FOR CHANNELS  
LINED WITH VEGETATION**

COVER	SLOPE RANGE PERCENT	PERMISSIBLE VELOCITY FT/SEC	
		EROSION (1) RESISTANT SOIL	EASILY (2) ERODED SOIL
Kentucky Bluegrass Tall Fescue	< 5	7 <sup>(3)</sup>	5
	5-10	6 <sup>(3)</sup>	4
	> 10	5	3
Grass Mixture Reed Canarygrass	< 5	5	4
	5-10	4	3
Sericea Lespedez Weeping Lovegrass Redtop Red Fescue	<5	3.5	2.5
Annuals – temporary Cover only Sudangrass	<5	3.5	2.5

- (1) Cohesive (clayey) fine grain soils and coarse grain soils with a plasticity index of 10 to 40 (CL, CH, SC and GC).
- (2) Soils that do not meet the requirements for erosion resistant soils.
- (3) Use velocities exceeding 5 ft./sec. only where a good cover and proper maintenance can be obtained.

TABLE 7. – MAXIMUM PERMISSIBLE VELOCITIES FOR ROCK LINED CHANNELS AND RIPRAP				
NSA No.	Graded Rock Size (In.)			Permissible Velocity fps
	Maximum	D <sub>50</sub>	Minimum	
R-1	1.5	.75	NO. 8	2.5
R-2	3	1.50	1	4.5
R-3	6	3	2	6.5
R-4	12	6	3	9.0
R-5	18	9	5	11.5
R-6	24	12	7	13.0
R-7	30	15	12	14.5

PERMISSIBLE VELOCITIES BASED ON ROCK AT 165 LBS. PER CUBIC FOOT. ADJUST VELOCITIES FOR OTHER ROCK WEIGHTS USED.

TABLE 8. - MAXIMUM PERMISSIBLE VELOCITIES FOR RENO MATTRESS AND GABIONS				
Type	n	Thickness (Inches)	Rock Fill Gradation (Inches)	Permissible Velocity (FPS)
Reno Mattress	.025	6	3-6	13.5
	.025	9	3-6	16.0
	.025	12	4-6	18.0
Gabion	.027	18+	5-9	22.0

### **30. EROSION CONTROL BLANKET FOR STEEP SLOPES**

Steep slopes that are disturbed for utility line construction such as roadway/railroad cut or embankment slopes greater than 3 horizontal to 1 vertical should be protected against erosion with erosion control blankets or mats suitable for the establishment of vegetation. The erosion control blankets should be installed immediately after the soil amendments and the seed are applied. Erosion control blankets should also be installed on other steep right-of-way slopes where erosion will be a problem until vegetation is established.

The installation procedure should comply with the manufacturer's recommendations, including slope preparation, orientation, trenching, overlap and spacing of staples.

### **31. STABILIZATION DURING NON-GROWING SEASONS**

All utility line construction should be planned for completion within the recommended dates for the application of permanent seeding and establishment of a permanent vegetative cover. However, when emergency utility line construction must be done and is completed during a non-growing season (wintertime, etc.), Interim stabilization BMP's must be implemented and adequately maintained. The application of straw mulch at the rate of three tons per acre is recommended. The BMP's should be checked weekly (unless snow covered) to identify areas that become bare.

These bare areas should be covered with a properly installed erosion control blanket. All temporary erosion and sediment pollution controls must be maintained until perennial vegetation is established.

### **32. PERMANENT STABILIZATION**

Permanent control BMP's such as slope breakers/interceptor dikes/water bars, etc., Should be in place prior to application of soil amendments, seed and mulch. The objective should be to obtain a perennial vegetative cover that is resistant to erosion. The acceptable standard for vegetative stabilization is a uniform 70% cover.

- A. Seed mixtures – seed mixtures should be suited to the climatic, topographic, and soil conditions encountered on the project. It is recommended that a standard reference such as the Pennsylvania State University Agricultural Extension publication “EROSION CONTROL & CONSERVATION PLANTINGS ON NON-CROPLAND” be used to choose appropriate seed mixtures. Note: seed mixtures used in wetland areas should be compatible with the restoration of the native hydrophytic vegetation and/or meet the requirements of other applicable Department and federal permits.
  
- B. Soil testing is generally recommended for determining the type and rate of soil amendments that should be applied. On very large utility line projects this may not be feasible and is not a Department requirement. If soil testing is not done, then the type and rate of soil additives or amendments used should be taken from the same reference from which the seed mixture was obtained. Where utility lines cross active, abandoned or reclaimed surface mined lands or other areas with known or suspected severe acid soil conditions, then soil testing in those areas is recommended.
  
- C. Mulch - mulch should be in the form of hay or straw applied at the rate of 3 tons per acre. Wood-cellulose is not recommended as a mulching material for most utility line applications.

## NOTES

## NOTES

This and related environmental information are available electronically via Internet. For more information, visit us through the PA PowerPort at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (choose PA Keyword "Erosion Control").