Chapter 5

Sediment Control

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Brush / Fabric Barrier (BFB)

Description

A dam-like structure constructed from woody residue and faced with a non-woven geotextile fabric to provide a temporary sediment basin. This practice is applicable on sites with a small drainage area of 2 acres or less.

Installation

- Ensure the detention area for the structure is adequate.
- Smooth the foundation area for the brush/fabric barrier.
- Use woody debris from on-site to construct the barrier on a constant elevation with each end upturned to ensure that stormwater flow goes over the barrier and not around.
- Tightly pack the woody debris to form a dam that is 3 to 6 feet tall and at least 5 feet wide at the base. Align the stems with the length of the barrier.
- Trim limbs from the front side of the barrier.
- Face the front of the barrier with 8 oz. non-woven geotextile fabric utilizing the minimum pieces of fabric (one single piece is best to avoid splicing). The minimum vertical splice overlap should be 3 ft. and secured to avoid flows through the splice.
- Anchor the bottom of the fabric in an excavated trench that is at least 6” deep in front of the barrier. Stakes should be placed every 3 ft. in the trench. Tie the top of the

fabric securely with twine to stakes behind the dam.

Maintenance

- Inspect the brush/fabric barrier after rainfall events for flows around or under the structure and repair as needed.
- Remove and properly dispose of sediment before it reaches ½ the height of the barrier.
- Check for gully erosion behind the dam after large rainfall events and repair as needed.
- Remove the brush/fabric dam when the structure is no longer needed, properly disposing of geotextile, woody debris and sediment.
- Stabilize the area with vegetation.

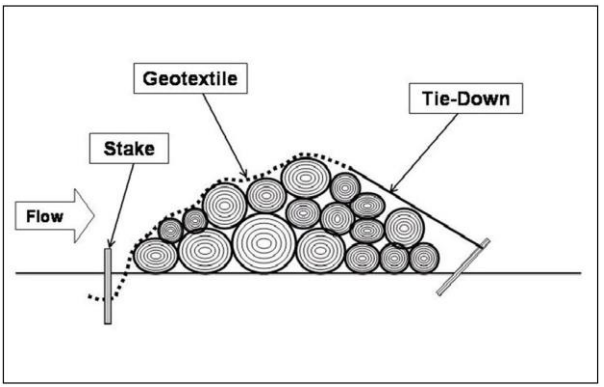

Figure BFB-1 Brush/Fabric Barrier

Flocculant (FL)

Description

A product that causes small suspended soil particles to be drawn together creating “flocs” that settle out of stormwater runoff from construction sites to help minimize turbidity.

Installation

- The application of flocculants should be designed by a qualified credentialed professional.
- The application of flocculants should conform to the design and specifications in the plans.
- Only the approved flocculants for the job can be used and only at the dosage rates and application methods approved.
- A Safety Data Sheet (SDS) for the approved flocculant should be available on the job site.
- Only mix and apply flocculants according to the Occupational Safety and Health Administration (OSHA) SDS requirements.
- Solid form flocculant (logs) should be installed at a location that maintains hydration and shade. Do not place logs in sediment, but in areas of turbulent flow.
- Dry form flocculant can be applied by hand or mechanical spreader. Small applications can be spread by hand.
- Do not apply flocculants directly to streams, wetlands, or other waters of the state.

- All runoff treated with flocculant applications must drain into a sediment basin or other BMP that promotes floc settling prior to discharge from the site.

Maintenance

- Reapply flocculants at specified intervals or when turbidity control is no longer effective.
- Inspect flocculant logs to ensure they are properly located and hydrated.
- Deposition of sediment in basins or other BMPs may require periodic sediment removal.

Inlet Protection (IP)

Description

A barrier placed around a storm drain inlet to temporarily pond runoff water, allowing suspended soil particles to settle out; thereby minimizing sediment entering storm drains during construction.

General

- Ensure that each inlet protection practice has no more than 1 acre of drainage area.
- Gentler approaches provide more storage.
- Do not use where ponding is hazardous to motorists.

Silt Fence Inlet Protection

- Once the earth surface is compacted around the inlet, place 8 oz. non-woven geotextile from the inlet to at least 1 ft. beyond the silt fence. Secure with a double, staggered row of pins on 10 in. centers.
- Place t-posts on max. 3 ft. centers around the inlet.
- Install wire backing tightly from the earth surface to top of posts and secure. Ends of wire should be overlapped 24 inches.
- Place 2 x 4 bracing on top of posts diagonally drilling holes to accommodate posts.
- Install a dewatering device.
- Install the non-woven silt fence fabric (3.5 to 4 oz.) securing tightly to fence with at least

8 in. horizontally on the earth surface. Ends of the fabric should be overlapped 12 inches. Pin securely to earth surface on 5 in. centers.

Figure IP-1 Silt Fence Inlet Protection installation showing geotextile underlayment, steel T-posts, 2 x 4 bracing, and dewatering device.
(Photo courtesy of AU-ESCTF)

Figure IP-2 Silt Fence Inlet Protection installation showing silt fence, geotextile underlayment, steel T-posts, 2 x 4 bracing, and dewatering device.
(Photo courtesy of AU-ESCTF)

Block and Gravel Inlet Protection

- Once the earth surface is compacted around the inlet, place 8 oz. non-woven geotextile from the inlet to at least 1 ft. beyond where the aggregate will be located. Secure with two staggered rows of pins on 10 in. centers. When installing a block and gravel inlet protection on asphalt or concrete surfaces, this first layer of geotextile is not necessary
- Place a second layer of geotextile from the inlet, under the block location, with extra to extend to top of blocks.
- Place cinder blocks with at least one block turned sideways for dewatering. Place hardware cloth over the cinder block opening to use for dewatering.
- Wrap the second layer of geotextile up the face of the blocks, cut at least one opening in the geotextile for dewatering, and place a triangular cross-section of aggregate.

Figure IP-3 Block and Gravel Inlet Protection installation showing geotextile underlayment, gravel, and dewatering device.
(Photo courtesy of AU-ESCTF)

Figure IP-4 Block and Gravel Inlet Protection installation showing dewatering device.
(Photo courtesy of AU-ESCTF)

Sand Bag Inlet Protection

- Once the earth surface is compacted around the inlet, place 8 oz. non-woven geotextile from the inlet to at least 1 ft. beyond where the sand bags will be located. Secure with two staggered rows of pins on 10 in. centers.
- Leave at least 1 ft. between the bags and inlet.
- Orient the three layers of bags into a triangular cross-section with the first layer consisting of two bags oriented tangent to the circle, the second layer consisting of one bag perpendicular to the circle, and the third layer consisting of one bag tangent to the circle.

Figure IP-4 IP-5 Sand Bag Inlet Protection installation.
(Photo courtesy of AU-ESCTF)

Wattle Inlet Protection

- Once the earth surface is compacted around the inlet, place 8 oz. non-woven geotextile from the inlet to at least 1 ft. beyond where the wattle will be located. Secure with two staggered rows of pins on 10 in. centers.
- Dense wattles pond runoff better than porous wattles.
- Place the wattle in a circular fashion at least 1 ft. from the inlet. Wattle ends should be overlapped at least 18 inches and secured with grade stakes or hardwood stakes using a t-pee installation method.
- Stake the wattles with t-pee stakes at least 2 ft. on centers.
- Prevent the wattles from floating by securing with sod staples on each side of the wattle on 10 inch centers.

Figure IP-6 Wattle Inlet Protection installation.
(Photo courtesy of AU-ESCTF)

Manufactured Inlet Protection

Ensure the device:

- Is structurally supported to withstand sediment and hydrostatic loads.
- Ponds water to allow for coarse sediment to settle out of suspension.
- Does not float or undermine.
- Does not cause erosion of the soil surface between the device and the inlet.
- Has a dewatering mechanism to prevent prolonged flooding.
- Is installed according to manufacturer's specifications, ensuring adequate anchoring to ground and a good seal to prevent water from piping under the device.

Maintenance

- Inspect each inlet protection practice after rainfall events and make repairs as needed.
- Remove sediment from the pool area before its capacity is reduced by 50%.
- When the contributing drainage area has been adequately stabilized, remove all materials and sediment and dispose of properly. Fill the disturbed area to the grade of the drop inlet. Stabilize disturbed areas in accordance with the plans.

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Rock Filter Dam (RD)

Description

A stone embankment constructed across natural drainageways with drainage areas of 10 acres or less used to capture sediment from disturbed areas. This practice can also be used as a forebay to a sediment basin.

Installation

- Clear and grub the area under the dam, removing roots, brush and other debris.
- Divert runoff from undisturbed areas away from the rock dam and basin.
- Smooth the dam foundation.
- If specified, cover the foundation with filter fabric, overlapping the downstream strips 1 foot with the upstream strips. Trench the upstream edge of the fabric 1 foot deep into the foundation.
- Construct the dam to the planned dimensions using rock of the specified size and quality.
- Line the face of the dam with gravel of the specified size and thickness.
- After the dam is constructed, clear the basin area.
- Set a marker at the elevation equivalent to 50% of the sediment volume to indicate the clean-out level.
- Stabilize disturbed areas within and around the rock filter dam with vegetation when construction is complete.

- Check finished grades and dimensions for compliance with specifications.
- Check materials for compliance with specifications.

Maintenance

- Check the dam after each storm event for rock displacement and erosion at the abutments and the toe of the dam. Repair and replace rock as needed.
- Remove sediment from the basin when it accumulates to the marked clean-out elevation.
- Replace gravel filter on the dam face if it becomes clogged with sediment.
- After stabilization of the construction site, remove the dam and sediment in the basin, smooth the area and stabilize using vegetation.

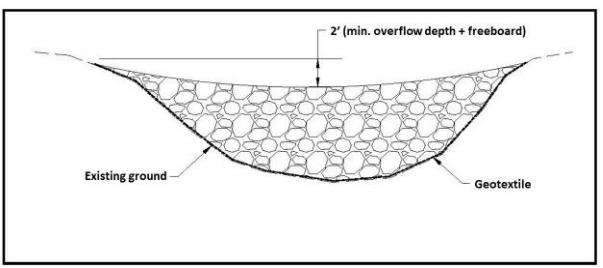

Figure RD-1 Typical Front View of Rock Filter Dam

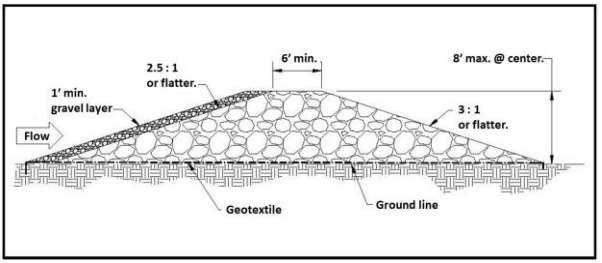

Figure RD-2 Typical Section of Rock Filter Dam

Figure RD-3 Typical Rock Filter Dam

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Sediment Barrier (SB)

Description

A temporary structure across a disturbed landscape, mostly on the contour, that ponds runoff water and reduces the quantity of sediment moving downslope. Sediment barriers include silt fence, sand bags, wattles and various man-made materials. Sediment barriers are used where sheet flow can be ponded to allow sediment to settle out of the water and stay on the construction site.

Installation

Silt fence is the only barrier installation covered in this edition of the Field Guide.

- Begin by determining the exact location of underground utilities so that locations for placement of stakes can be selected where utilities will not be damaged.
- Locate the fence mostly on the contour so that sheet flow from disturbed areas must pond and pass through the fence. Turn the ends of the fence uphill to provide temporary storage of runoff and sediment.
- Generally, silt fence should not be placed across concentrated flow areas such as channels or waterways unless specifically designed by a professional and used as a check dam or inlet protection.
- Smooth the construction zone to provide a broad, nearly level area wide enough to provide storage of runoff and sediment behind the fence.

- If placed near the toe of a slope, the fence should be installed far enough from the slope toe to provide a broad flat area for adequate storage capacity for runoff and sediment.
- Dig at least a 6 in. deep and 6 in. wide trench along the fence alignment.
- Drive posts into the ground to the specified depth on the downslope side of the trench. Space posts a maximum of 10 feet if fence is supported by woven wire (Type A), or 4-6 feet when no woven wire supports the fence (Type B). At locations where runoff water may accumulate, install posts at ½ the recommended spacing.
- Fasten support wire fence for Types A fence to the upslope side of posts and 6" into the trench.
- Attach continuous length of fabric to upslope side of fence posts. Minimize the number of joints. If joints are necessary, fasten fence securely to support posts and overlap to the next post. Avoid joints at low points along the line.
- When joining Type B fence with pre-installed posts, securely wrap the end post together with at least 2 layers of fabric prior to driving the post bundle.
- Place the bottom 12" of fabric in the 6" deep (minimum) trench, lapping toward the upslope side.
- Backfill the trench with compacted earth.
- Provide good access in areas of predicted heavy sedimentation for clean out and maintenance.

- Stabilize disturbed areas with temporary or permanent vegetation. If no vegetation plan exists, use the planting and mulching information found in the permanent seeding, temporary seeding, or the mulching practice.

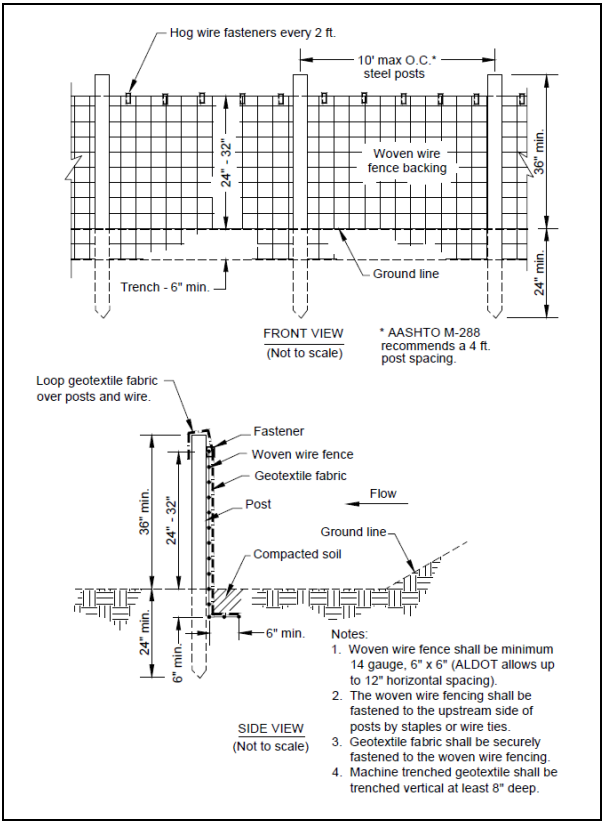

Figure SB-1 Detail of Type A Silt Fence

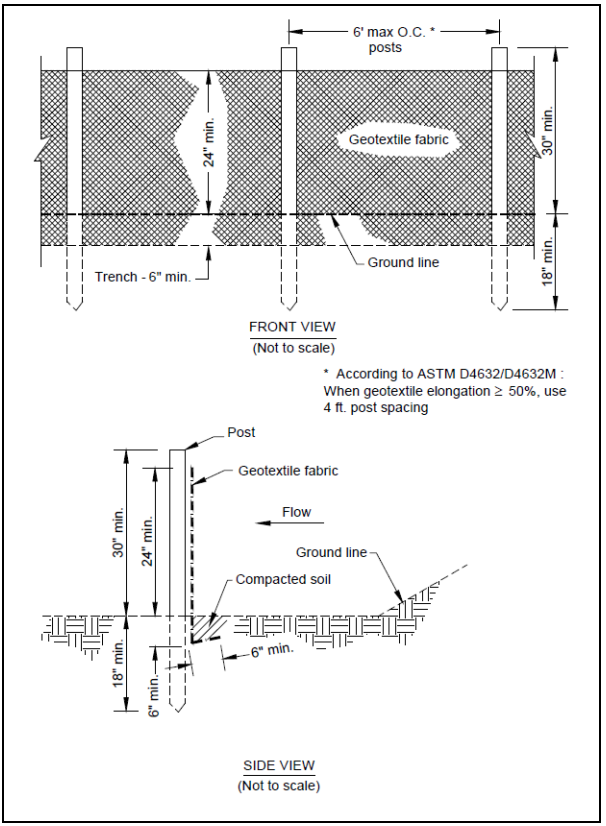

Figure SB-2 Detail of Type B Silt Fence

Maintenance

- Inspect sediment fences at least weekly and after each significant or qualifying rain event and make required repairs immediately.
- Promptly replace the silt fence fabric if it collapses, tears, decomposes or becomes ineffective.

- Remove sediment deposits before they reach a depth of ½ the height of the fence.
- After the contributing drainage area has been stabilized, remove all barrier materials and unstable sediment deposits, bring the area to grade and stabilize it with vegetation.

Figure SB-3 Typical Type B Silt Fence Installation

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Sediment Basin (SBN)

Description

An earthen embankment and/or excavation suitably located to capture runoff, with an auxiliary spillway lined to prevent spillway erosion, interior porous baffles to reduce turbulence and evenly distribute flows, and a floating skimmer or other approved surface dewatering device that removes water from the top of the basin. Flocculants are commonly used with a sediment basin to reduce turbidity and increase trapping efficiency.

Installation

- Ensure the basin and auxiliary spillway are properly located and constructed to the dimensions and other specifications on the plans.
- The storage volume at the auxiliary spillway elevation should be at least 3,600 ft^3/acre of drainage area.
- The runoff water entering the basin should be at the opposite end of the basin from the discharge outlet and should enter the basin without causing erosion of the basin itself.
- All interior surfaces of the basin should be stabilized and erosion free.
- Three baffles should be installed perpendicular between the inlet and outlet of the basin creating four near equal volumes in the basin. Construct the baffles like a wire supported silt fence with 2 layers of coir

erosion blanket (700 – 900 g/m^2). Securely fasten the coir to the posts and wire and pin the coir to the basin bottom (no trenching). Flow should not be allowed under, over, or around the baffles.

- A device that dewaters from the surface should be installed per the plans and manufacturer's specifications. A skimmer is often used for this purpose. Ensure that the skimmer mechanism is properly sized to achieve the basin dewatering times required. A skimmer should not be allowed to sit on the bottom of the basin. It should be slightly elevated with a gravel pad or blocks.
- Provide outlet protection at the dewatering device discharge.
- Ensure that the auxiliary spillway meets design specifications and is stabilized.
- Flocculant is often introduced into the runoff upstream of the basin in a turbulent flow area to ensure proper mixing. Ensure the flocculant is the proper material specified for the project.

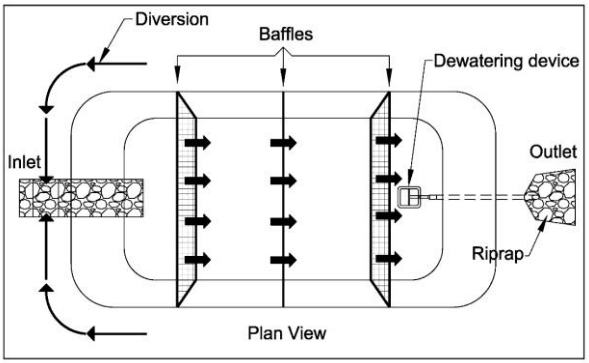

Figure SBN-1 Porous baffles in a sediment basin

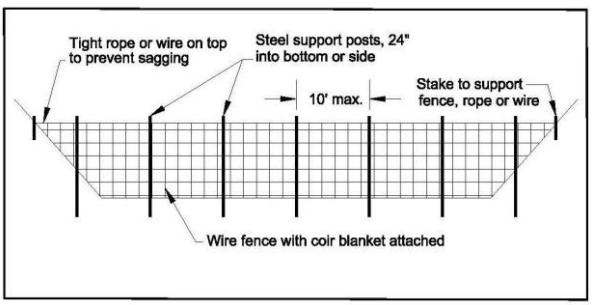

Figure SBN-2 Cross-section of a porous baffle in a sediment basin

Figure SBN-3 Example of porous baffle made of 700 g/m^2 coir erosion blanket as viewed from the inlet

Maintenance

- Inspect sediment basins after each storm event.
- Any erosion occurring in the interior of the basin or in the auxiliary spillway should be promptly repaired.
- Baffle displacement or water bypass of the baffles should be repaired.
- Ensure the surface dewatering mechanism is functioning properly.
- Replace flocculant when needed and per specifications.
- Remove sediment deposits promptly after it has accumulated to ½ of the basin capacity.

Sediment Trap (ST)

Description

A temporary catch basin used on very small drainage areas to intercept sediment laden runoff and detain small amounts of sediment. Various materials may be used for sediment traps including straw bales, sand bags, wattles, and various man-made materials and devices.

Installation

Straw Bale Sediment Trap is the only Sediment Trap covered in this edition of the Field Guide.

- Smooth the construction area to provide a broad level area for bale installation.
- Excavate a trench to the dimensions shown on the drawings. Make the trench long enough to ensure end bales are upslope of the sediment pool so that excess flows do not bypass the trap.
- Place bales end to end in the trench with the bindings around the sides not top to bottom.
- Anchor the bales by driving 2 – 36 inch long 2" x 2" stakes through each bale and 18" into the ground.
- Wedge loose straw into any gaps to slow water movement through the bales.
- Backfill with compacted soil to ground level on the downstream side and 4" above ground level on the upstream side of the bales.
- Stabilize disturbed areas with vegetation.

- Check finished grade and dimensions of straw bale trap.

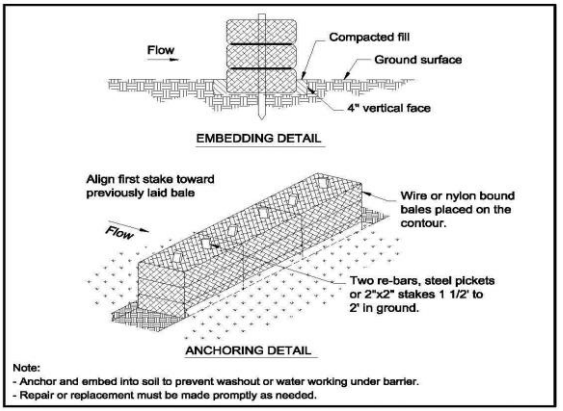

Figure ST-1 Placement of Straw Bales

Maintenance

- Inspect straw bale barriers after each storm event and remove sediment deposits promptly after it has accumulated to ½ of the original capacity.
- Replace deteriorated and damaged bales promptly.
- After contributing area is stabilized, remove straw bales and sediment and stabilize the area using vegetation.

Figure ST-2 Straw Bales Sediment Trap

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