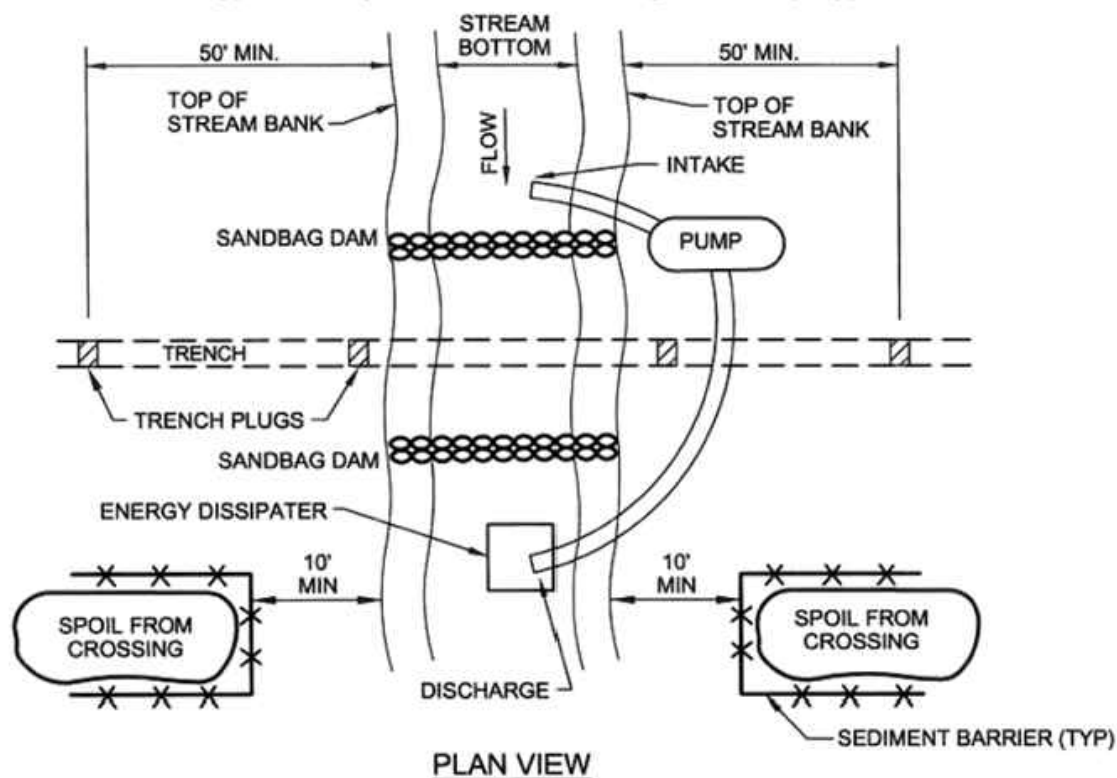


**STANDARD CONSTRUCTION DETAIL #13-2**  
**Typical Utility Line Stream Crossing with Pump Bypass**



PA DEP

**Grubbing shall not take place within 50 feet of top-of-bank until all materials required to complete crossing are on site and pipe is ready for installation.**

**Bypass pump intake shall be maintained a sufficient distance from the bottom to prevent pumping of channel bottom materials.**

**Trench plugs shall be installed within the trench on both sides of the stream channel (Standard Construction Detail #13-4).**

**Water accumulating within the work area shall be pumped to a pumped water filter bag or sediment trap prior to discharging into any receiving surface water.**

**Hazardous or pollutant material storage areas shall be located at least 100 feet back from the top of streambank.**

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

**All disturbed areas within 50 feet of top-of-bank shall be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized.**

**Appropriate streambank protection shall be provided within the channel.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

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FALCON ETHANE PIPELINE SYSTEM (AE)

SHELL PIPELINE COMPANY LP

**DET01 - DETAILS**  
**DAM & PUMP STREAM CROSSING**  
 WASHINGTON, ALLEGHENY, AND BEAVER CO. PA

DATE: 09/14/17

BY: BW

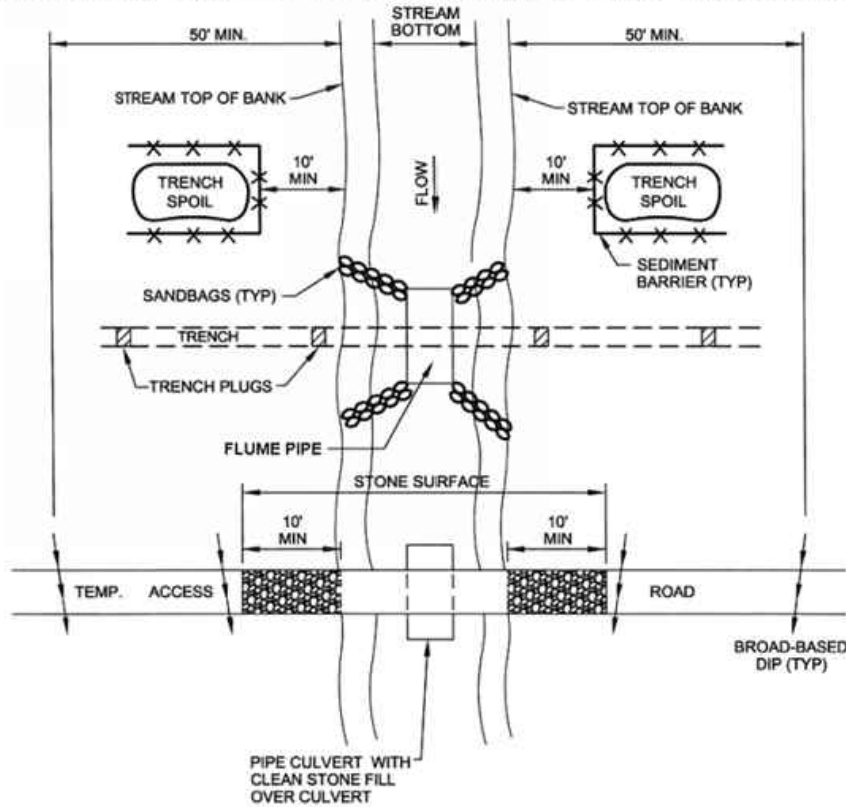
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**STANDARD CONSTRUCTION DETAIL #13-1**  
**Typical Utility Line Flumed Stream Crossing with Optional Access Road**



PLAN VIEW

PA DEP

**Grubbing shall not take place within 50 feet of top-of-bank until all materials required to complete crossing are on site and pipe is ready for installation.**

**Pipe culvert for access road and flume pipe may be one continuous pipe.**

**Trench plugs shall be installed within the trench on both sides of the stream channel (Standard Construction Detail #13-4).**

**Water accumulating within the work area shall be pumped to a pumped water filter bag or sediment trap prior to discharging into any surface water.**

**Hazardous or pollutant material storage areas shall be located at least 100 feet back from the top of streambank.**

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

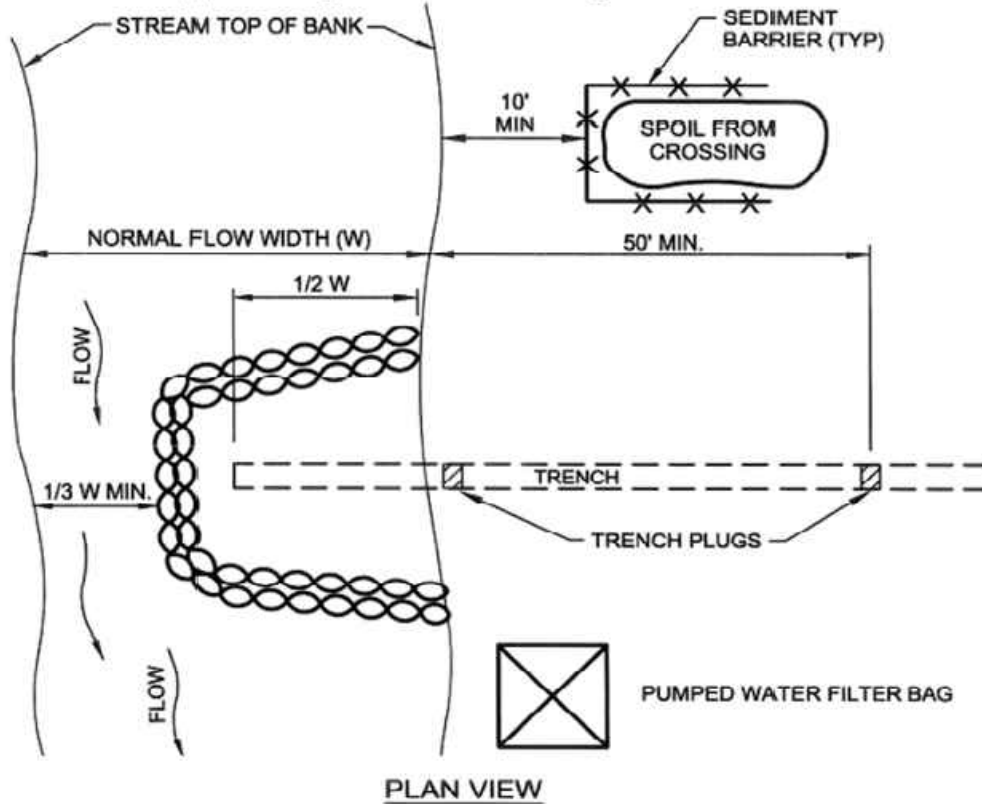
**All disturbed areas within 50 feet of top-of-bank shall be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized. Appropriate streambank protection shall be provided within the channel.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

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BY:		BW				0

**STANDARD CONSTRUCTION DETAIL #13-3  
Typical Utility Line Stream Crossing with Cofferdam**



PA DEP

**Grubbing shall not take place within 50 feet of top-of-bank until all materials required to complete crossing are on site and pipe is ready for installation.**

**Trench plugs shall be installed within the trench on both sides of the stream channel (Standard Construction Detail #13-4).**

**Water accumulating within the work area shall be pumped to a pumped water filter bag or sediment trap prior to discharging into any receiving surface water.**

**Hazardous or pollutant material storage areas shall be located at least 100 feet back from the top of streambank.**

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

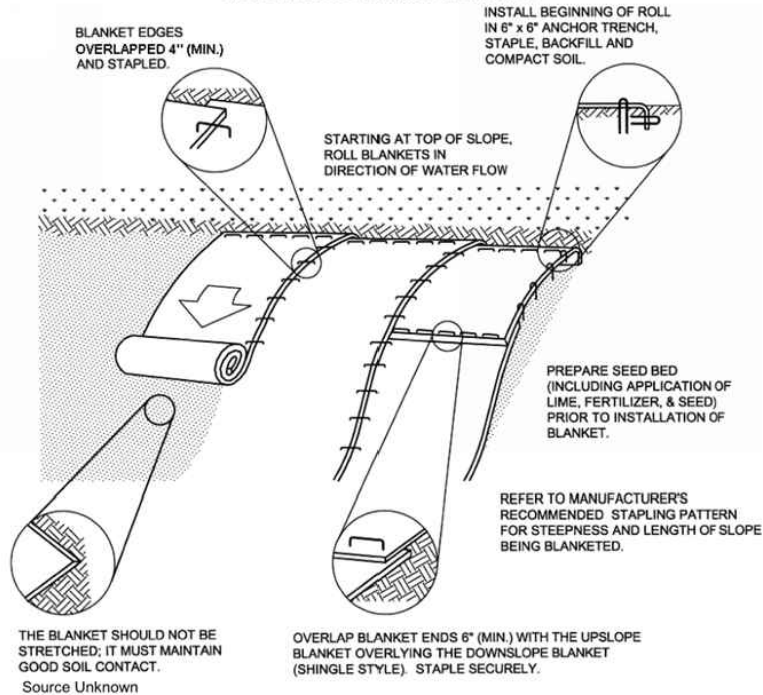
**All disturbed areas within 50 feet of top-of-bank shall be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

Filename: Y:\PROJECTS\1747\SHELL\60489885 - FALCON\900-WORK\911-ENVIRONMENTAL\20-SHEETS\SITESPECIFICS\PENNSYLVANIA\DETAILS.DWG  
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SHELL PIPELINE COMPANY LP					
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BY:		BW		SPLC-GOM-AE-SA124664	

**STANDARD CONSTRUCTION DETAIL # 11-1**  
**Erosion Control Blanket Installation**



Seed and soil amendments shall be applied according to the rates in the plan drawings prior to installing the blanket.

Provide anchor trench at toe of slope in similar fashion as at top of slope.

Slope surface shall be free of rocks, clods, sticks, and grass.

Blanket shall have good continuous contact with underlying soil throughout entire length. Lay blanket loosely and stake or staple to maintain direct contact with soil. Do not stretch blanket.

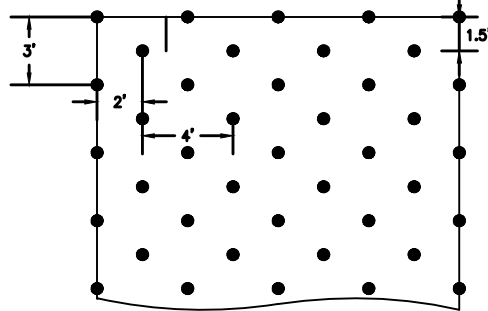
The blanket shall be stapled in accordance with the manufacturer's recommendations.

Blanketed areas shall be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70% coverage throughout the blanketed area. Damaged or displaced blankets shall be restored or replaced within 4 calendar days.

Source: PaDEP, E&S Pollution Control Manual, March 2012.

Note: Contractor to use single mat straw fiber matrix for all slopes 3:1 and flatter. Use double mat straw fiber matrix on all slopes greater than 3:1. Hydraulically applied erosion control blankets may be used in lieu of erosion control blankets.

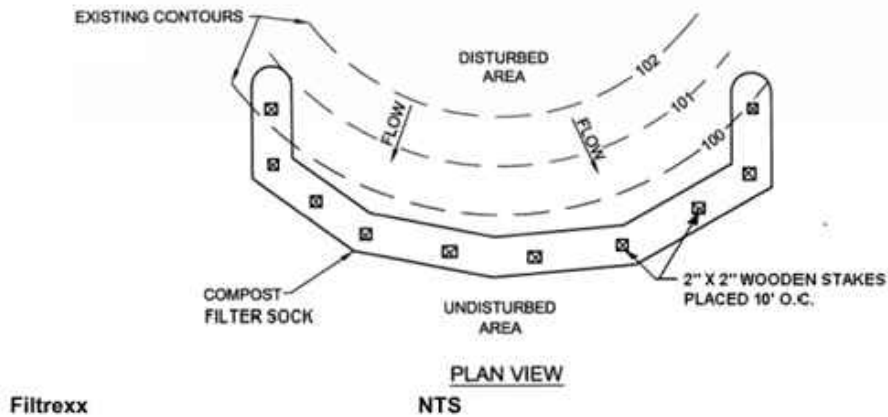
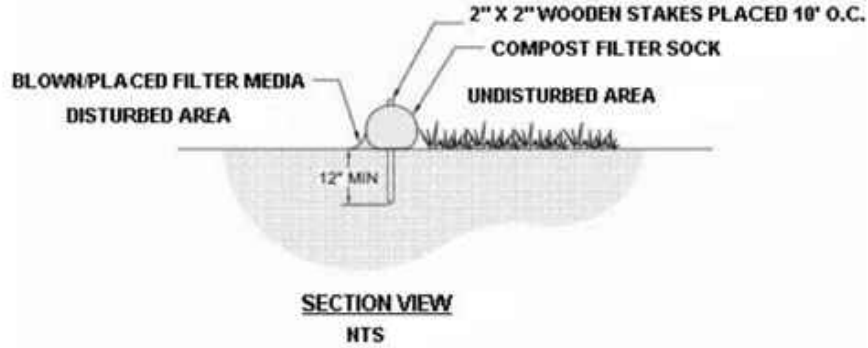
**TYPICAL EROSION CONTROL BLANKET STAPLE PATTERN DETAIL**



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BY:		BW				

## STANDARD CONSTRUCTION DETAIL #4-1 COMPOST FILTER SOCK



**Sock fabric shall meet standards of Table 4.1. Compost shall meet the standards of Table 4.2.**

**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 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2. Stakes may be installed immediately downslope of the sock if so specified by the manufacturer.**

**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.**

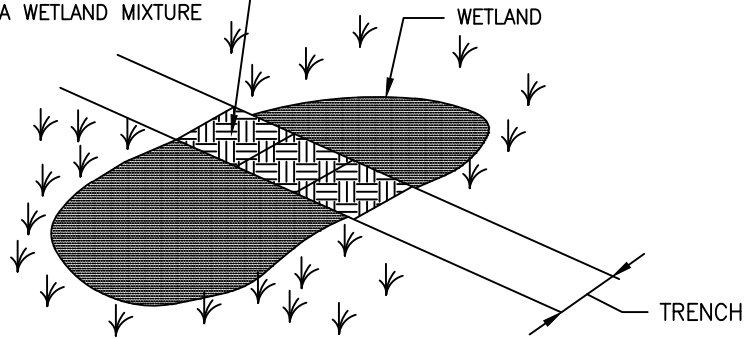
**Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

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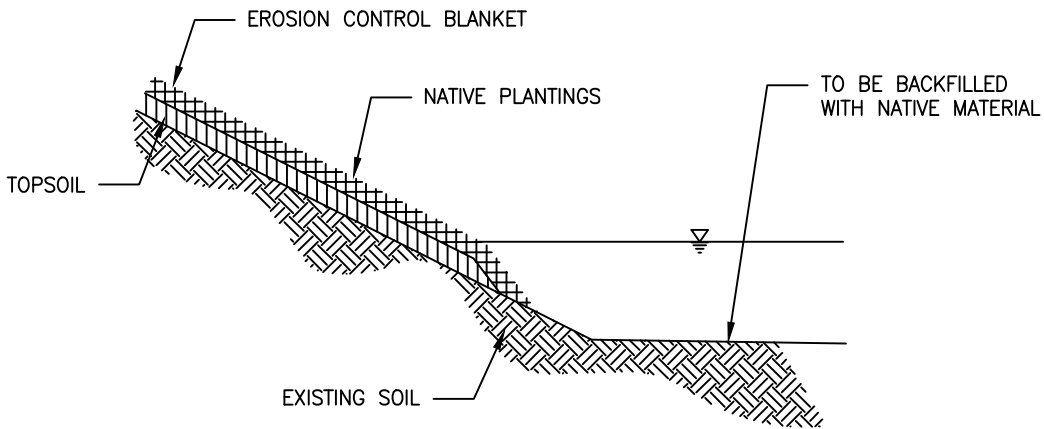
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RETURN TO PRECONSTRUCTION  
GRADE AND THEN MULCH AND  
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**TYPICAL WETLAND RESTORATION**

SCALE: N.T.S.



**BANK RESTORATION DETAIL**

SCALE: N.T.S.

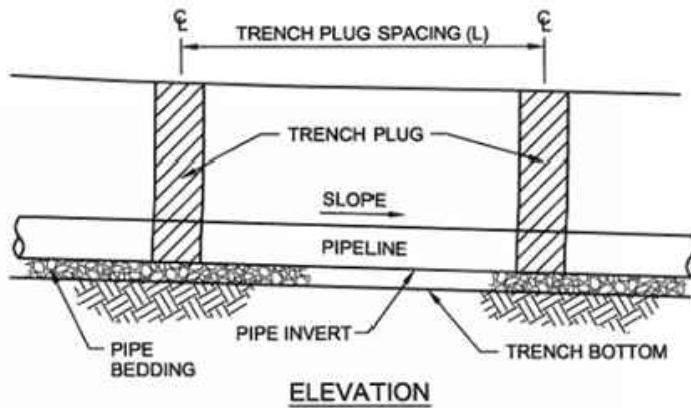
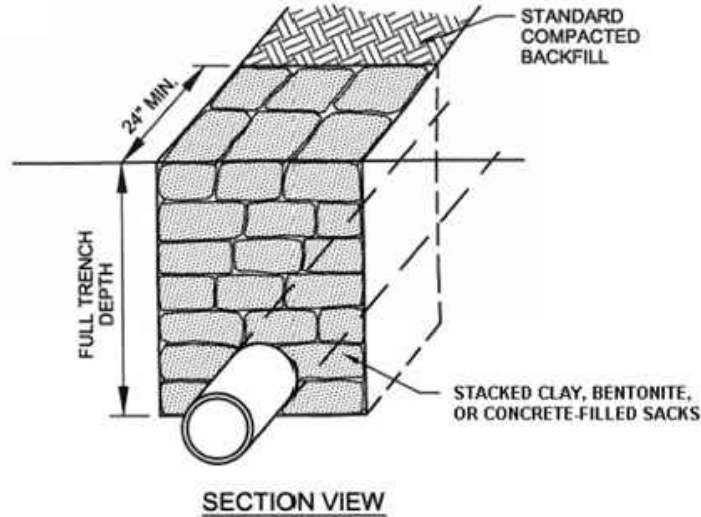
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FALCON ETHANE PIPELINE SYSTEM (AE)	
SHELL PIPELINE COMPANY LP	
<b>DET06 - DETAILS</b>	
<b>STREAM &amp; WETLAND RESTORATION</b>	
WASHINGTON, ALLEGHENY, AND BEAVER CO. PA	
DATE:	09/14/17
BY:	BW
SPLC-GOM-AE-SA124667	
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**STANDARD CONSTRUCTION DETAIL # 13-4**  
**Typical Trench Plug Installation**



PA DEP

**TABLE 13.1**  
**Maximum Spacing and Materials for Trench Plugs**

Trench Slope (%)	Spacing L (FT)	Plug Material
< 5	1,000	* Clay, Bentonite, or Concrete Filled Sacks
5 - 15	500	* Clay, Bentonite, or Concrete Filled Sacks
15 - 25	300	* Clay, Bentonite, or Concrete Filled Sacks
25 - 35	200	* Clay, Bentonite, or Concrete Filled Sacks
35 - 100	100	* Clay, Bentonite, or Concrete Filled Sacks
> 100	50	Cement Filled Bags (Wetted) or Mortared Stone

**\*TOPSOIL MAY NOT BE USED TO FILL SACKS.**

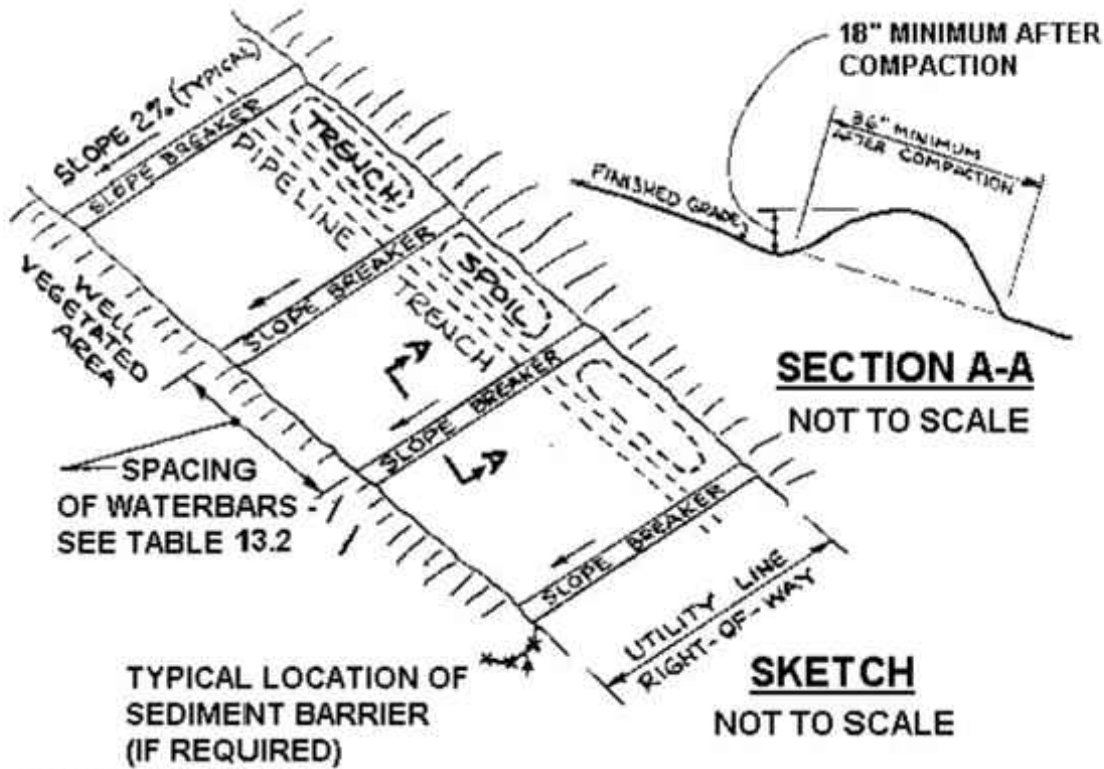
**Impervious trench plugs are required for all stream, river, wetland, or other water body crossings.**

Source: PaDEP, E&S Pollution Control Manual, March 2012.

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**FIGURE 13.1**  
**Waterbar Installation on a Utility Line Right-of-way**



PA DEP

**TABLE 13.2**  
**Maximum Spacing for Permanent Waterbars on a Utility Line Right-of-way**

Percent Slope	Spacing (FT)
< 5	250
5 - 15	150
15 - 30	100
> 30	50

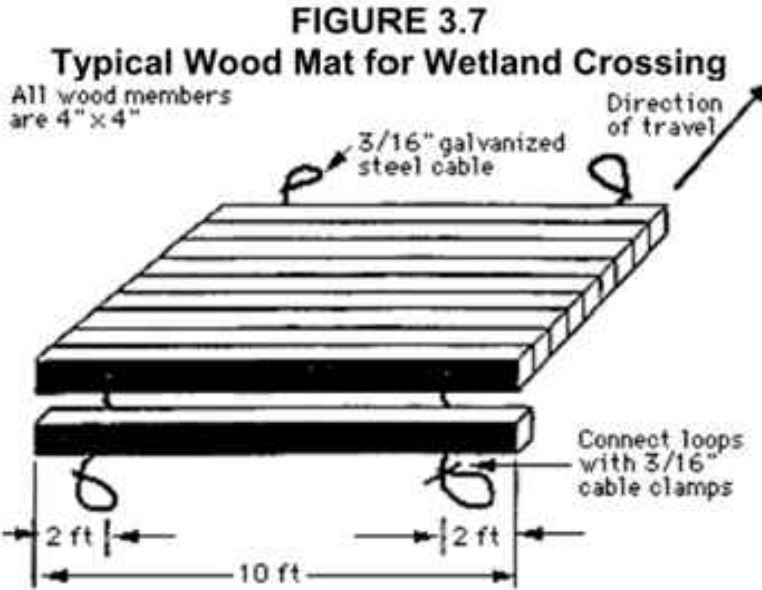
Source: PaDEP, E&S Pollution Control Manual, March 2012

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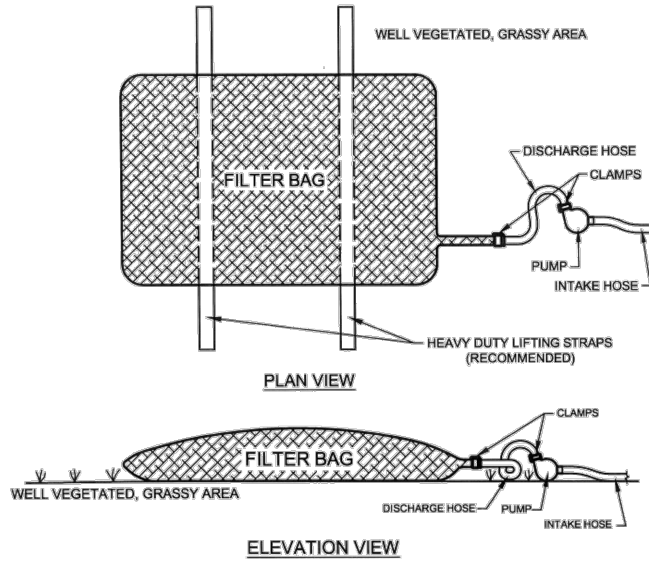


University of Minnesota FS 07009  
**A geotextile underlayment shall be used under the wood mat.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

						FALCON ETHANE PIPELINE SYSTEM (AE)
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**STANDARD CONSTRUCTION DETAIL # 3-16  
Pumped Water Filter Bag**



PA DEP

Low volume 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. High volume filter bags shall be made from woven geotextiles that meet the following standards:

Property	Test Method	Minimum Standard
Avg. Wide Width Strength	ASTM D-4884	60 lb/in
Grab Tensile	ASTM D-4632	205 lb
Puncture	ASTM D-4833	110 lb
Mullen Burst	ASTM D-3786	350 psi
UV Resistance	ASTM D-4355	70%
AOS % Retained	ASTM D-4751	80 Sieve

A suitable means of accessing the bag with machinery required for disposal purposes shall be provided. Filter bags shall be replaced when they become ½ full of sediment. Spare bags shall be kept available for replacement of those that have failed or are filled. Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already attached.

Bags shall be located in well-vegetated (grassy) area, and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile underlayment and flow path shall be provided. Bags may be placed on filter stone to increase discharge capacity. Bags shall not be placed on slopes greater than 5%. For slopes exceeding 5%, clean rock or other non-erodible and non-polluting material may be placed under the bag to reduce slope steepness.

No downslope sediment barrier is required for most installations. Compost berm or compost filter sock shall be installed below bags located in HQ or EV watersheds, within 50 feet of any receiving surface water or where grassy area is not available.

The pump discharge hose shall be inserted into the bags in the manner specified by the manufacturer and securely clamped. A piece of PVC pipe is recommended for this purpose.

The pumping rate shall be no greater than 750 gpm or ½ the maximum specified by the manufacturer, whichever is less. Pump intakes shall be floating and screened.

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

FALCON ETHANE PIPELINE SYSTEM (AE)

SHELL PIPELINE COMPANY LP

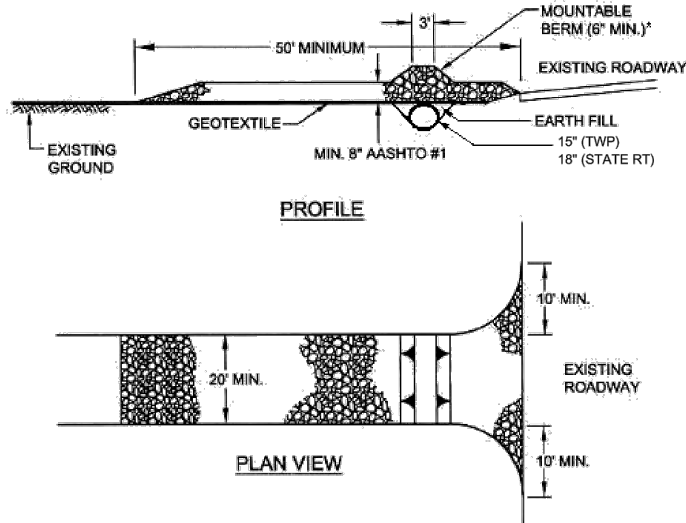
**DET10 – DETAILS  
PUMP WATER FILTER BAG  
WASHINGTON, ALLEGHENY, AND BEAVER CO. PA**

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**STANDARD CONSTRUCTION DETAIL # 3-1  
Rock Construction Entrance**



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.

THE CULVERT PIPE SHALL BE SIZED TO A LARGER DIAMETER TO ACCOMMODATE STREAM FLOW IN DITCHES AND STREAMS THAT EXCEED THE FULL FLOW CAPACITY OF A 15 INCH OR 18 INCH DIAMETER PIPE AT A 1% SLOPE; CALCULATE THE PEAK FLOW CONDITION FOR A 2 YEAR – FIVE MINUTE STORM INTENSITY FOR THE CONTRIBUTING RUNOFF AREA. PROVIDE THE PERMIT MANAGER AND THE ROADWAY ENGINEER WITH SUPPORTING CALCULATIONS. OVERTOPPING FLOW IS NOT PERMITTED.

CULVERT PIPE MATERIAL – HDPE; CONCRETE; CORRUGATED STEEL; STEEL; PROVIDE AND INSTALL THE CULVERT PIPE IN THE DITCH FLOWLINE, EXCAVATE THE DITCHLINE TO ACCOMMODATE THE PIPE DIAMETER, WIDEN THE DITCHLINE UPSTREAM AND DOWNSTREAM TO ACCOMMODATE THE PIPE DIAMETER AND PROVIDE COVER OVER THE PIPE TO PROTECT FROM VEHICLE TRAFFIC. CONTACT THE ROADWAY ENGINEER FOR APPROVAL PRIOR TO SUBSTITUTING MULTIPLE PIPES AND DIFFERING PIPE DIAMETERS TO PROVIDE ADEQUATE FLOW CAPACITY. REPLACE ANY DAMAGED CULVERT PIPE WITHIN 8 HOURS OF DISCOVERY. DAMAGED CULVERT PIPE INCLUDES; CRUSHED ENDS, OUT OF ROUND PIPE, SEPARATION, CRACKS AND VOIDS IN THE PIPE.

INSPECT THE CULVERT PIPE ONCE PER WEEK AND RECORD THE CONDITION IN THE DAILY LOGS.

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.

WASH RACKS OR VACUUM TRUCKS MUST BE USED ON ABACT PROJECTS.

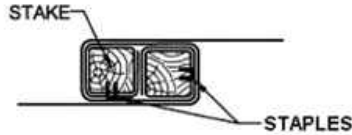
SOURCE: Adapted from PA DEP, E&S Pollution Control Manual, March 2012.

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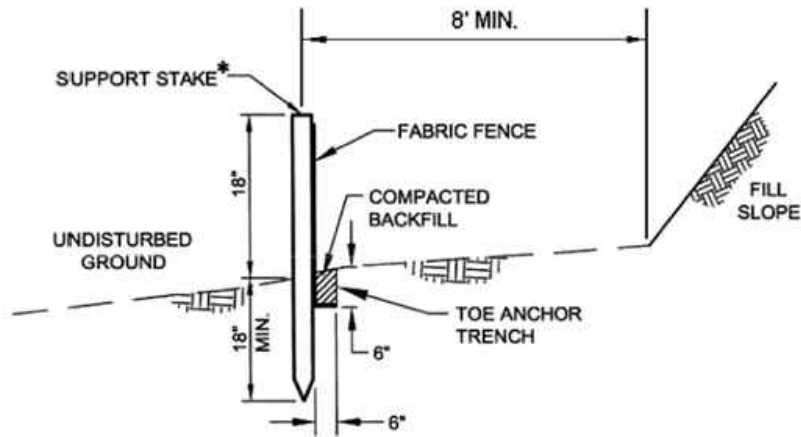
FALCON ETHANE PIPELINE SYSTEM (AE)					
SHELL PIPELINE COMPANY LP					
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**STANDARD CONSTRUCTION DETAIL # 4-7**  
**Standard Silt Fence (18" High)**

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



JOINING FENCE SECTIONS



ELEVATION VIEW

PA DEP

Fabric shall have the minimum properties as shown in Table 4.3.

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 4.1).

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 (Standard Construction Detail # 4-6).

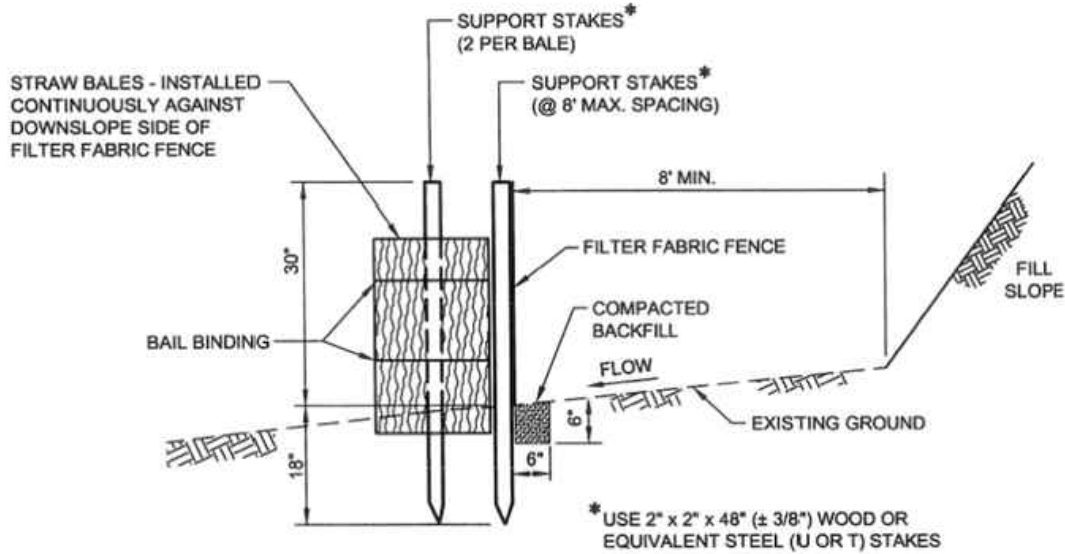
Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

Source: PaDEP, E&S Pollution Control Manual, March 2012

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						DATE:	09/14/17
						BY:	BW
						SPLC-GOM-AE-SA124673	
						REV.	0

**STANDARD CONSTRUCTION DETAIL # 4-9  
Silt Fence Reinforced by Staked Straw Bales**



PA DEP

**Fabric shall have the minimum properties as shown in Table 4.3.**

**This BMP is not suitable for projects lasting longer than 3 months unless bales are replaced quarterly.**

**Fabric width shall be 42" minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes.**

**Silt fence shall be installed at existing level grade. Both ends of each fence section shall be extended at least 8 feet upslope at 45 degrees to the main fence alignment (Figure 4.1).**

**Sediment shall be removed where accumulations reach half the aboveground height of the fence.**

**Any fence section which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail # 4-6).**

**Fence shall be removed and properly disposed of when tributary area is permanently stabilized.**

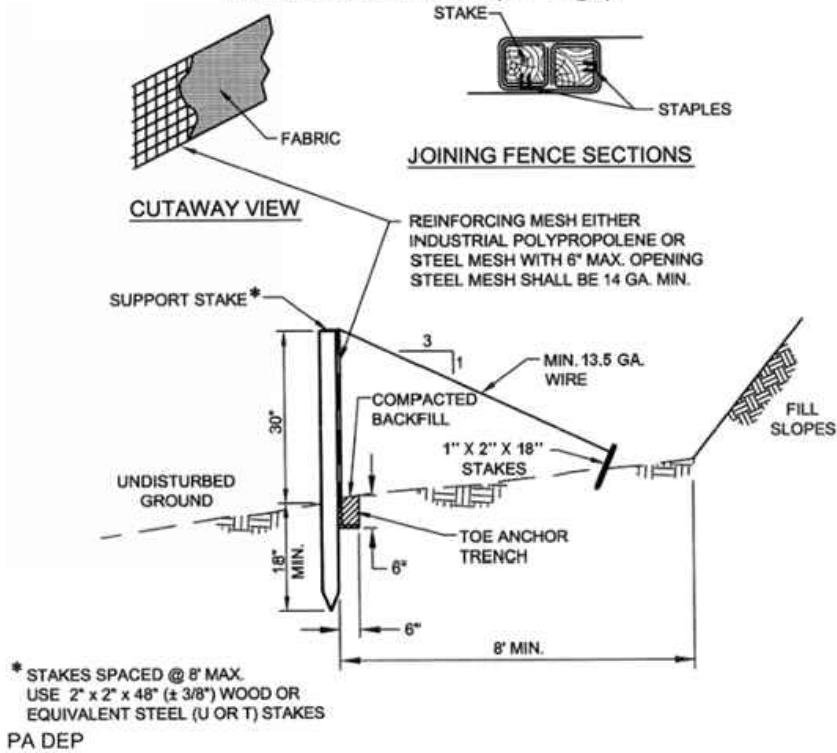
Source: PaDEP, E&S Pollution Control Manual, March 2012

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### STANDARD CONSTRUCTION DETAIL # 4-8 Reinforced Silt Fence (30" High)



Fabric shall have the minimum properties as shown in Table 4.3.

Fabric width shall be 42" minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes. An 18" support stake shall be driven 12" minimum into undisturbed ground.

Silt fence shall be installed at existing level grade. Both ends of each fence section shall be extended at least 8 feet upslope at 45 degrees to the main fence alignment (Figure 4.1).

Sediment shall be removed where accumulations reach half the aboveground height of the fence.

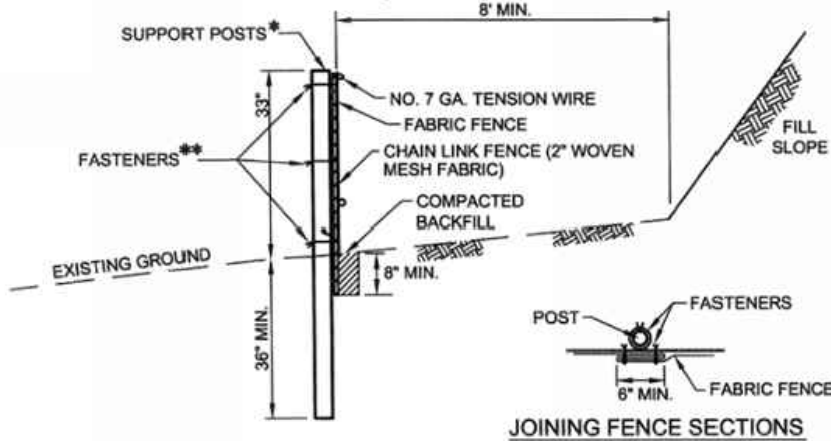
Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail # 4-6).

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

Source: PaDEP, E&S Pollution Control Manual, March 2012

FALCON ETHANE PIPELINE SYSTEM (AE)					
SHELL PIPELINE COMPANY LP					
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BY:		BW		SPLC-GOM-AE-SA124675	

**STANDARD CONSTRUCTION DETAIL # 4-10  
Super Silt Fence**



- \* POSTS SPACED @ 10' MAX. USE 2 1/2" DIA. HEAVY DUTY GALVANIZED OR ALUMINUM POSTS.
- \*\* CHAIN LINK TO POST FASTENERS SPACED @ 14" MAX. USE NO. 9 GA. ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL PRE-FORMED CLIPS. CHAIN LINK TO TENSION WIRE FASTENERS SPACED @ 60" MAX. USE NO. 13.5 GA. GALVANIZED STEEL WIRE. FABRIC TO CHAIN FASTENERS SPACED @ 24" MAX C. TO C.

PA DEP

**Fabric shall have the minimum properties as shown in Table 4.3.**

**Filter fabric width shall be 42" minimum.**

**Posts shall be installed using a posthole drill.**

**Chain link shall be galvanized No. 11.5 Ga. steel wire with 2 1/4" opening, No. 11 Ga. aluminum coated steel wire in accordance with ASTM-A-491, or galvanized No. 9 Ga. steel wire top and bottom with galvanized No. 11 Ga. steel intermediate wires. No. 7 gage tension wire to be installed horizontally through holes at top and bottom of chain-link fence or attached with hog rings at 5' (max.) centers.**

**Silt fence shall be placed at existing level grade. Both ends of the fence shall be extended at least 8 feet upslope at 45 degrees to main barrier alignment (Figure 4.1).**

**Sediment shall be removed when accumulations reach half the aboveground height of the fence.**

**Fence shall be removed and properly disposed of when tributary area is permanently stabilized.**

Source: PaDEP, E&S Pollution Control Manual, March 2012

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