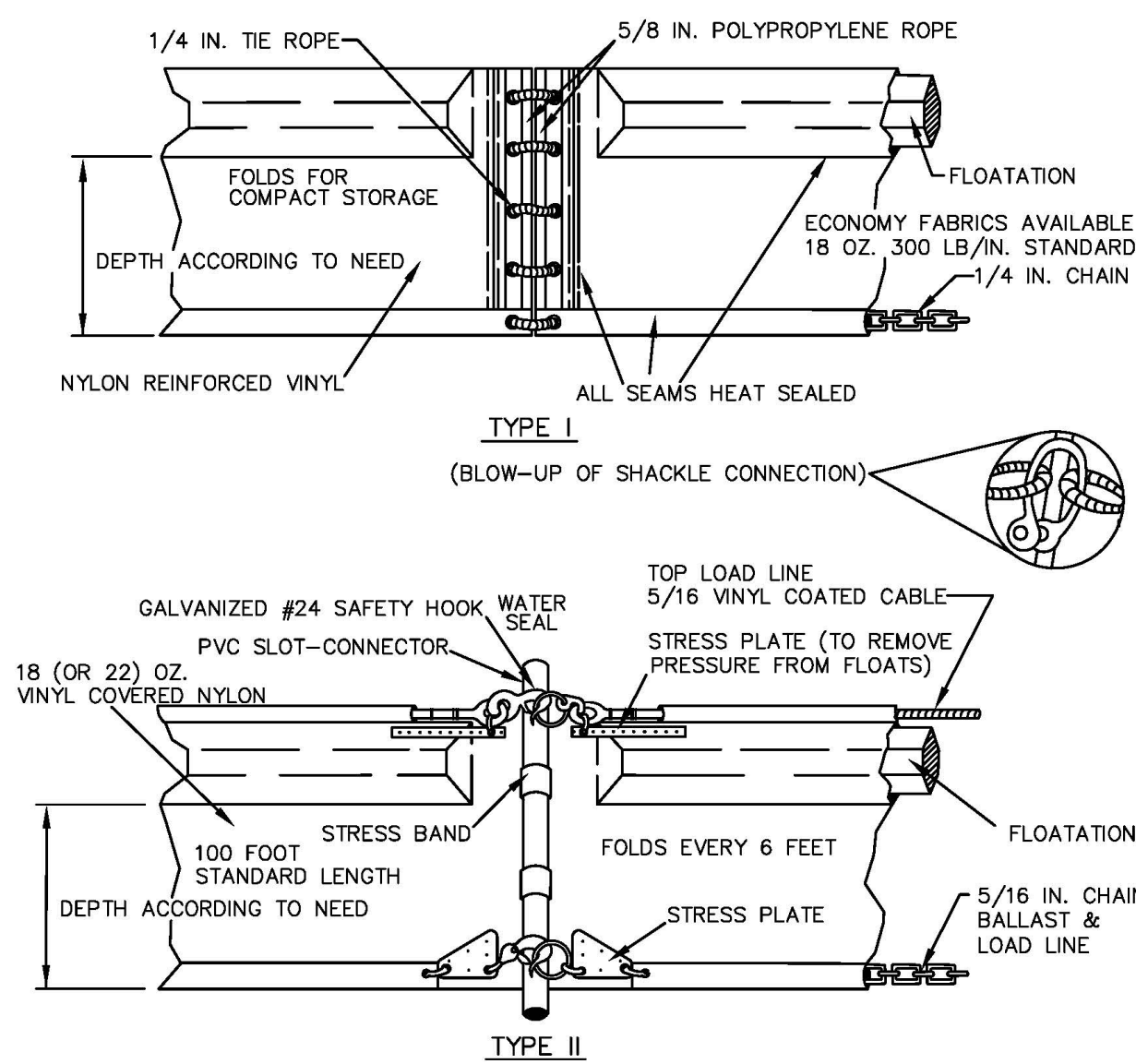


FLLOATING TURBIDITY BARRIER

Construction Specifications

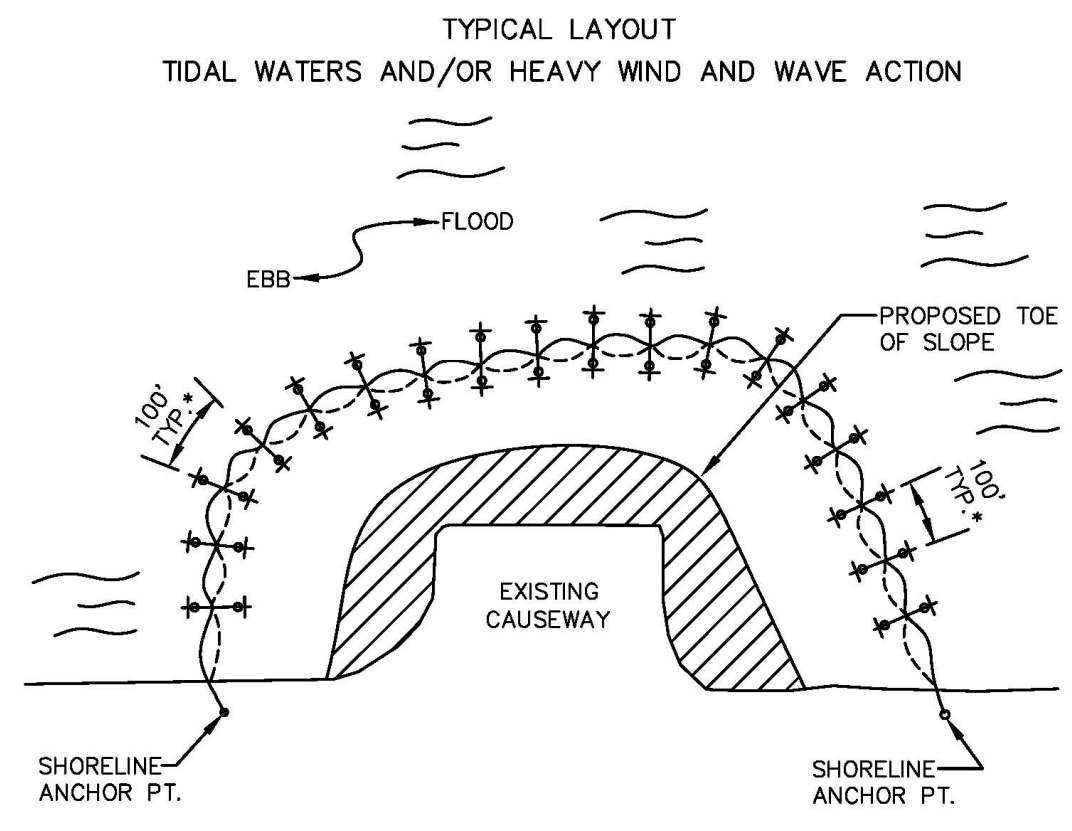
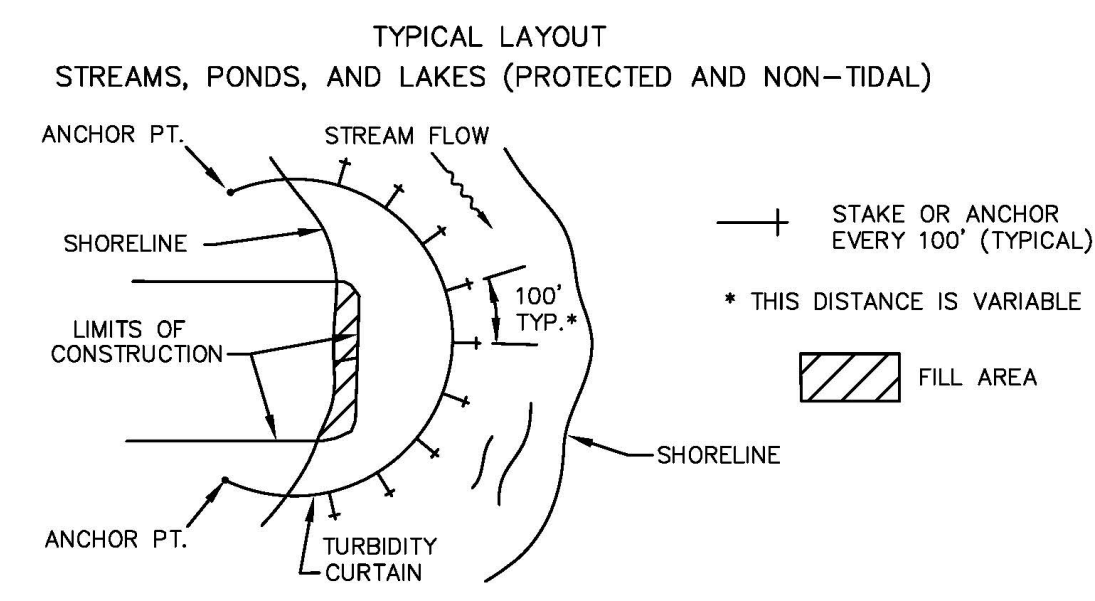
- Materials**
- Barriers should be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.
 - The curtain fabric must meet the minimum requirements noted in Table 3.27-A.
 - Seams in the fabric shall be either vulcanized welded or sewn, and shall develop the full strength of the fabric.
 - Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches (8 cm) above the water surface level. (See Plate 4.45c)
 - Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a break strength in excess of 10,000 pounds (4.5 t). The supplemental (bottom) load-line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connecting to load lines in adjacent sections (See Plates 4.45a and 4.45b which portray this orientation).
 - External anchors may consist of 2 x 4 inch (5 x 10 cm) or 2-1/2 inch (6 cm) minimum diameter wooden stakes, or 1.33 pounds/linear foot (2 kg/m) steel posts when Type I installation is used; when Type II or Type III installations are used, bottom anchors should be used.
 - Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line would then run from the buoy to the top load line of the curtain. When used with Type III installations, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and expected wind and wave action; manufacturer's recommendations should be followed. See orientation of external anchors and anchor buoys for tidal installation in Plate 4.45b.



FLLOATING TURBIDITY BARRIERS TYPE I & II

Installation

- In the calm water of lakes or ponds (Type I installation) it is usually sufficient to merely set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furling condition out and attach it to these stakes or anchor points. Following this, any additional stakes or buoyed anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. Only then, the furling lines should be cut to let the curtain skirt drop.
- In rivers or in other moving water (Type II and Type III installations) it is important to set all the curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the expected current conditions, before putting the furling curtain into the water. Anchor buoys should be employed on all anchors to prevent the current from submerging the floatation at the anchor points. If the moving water into which the curtain is being installed is tidal and will subject the curtain to currents in both directions as the tide changes, it is important to provide anchors on both sides of the curtain for two reasons: a) Curtain movement will be minimized during tidal current reversals. b) The curtain will not overrun the anchors pull them out when the tide reverses. When the anchors are secure, the furling curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. At this point, and before unfurling, the "lay" of the curtain should be assessed and any necessary adjustments made to the anchors. Finally, when the location is ascertained to be as desired, the furling lines should be cut to allow the skirt to drop.
- Always attach anchor lines to the floatation device, not to the bottom of the curtain. The anchoring line attached to the floatation device on the downstream side will provide support for the curtain. Attaching the anchors to the bottom of the curtain could cause premature failure of the curtain due to the stresses imparted on the middle section of the curtain.
- There is an exception to the rule that turbidity curtains should not be installed across channel flows; it occurs when there is a danger of creating a silt buildup in the middle of a watercourse, thereby blocking access or creating a sand bar. Curtains have been used effectively in large areas of moving water by forming a very long-sided, sharp "V" to deflect clean water around a work site, confine a large part of the silt-laden water to the work area inside the "V" and direct much of the silt toward the shoreline. Care must be taken, however, not to install the curtain perpendicular to the water current.
- The effectiveness of the barrier can be increased by installing two parallel curtains, separated at regular intervals by 10' (3 m) long wooden boards or lengths of pipe.



Removal

- Care should be taken to protect the skirt from damage as the turbidity curtain is dragged from the water.
- The site selected to bring the curtain ashore should be free of sharp rocks, broken cement, debris, etc. so as to minimize damage when hauling the curtain over the area.
- If the curtain has a deep skirt, it can be further protected by running a small boat along its length with a crew installing furling lines before attempting to remove the curtain from the water.

Maintenance

- The developer/owner shall be responsible for maintenance of the filter curtain for the duration of the project to ensure the continuous protection of the watercourse.
- Should repairs to the geotextile fabric become necessary, there are normally repair kits available from the manufacturers; manufacturer's instructions must be followed to ensure the adequacy of the repair.
- When the curtain is no longer required as determined by the inspector, the curtain and related components shall be removed in such a manner as to minimize turbidity. Sediment shall be removed and the original depth (or plan elevation) restored before removing the curtain. Remaining sediment shall be sufficiently settled before removing the curtain. Any spoils must be taken to an upland area and stabilized.

TYPICAL INSTALLATION LAYOUTS OF FLOATING TURBIDITY BARRIERS

NPDES NOTES:

- CONTRACTOR IS TO SUBMIT THE NOTICE OF INTENT (NOI) APPLICATION PROVIDED ON THE DEP WEB SITE ALONG WITH THE APPLICATION FEE OF \$250.00 FOR SMALL CONSTRUCTION PROJECTS (LESS THAN 5 ACRES) OR \$400.00 FOR LARGE CONSTRUCTION PROJECTS (5 OR MORE ACRES) TO THE NOTICES CENTER. AUTHORIZATION IS GRANTED 48 HOURS AFTER THE DATE OF THE COMPLETE NOI APPLICATION IS POST-MARKED TO DEP. THE NOTICES CENTER WILL SEND AN ACKNOWLEDGMENT LETTER AFTER RECEIVING AND PROCESSING YOUR COMPLETE NOI APPLICATION AND FEE.
- RESUBMIT NOI PACKAGE EVERY FIVE YEARS (IF CONSTRUCTION ACTIVITY EXCEEDS FIVE YEARS).
- THE APPLICATION FEE IS SUBJECT TO CHANGE. ALWAYS CONFIRM THE AMOUNT BY CALLING THE NOTICES CENTER AT (850) 245-7522.
- THE ADDRESS FOR NPDES STORMWATER NOTICES CENTER IS: FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION 2600 BLAIR STONE ROAD, MS#2510 TALLAHASSEE, FL. 32399-2400
- THE MAILING ADDRESS FOR SOUTH FLORIDA WATER MANAGEMENT DISTRICT IS: P.O. BOX 24680, WEST PALM BEACH, FL 33416-4680

SILT FENCE

Construction Specifications

Materials

- Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester, or polyethylene yarn. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0_ F to 120_ F (-17C to 49C).
- Burlap shall be 10 ounces per square yard (340 g/m²) fabric.
- Posts for silt fences shall be either 4 inch (10 cm) diameter wood, or 1.33 pounds per linear foot (2 kg/m) steel with a minimum length of 5 feet (1.5 m). Steel posts shall have projections for fastening wire to them.
- Stakes for filter barriers shall be 1" x 2" (2.5 x 5 cm) wood (preferred), or equivalent metal with a minimum length of 3 feet (90 cm).
- Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 36 inches (90 cm) in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6 inches (15 cm).

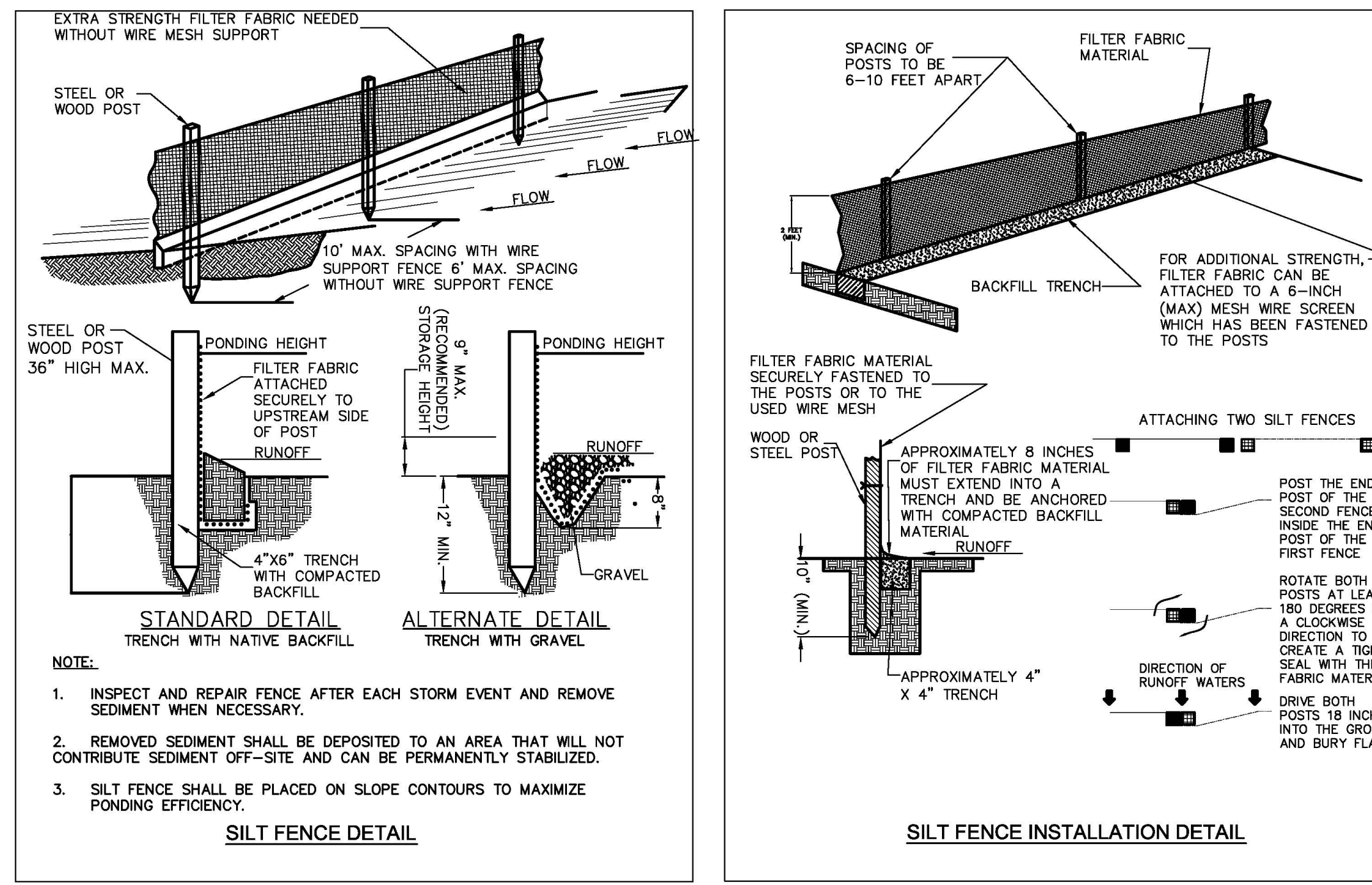
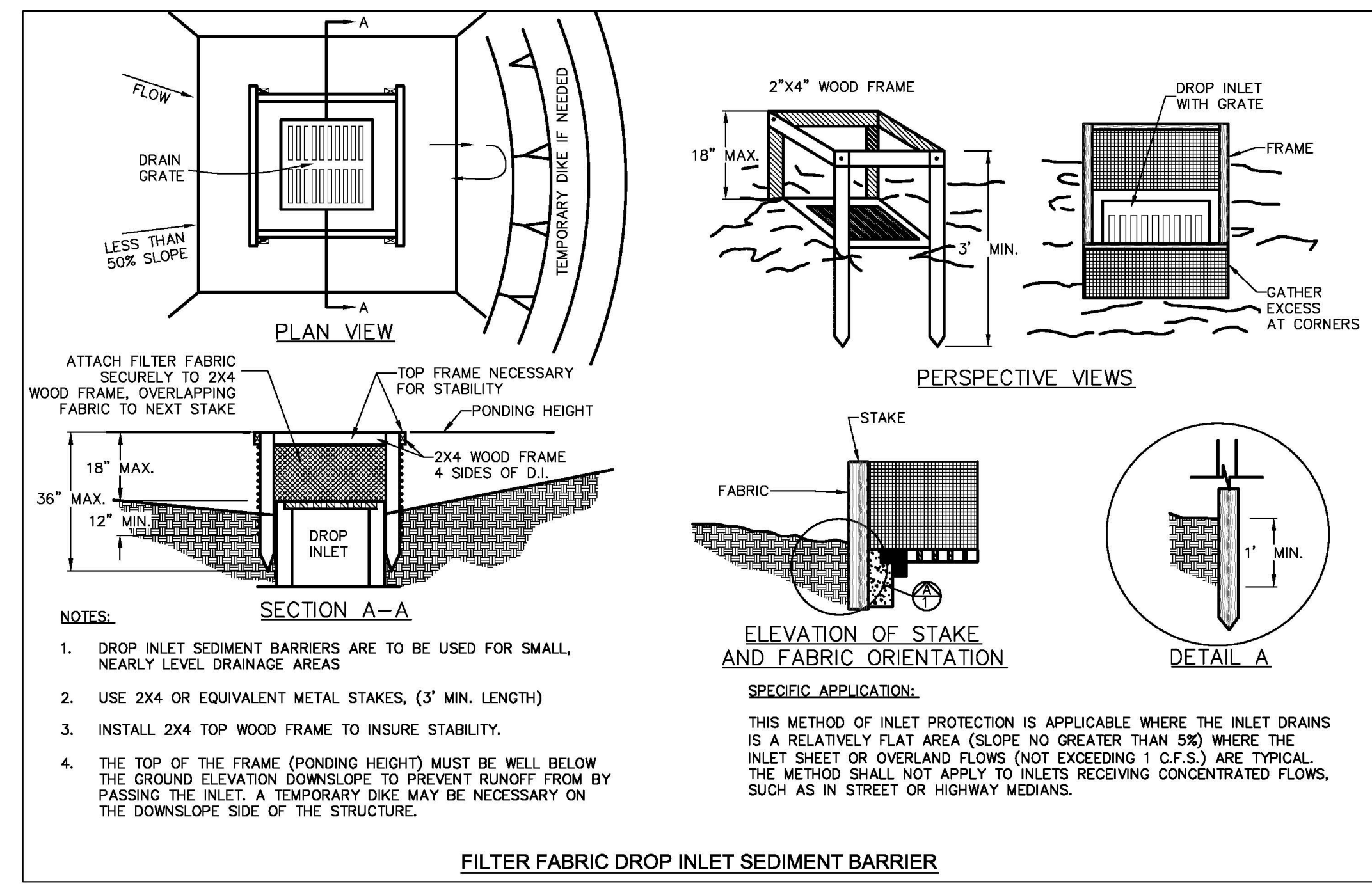
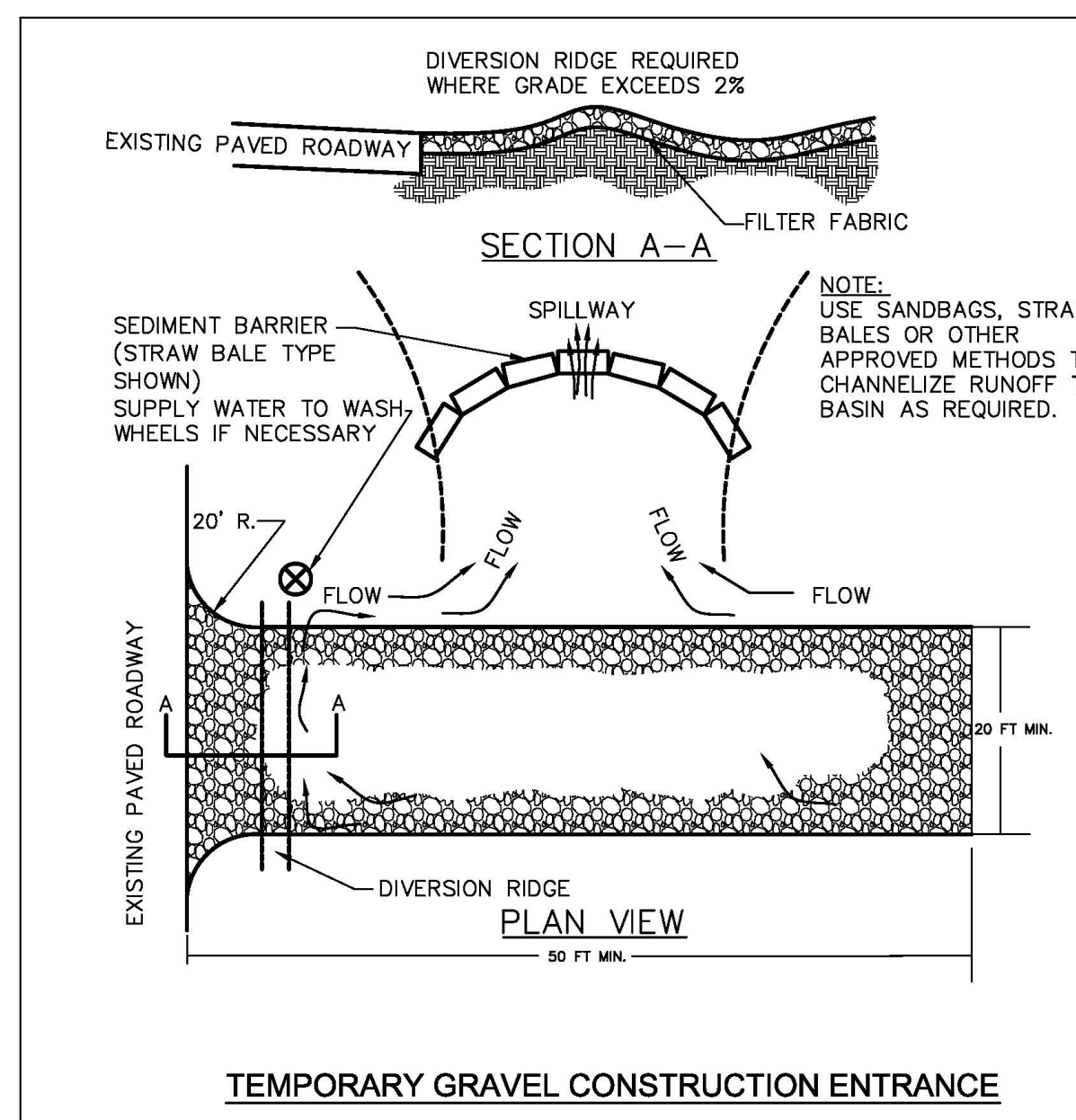
Sheet Flow Application:

Silt Fence This sediment barrier uses standard strength or extra strength synthetic filter fabrics. It is designed for situations in which only sheet or overland flows are expected. (See Plate 4.06d)

- The height of a silt fence shall not exceed 36 inches (90 cm). Higher fences may impound volumes of water sufficient to cause failure of the structure. 2. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced as described in item No. 8 below.
- Posts shall be spaced a maximum of 10 feet (3 m) apart at the barrier location and driven securely into the ground a minimum of 12 inches (30 cm). When extra strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet (1.8 m).
- A trench shall be excavated approximately 4 inches (10 cm) wide and 4 inches (10 cm) deep along the line of posts and upslope from the barrier.
- When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1 inch (25 mm) long, tie wires, or hog rings. The wire shall extend into the trench a minimum of 2 inches (5 cm) and shall not extend more than 36 inches (90 cm) above the original ground surface.
- The standard strength filter fabric shall be stapled or wired to the fence, and 8 inches (20 cm) of the fabric shall be extended into the trench. The fabric shall not extend more than 36 inches (90 cm) above the original ground surface.
- When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of item No. 6 applying.
- When attaching two silt fences together, place the end post of the second fence inside the end post of the first fence. Rotate both posts at least 180 degrees on a clockwise direction to create a tight seal with the filter fabric. Drive both posts into the ground and bury the flap. (See Plate 4.06g)
- The trench shall be backfilled and the soil compacted over the filter fabric.
- The most effective application consists of a double row of silt fences spaced a minimum of three feet apart. The three foot separation is so that if the first row collapses it will not fall on the second row. Wire or synthetic mesh is may be used to reinforce the first row. (See Plate 4.06c)
- When used to control sediments from a steep slope, silt fences should be placed away from the toe of the slope for increased holding capacity. (See Plate 4.06f)
- Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Maintenance

- Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
- Should the fabric on a silt fence or filter barrier decompose or become ineffective before the end of the expected useful life and the barrier still is necessary, the fabric shall be replaced promptly.
- Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the barrier.



NOTES:

- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
- WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

Washing
If conditions on the site are such that most of the mud is not removed by the vehicles traveling over the stone, then the vehicle tires must be washed before entering a public road. Wash water must be carried away from the entrance to a settling area to remove sediment (see Figure 4.3b of the Florida Stormwater Erosion and Sedimentation Control Inspector's Manual). A wash rack may also be used to make washing more convenient and effective (see Figure 4.3c of the Florida Stormwater Erosion and Sedimentation Control Inspector's Manual).

Location
The entrance should be located to provide for maximum utility by all construction vehicles.

Construction Specifications
The entrance area should be cleared of all vegetation, roots, and other objectionable material. A geotextile should be laid down to improve stability and simplify maintenance when gravel is used. The gravel shall then be placed over the geotextile to the specified dimensions.

Maintenance
The stabilized construction exit shall be maintained in a condition that will prevent the tracking or flow of mud onto public rights of way. This may require periodic maintenance as conditions demand, and the repair and/or cleanout of any structures used to trap sediments. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. Look for signs of trucks and trailer equipment "cutting corners" where the construction exit meets the roadway. Sweep the paved road as needed.

BY

REVISIONS

NO. DATE

STORM WATER POLLUTION PREVENTION & EROSION CONTROL

CITY OF MIRAMAR
DEPARTMENT OF
CONSTRUCTION & FACILITIES MANAGEMENT
ENGINEERING STANDARDS

SCALE:
N.T.S.

SHEET NO.
11 OF 11