Sd2-F

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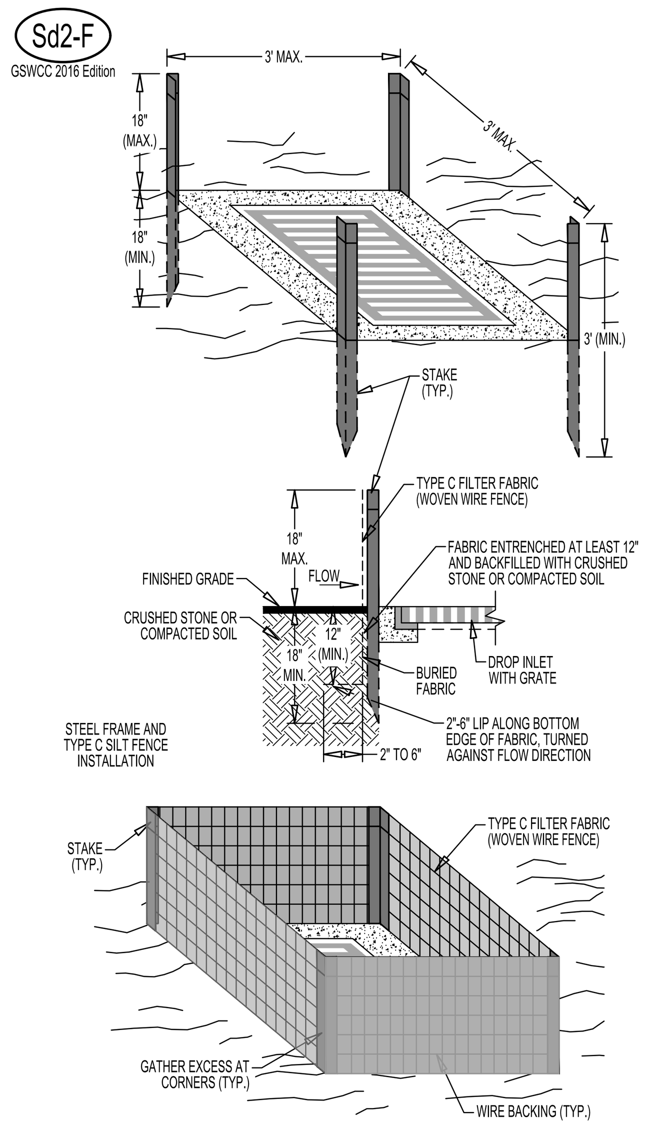

NOTE:

1. DESIGN IS FOR SLOPES NO GREATER THAN 5% (NOT DESIGNED FOR CONCENTRATED FLOWS).
2. THE STEEL POSTS SUPPORTING THE SILT FENCE MATERIAL SHOULD BE SPACED EVENLY AROUND THE PERIMETER OF THE INLET (MAX. OF 3' APART).
3. THE STEEL POSTS SHOULD BE SECURELY DRIVEN AT LEAST 18" DEEP.
4. THE FABRIC SHOULD BE ENTRENCHED AT LEAST 12" AND THEN BACKFILLED WITH CRUSHED STONE OR COMPACTED SOIL.

Figure 6-28.1 - Fabric and Supporting Frame For Inlet Projection

PURPOSE
To prevent sediment from entering a storm drainage systems prior to permanent stabilization of the disturbed area draining to the inlet.

CONDITIONS
All storm drain drop inlets that receive runoff from disturbed areas.

DESIGN CRITERIA
Through testing there are 2 different categories (high retention and high flow) supported. In areas where BMPs are being used on paved surfaces, or safety is a concern, the potentially negative effects of ponding should be taken into account. In such cases, a high flow BMP is preferred. On unpaved areas where ponding will not cause a safety hazard, high retention shall be taken into account. If high retention is not used in this situation a rationale shall be given on the plan and an unpaved application should apply. Sediment traps must be self-draining unless they are otherwise protected in an approved fashion that will not present a safety hazard. The drainage area entering the inlet sediment trap shall be no greater than 1 acre. If runoff may bypass the protected inlet, a temporary dike should be constructed on the down slope side of the structure. Also, a stone filter ring may be used on the up slope side of the inlet to slow runoff and filter larger soil particles. **Refer to Fr-Stone Filter Ring.**

CONSTRUCTION SPECIFICATIONS
Filter Fabric with Supporting Frame
This method of inlet protection is applicable where the inlet drains a relatively fat area (slope no greater than 5%) and shall not apply to inlets receiving concentrated flows, such as in street or highway medians. As shown in Figure 6-28.1, Type S silt fence supported by steel posts should be used. The stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3' apart, and securely driven into the ground, approximately 18" deep. The fabric shall be 36" tall and entrenched 12" and backfilled with crushed stone or compacted soil. Fabric and wire shall be securely fastened to the posts, and fabric ends must be overlapped a minimum of 18" or wrapped together around a post to provide a continuous fabric barrier around the inlet.

MAINTENANCE
The trap shall be inspected daily and after each rain, and repairs made as needed. Sediment shall be removed when the sediment has accumulated to one-half the height of the trap. Sediment shall be removed from curb inlet protection immediately. For excavated inlet sediment traps, sediment shall be removed when one-half of the sediment storage capacity has been lost to sediment accumulation. Sod inlet protection shall be maintained as specified in Ds4 - Disturbed Area Stabilization (With Sodding). Sediment shall not be washed into the inlet. It shall be removed from the sediment trap, disposed of and stabilized so that it will not enter the inlet again. When the contributing drainage area has been permanently stabilized, all materials and any sediment shall be removed, and either salvaged or disposed of properly. The disturbed area shall be brought to proper grade, then smoothed and compacted. Appropriately stabilize all disturbed areas around the inlet.

N.T.S.

INLET SEDIMENT TRAP (FILTER FABRIC W/ SUPPORTING FRAME) - (Sd2-F)

Sd2-E

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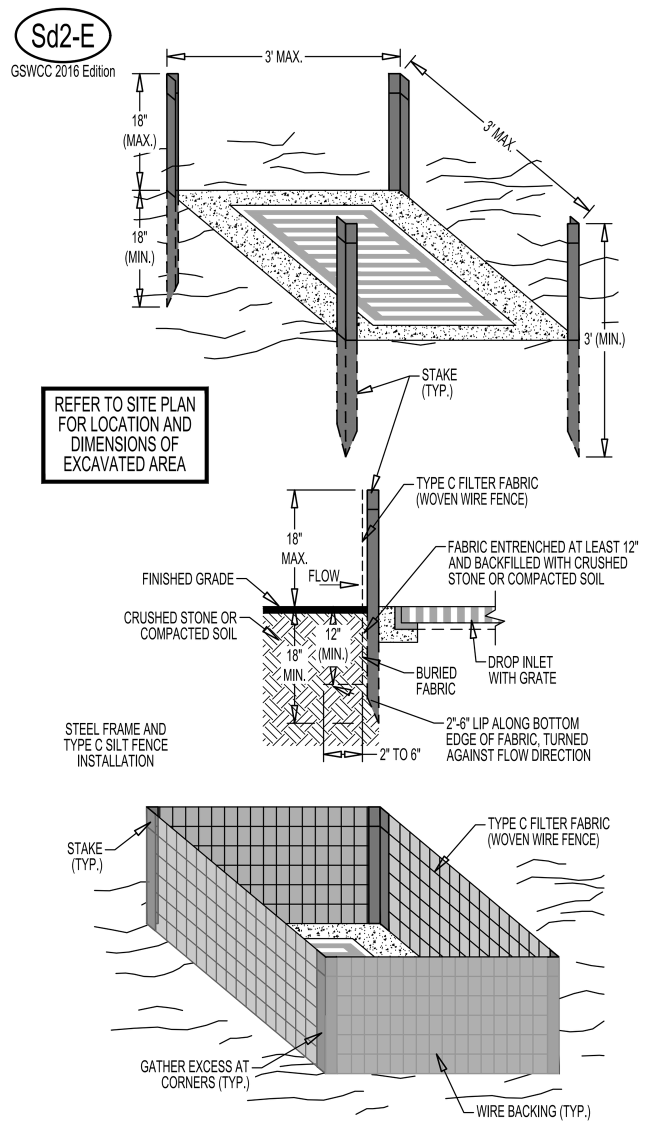
REFER TO SITE PLAN FOR LOCATION AND DIMENSIONS OF EXCAVATED AREA



NOTE:

1. DESIGN IS FOR SLOPES NO GREATER THAN 5% (NOT DESIGNED FOR CONCENTRATED FLOWS).
2. THE STEEL POSTS SUPPORTING THE SILT FENCE MATERIAL SHOULD BE SPACED EVENLY AROUND THE PERIMETER OF THE INLET (MAX. OF 3' APART).
3. THE STEEL POSTS SHOULD BE SECURELY DRIVEN AT LEAST 18" DEEP.
4. THE FABRIC SHOULD BE ENTRENCHED AT LEAST 12" AND THEN BACKFILLED WITH CRUSHED STONE OR COMPACTED SOIL.

Figure 6-28.1 - Fabric and Supporting Frame For Inlet Projection

An excavation may be created around the inlet sediment trap to provide additional sediment storage. The trap shall be sized to provide a minimum storage capacity calculated at the rate of 67 cubic yards per acre of drainage area. A minimum depth of 1.5 feet for sediment storage should be provided. Side slopes shall not be steeper than 2:1

CONSTRUCTION SPECIFICATIONS
Filter Fabric with Supporting Frame
Silt fence material with wire reinforcement and supported by steel posts should be used. The stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3' apart, and securely driven into the ground, approximately 18" deep. The fabric shall be 36" tall and entrenched 12" and backfilled with crushed stone or compacted soil. Fabric and wire shall be securely fastened to the posts, and fabric ends must be overlapped a minimum of 18" or wrapped together around a post to provide a continuous fabric barrier around the inlet.

MAINTENANCE
The trap shall be inspected daily and after each rain, and repairs made as needed. Sediment shall be removed when the sediment has accumulated to one-half the height of the trap. Sediment shall be removed from curb inlet protection immediately. For excavated inlet sediment traps, sediment shall be removed when one-half of the sediment storage capacity has been lost to sediment accumulation. Sod inlet protection shall be maintained as specified in Ds4 - Disturbed Area Stabilization (With Sodding). Sediment shall not be washed into the inlet. It shall be removed from the sediment trap, disposed of and stabilized so that it will not enter the inlet again. When the contributing drainage area has been permanently stabilized, all materials and any sediment shall be removed, and either salvaged or disposed of properly. The disturbed area shall be brought to proper grade, then smoothed and compacted. Appropriately stabilize all disturbed areas around the inlet.

N.T.S.

EXCAVATED INLET SEDIMENT TRAP - (Sd2-E)

Sd1-S

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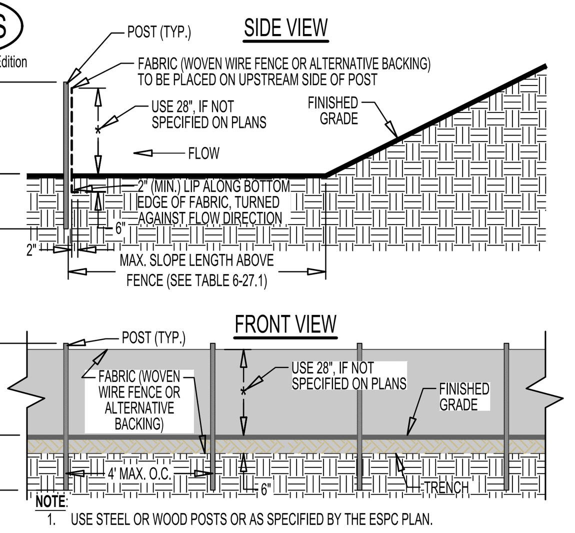


NOTE:
1. USE STEEL OR WOOD POSTS OR AS SPECIFIED BY THE ESPC PLAN.
2. HEIGHT (*) IS TO BE SHOWN ON THE ESPC PLAN. (USE 28", IF NOT SPECIFIED ON PLANS)

Figure 6-27.2

PURPOSE
To minimize and prevent sediment carried by sheet flow from leaving the site and entering natural drainage ways or storm drainage systems by slowing storm water runoff and causing the deposition and/or filtration of sediment at the structure. The barriers retain the soil on the disturbed land until the activities disturbing the land are completed and vegetation is established.

CONDITIONS
Barriers should be installed where runoff can be stored behind the barrier without damaging the submerged area behind the barrier or the structure itself. Sediment barriers shall not be installed across streams, ditches, waterways, or other concentrated flow areas.

DESIGN CRITERIA
Sediment barriers are designed to retain sediment transported by sheet flow from disturbed areas. It is important for the design professional to take into account the profile of the product for use on the site.

Sediment Barriers should also provide a rip-rap splash pad or other outlet protection device for any point where flow may overtop the sediment barrier. Ensure that the maximum height of the barrier at a protected, reinforced outlet does not exceed 1' and that the support spacing does not exceed 4'.

Where all runoff is to be stored behind the sediment barrier (where no storm water disposal system is present), maximum continuous slope length behind a sediment barrier shall not exceed those shown in Table 6-27.1. For longer slope lengths, slope interrupters must be used. The drainage area shall not exceed ¼ acre for every 100' of sediment barrier.

Table 6-27.1 Criteria for Sediment Barrier

Land Slope	Maximum Slope Length Above Fence
Percent	Feet
< 2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20 *	15
*In areas where the slope is greater than 20%, a flat area length of 10' between the toe of slope to the barrier should be provided.	

Placement
The type of sediment barrier depends on whether the area is sensitive or non-sensitive. Sensitive areas can be defined as any area that needs additional protection. These areas include, but are not limited to, state waters, wetlands, or any area the design professional designates as sensitive. When using multiple types of sediment barriers on a site in a single run, the barriers must be overlapped 18" or as specified by the design professional. See Figure 6-27.5.

CONSTRUCTION SPECIFICATIONS
Sediment barriers being used as Type S shall have a support spacing of no greater than 4' on center, with each being driven into the ground a minimum of 18".

*As of January 1, 2016, in the existing Georgia Department of Transportation Qualified Products List #36 (QPL- 36), Type C will fall under sensitive applications and be classified as sensitive. Refer to Appendix A-2 and the Equivalent BMP List.

PRACTICE CLASSIFICATIONS
For silt fence Type C, refer to Table 6-27.4.

Type C Silt Fence
Type C fence is 36" wide with wire reinforcement or equivalent. The wire reinforcement is necessary because this fabric allows almost three times the flow rate as Type A silt fence. Type C silt fence shall be used where runoff flows or velocities are particularly high or where slopes exceed a vertical height of 10'. **Type C is classified as sensitive application.**

Installation
Sediment barriers should be installed along the contour. Temporary sediment barriers shall be installed according to the following specifications as shown on the plans or as directed by the design professional. For installation of sensitive barriers, see Figure 6-27.2 and 6-27.5.

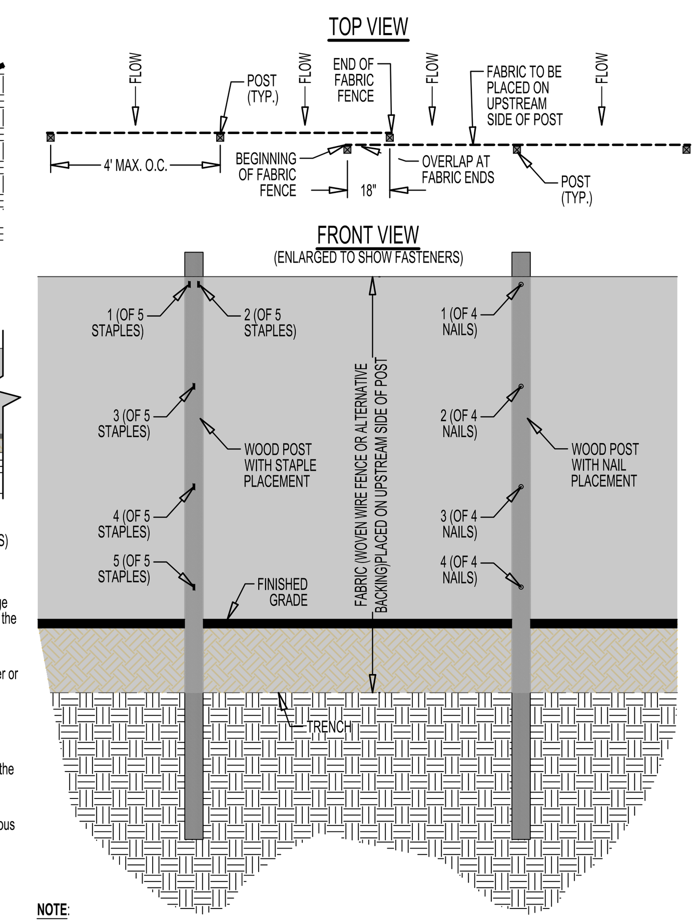
Post installation shall start at the center of a low point (if applicable) with the remaining posts spaced no greater than 4' apart for Type S sediment barriers. For post size requirements, see Table 6-27.2. Fasteners for wood posts are listed in Table 6-27.3.

Static Slicing Method
The static slicing machine pulls a narrow blade through the ground to create a slit 12" deep, and simultaneously inserts the silt fence fabric into this slit behind the blade. The blade is designed to slightly disrupt soil upward next to the slit and to minimize horizontal compaction, thereby creating an optimum condition for compacting the soil vertically on both sides of the fabric. Compaction is achieved by rolling a tractor wheel along both sides of the slit in the ground 2 to 4 times to achieve nearly the same or greater compaction as the original undisturbed soil. This vertical compaction reduces the air spaces between soil particles, which minimizes infiltration. Without this compaction, infiltration can saturate the soil, and water may find a pathway under the fence. When a silt fence is holding back several tons of accumulated water and sediment, it needs to be supported by posts that are driven 18" into the soil. Driving in the posts and attaching the fabric to them completes the installation.

Trenching Method
Trenching machines have been used for over 25 years to dig a trench for burying part of the filter fabric underground. Usually the trench is about 2"-6" wide with a 6" excavation. Post setting and fabric installation often precede compaction, which make effective compaction more difficult to achieve. EPA supported an independent technology evaluation (ASCE 2001), which compared 3 progressively better variations of the trenching method with static slicing The static slicing method performed better than 2 lower performance levels of the trenching method, and was as good as or better than the trenching method's highest performance level. The best trenching method typically required nearly triple the time and effort to achieve results comparable to the static slicing method.

Along all State Waters and other sensitive areas, 2 rows of Sensitive Area(s) Sediment Barrier (Type C Silt Fence) shall be used. The 2 rows of Sensitive Area(s) Sediment Barrier (Type C Silt Fence) shall be placed a minimum of 36" apart.

MAINTENANCE
Sediment shall be removed once it has accumulated to ½ the original height of the barrier. Sediment barriers shall be replaced whenever they have deteriorated to such an extent that the effectiveness of the product is reduced (approximately 6 months) or the height of the product is not maintaining 80% of its properly installed level. Temporary sediment barriers shall remain in place until disturbed areas have been permanently stabilized. All sediment accumulated at the barrier shall be removed and properly disposed of before the barrier is removed.



NOTE:
1. THE FABRIC AND WIRE SHALL BE SECURELY FASTENED TO POSTS AND FABRIC ENDS.
2. MUST BE OVERLAPPED A MINIMUM OF 18" OR WRAPPED TOGETHER AROUND A POST TO PROVIDE CONTINUOUS FABRIC BARRIER.

Figure 6-27.5

Table 6-27.2 Post Size

Type	Min. Length	Type of Post	Size of Post
S	4'	Steel Oak	1.15-1.25 lb./ ft. min 2"x2"

Table 6-27.3 Fasteners for Wood Posts

Type	Gauge	Crown	Legs	Staples per Post
Wire Staples	17 min.	¾" wide	½" long	5 min.
Type	Gauge	Length	Button Heads	Nails per Post
Nails	14 min.	1"	¾"	4 min.
Note: Filter Fabric may also be attached to the post by wire, cords, and pockets.				

Table 6-27.4

	Type C Fabric Fence
Tensile Strength (Lbs. Min.) [1] (ASTM D-4632)	Warp - 260 Fill - 180
Elongation (% Max.) (ASTM D-4632)	40
AOS (Apparent Opening Size) (Max. Sieve Size) (ASTM D-4751)	#30
Flow Rate (Gal/Min/Sq. Ft.) (GDT-87)	70
Ultraviolet Stability [2] (ASTM D-4632 after 300 hours weathering in accordance with ASTM D-4355)	80
Bursting Strength (PSI Min.) (ASTM D-3786 Diaphragm Bursting Strength Tester)	175
Minimum Fabric Width (Inches)	36

[1] Minimum roll average of five specimens.
[2] Percent of required initial minimum tensile strength.

N.T.S.

SENSITIVE AREA(S) SEDIMENT BARRIER (TYPE C SILT FENCE) - (Sd1-S)

Sd1-NS

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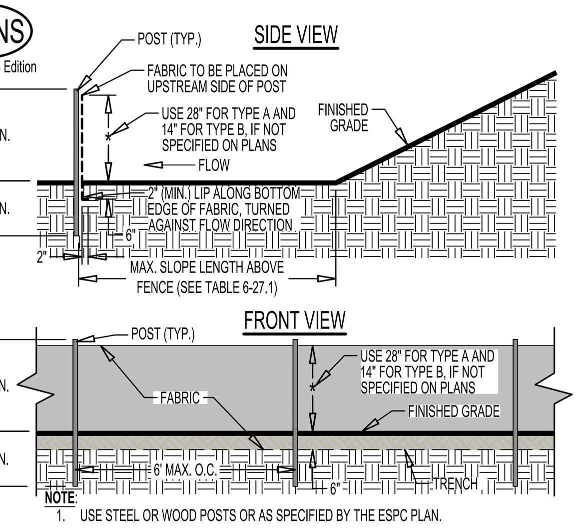


NOTE:
1. USE STEEL OR WOOD POSTS OR AS SPECIFIED BY THE ESPC PLAN.
2. HEIGHT (*) IS TO BE SHOWN ON THE ESPC PLAN. (USE 28", IF NOT SPECIFIED ON PLANS)

Figure 6-27.1

PURPOSE
To minimize and prevent sediment carried by sheet flow from leaving the site and entering natural drainage ways or storm drainage systems by slowing storm water runoff and causing the deposition and/or filtration of sediment at the structure. The barriers retain the soil on the disturbed land until the activities disturbing the land are completed and vegetation is established.

CONDITIONS
Barriers should be installed where runoff can be stored behind the barrier without damaging the submerged area behind the barrier or the structure itself. Sediment barriers shall not be installed across streams, ditches, waterways, or other concentrated flow areas.

DESIGN CRITERIA
Sediment barriers are designed to retain sediment transported by sheet flow from disturbed areas. It is important for the design professional to take into account the profile of the product for use on the site.

Sediment Barriers should also provide a rip-rap splash pad or other outlet protection device for any point where flow may overtop the sediment barrier. Ensure that the maximum height of the barrier at a protected, reinforced outlet does not exceed 1' and that the support spacing does not exceed 4'.

Where all runoff is to be stored behind the sediment barrier (where no storm water disposal system is present), maximum continuous slope length behind a sediment barrier shall not exceed those shown in Table 6-27.1. For longer slope lengths, slope interrupters must be used. The drainage area shall not exceed ¼ acre for every 100' of sediment barrier.

Table 6-27.1 Criteria for Sediment Barrier

Land Slope	Maximum Slope Length Above Fence
Percent	Feet
< 2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20 *	15
*In areas where the slope is greater than 20%, a flat area length of 10' between the toe of slope to the barrier should be provided.	

Placement
The type of sediment barrier depends on whether the area is sensitive or non-sensitive. Sensitive areas can be defined as any area that needs additional protection. These areas include, but are not limited to, state waters, wetlands, or any area the design professional designates as sensitive. When using multiple types of sediment barriers on a site in a single run, the barriers must be overlapped 18" or as specified by the design professional. See Figure 6-27.5.

CONSTRUCTION SPECIFICATIONS
Sediment barriers being used as Type NS (Non-sensitive Areas *) shall have a support spacing of no greater than 6' on center, with each being driven into the ground a minimum of 18".

*As of January 1, 2016, in the existing Georgia Department of Transportation Qualified Products List #36 (QPL- 36), Type A or Type B will fall under non-sensitive applications and be classified as non-sensitive. Refer to Appendix A-2 and the Equivalent BMP List.

PRACTICE CLASSIFICATIONS
For silt fence Type A and Type B, refer to Table 6-27.4.

Type A Silt Fence
This 36" wide filter fabric shall be used on developments where the life of the project is greater than or equal to 6 months. **Type A is classified as non-sensitive application.**

Type B Silt Fence
Though only 22" wide, this filter fabric allows the same flow rate as Type A silt fence. Type B silt fence shall be limited to use on minor projects, such as residential home sites or small commercial developments where permanent stabilization will be achieved in less than 6 months. **Type B is classified as non-sensitive application.**

Installation
Sediment barriers should be installed along the contour. Temporary sediment barriers shall be installed according to the following specifications as shown on the plans or as directed by the design professional. For installation of non-sensitive barriers, see Figure 6-27.1 and 6-27.5.

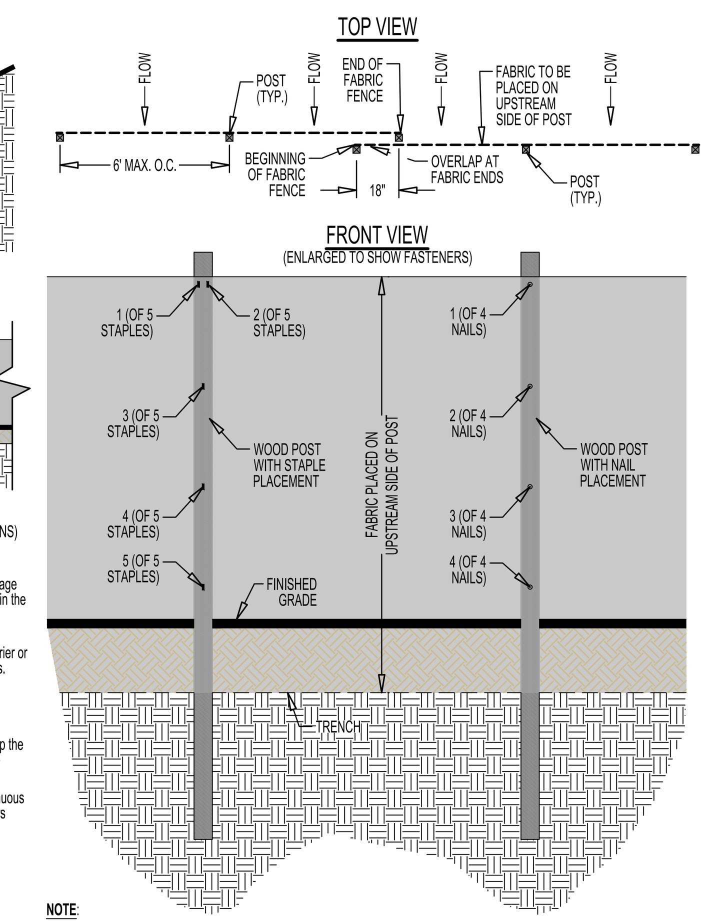
Post installation shall start at the center of a low point (if applicable) with the remaining posts spaced no greater than 6' apart for Type NS sediment barriers. For post size requirements, see Table 6-27.2. Fasteners for wood posts are listed in Table 6-27.3.

Static Slicing Method
The static slicing machine pulls a narrow blade through the ground to create a slit 12" deep, and simultaneously inserts the silt fence fabric into this slit behind the blade. The blade is designed to slightly disrupt soil upward next to the slit and to minimize horizontal compaction, thereby creating an optimum condition for compacting the soil vertically on both sides of the fabric. Compaction is achieved by rolling a tractor wheel along both sides of the slit in the ground 2 to 4 times to achieve nearly the same or greater compaction as the original undisturbed soil. This vertical compaction reduces the air spaces between soil particles, which minimizes infiltration. Without this compaction, infiltration can saturate the soil, and water may find a pathway under the fence. When a silt fence is holding back several tons of accumulated water and sediment, it needs to be supported by posts that are driven 18" into the soil. Driving in the posts and attaching the fabric to them completes the installation.

Trenching Method
Trenching machines have been used for over 25 years to dig a trench for burying part of the filter fabric underground. Usually the trench is about 2"-6" wide with a 6" excavation. Post setting and fabric installation often precede compaction, which make effective compaction more difficult to achieve. EPA supported an independent technology evaluation (ASCE 2001), which compared 3 progressively better variations of the trenching method with static slicing The static slicing method performed better than 2 lower performance levels of the trenching method, and was as good as or better than the trenching method's highest performance level. The best trenching method typically required nearly triple the time and effort to achieve results comparable to the static slicing method.

Along all State Waters and other sensitive areas, 2 rows of Sensitive Area(s) Sediment Barrier (Type C Silt Fence) shall be used. The 2 rows of Sensitive Area(s) Sediment Barrier (Type C Silt Fence) shall be placed a minimum of 36" apart.

MAINTENANCE
Sediment shall be removed once it has accumulated to ½ the original height of the barrier. Sediment barriers shall be replaced whenever they have deteriorated to such an extent that the effectiveness of the product is reduced (approximately 6 months) or the height of the product is not maintaining 80% of its properly installed level. Temporary sediment barriers shall remain in place until disturbed areas have been permanently stabilized. All sediment accumulated at the barrier shall be removed and properly disposed of before the barrier is removed.



NOTE:
1. THE FABRIC AND WIRE SHALL BE SECURELY FASTENED TO POSTS AND FABRIC ENDS.
2. MUST BE OVERLAPPED A MINIMUM OF 18" OR WRAPPED TOGETHER AROUND A POST TO PROVIDE CONTINUOUS FABRIC BARRIER.

Figure 6-27.5

Table 6-27.2 Post Size

Type	Min. Length	Type of Post	Size of Post
NS	4'	Soft Wood Oak Steel	3" dia. or 2x4 1.5" x 1.5" 1.15lb./ft. min.

Table 6-27.3 Fasteners for Wood Posts

Type	Gauge	Crown	Legs	Staples per Post
Wire Staples	17 min.	¾" wide	½" long	5 min.
Type	Gauge	Length	Button Heads	Nails per Post
Nails	14 min.	1"	¾"	4 min.
Note: Filter Fabric may also be attached to the post by wire, cords, and pockets.				

Table 6-27.4

	Type A Fabric Fence	Type B Fabric Fence
Tensile Strength (Lbs. Min.) [1] (ASTM D-4632)	Warp - 120 Fill - 100	Warp - 120 Fill - 100
Elongation (% Max.) (ASTM D-4632)	40	40
AOS (Apparent Opening Size) (Max. Sieve Size) (ASTM D-4751)	#30	#30
Flow Rate (Gal/Min/Sq. Ft.) (GDT-87)	25	25
Ultraviolet Stability [2] (ASTM D-4632 after 300 hours weathering in accordance with ASTM D-4355)	80	80
Bursting Strength (PSI Min.) (ASTM D-3786 Diaphragm Bursting Strength Tester)	175	175
Minimum Fabric Width (Inches)	36	22

[1] Minimum roll average of five specimens.
[2] Percent of required initial minimum tensile strength.

N.T.S.

NON-SENSITIVE AREA(S) SEDIMENT BARRIER (TYPE A AND TYPE B SILT FENCE) - (Sd1-NS)

Tp

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DEFINITION
Stripping off the more fertile top soil, storing it, then spreading it over the disturbed area after completion of construction activities.

PURPOSE
To provide suitable soil medium for vegetative growth on areas where other measures will not produce or maintain a desirable stand.

CONDITIONS
The practice is recommended for sites of 2:1 or flatter slopes where:

1. The texture of the exposed subsoil or parent material is not suitable to produce adequate vegetative growth
2. The soil material is so shallow that the rooting zone is not deep enough to support plants with continuing supplies of moisture and food.
3. The soil to be vegetated contains material toxic to plant growth.

CONSTRUCTION SPECIFICATIONS

MATERIALS
Topsoil should be friable and loamy, free of debris, objectionable weeds, and stones and contain no toxic substances that may be harmful to plant growth. A pH range of 5.0-7.5 is acceptable. Soluble salts shall not exceed 500 ppm.

TESTING
Field exploration should be made to determine whether the quantity and quality of surface soil justifies stripping.

STRIPPING
Stripping should be confined to the immediate construction area.

A 4 to 6 inch stripping depth is common but may vary depending on the particular soil.

TOPSOIL pH
If the pH value is less than 6.0, lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoil containing soluble salts greater than 500 ppm shall not be used.

STOCKPILES
The location of topsoil stockpiles should not obstruct the natural drainage or cause off-site environmental damage.

STABILIZATION
Stockpiles shall be contained by sediment barriers to prevent sedimentation on adjacent areas. Stockpiles shall be stabilized in accordance with specifications **Ds1 and Ds2 - Disturbed Area Stabilization (with Mulching) and (with Temporary Grassing), respectively or Tac-Tackifers.**

SITE PREPARATION
(Where topsoil is to be added)

TOPSOILING
When topsoiling, maintain needed erosion control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc.

GRADING
Grades on the areas to be topsoiled that have been previously established shall be maintained.

LIMING
Soil tests should be used to determine the pH of the soil. Where the pH of the subsoil is 5.0 or less or composed of heavy clays, agricultural limestone shall be spread at the rate of 100 pounds per 1,000 square feet. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedure.

Bonding - Use one of the following methods to insure bonding of topsoil and subsoil:

1. Tilling. After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 3 inches to permit bonding of the topsoil and subsoil.
2. Tracking. Passing a bulldozer over the entire surface are of the slope to leave horizontal depressions.

APPLYING TOPSOIL

1. Topsoil should be handled only when it is dry enough to work without damaging soil structure.
2. A uniform application of 5 inches (unsettled) is recommended, but may be adjusted at the discretion of the design professional.

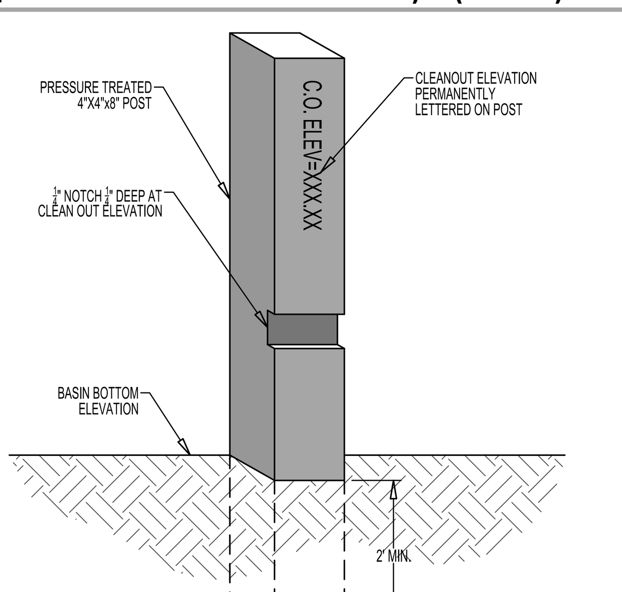
Figure 6-37.1 - Fabric and Supporting Frame For Inlet Projection

CUBIC YARDS OF TOPSOIL REQUIRED FOR APPLICATION TO VARIOUS DEPTHS

Depth (inches)	Per 1,000 SF	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806

N.T.S.

TOPSOILING - (Tp)



N.T.S.

BASIN CLEAN OUT MARKER

Cd-S

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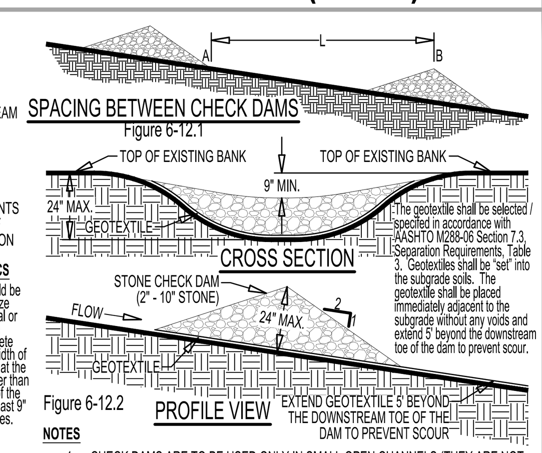
A = TOE OF UPSTREAM CHECK DAM
B = TOP OF THE DOWNSTREAM CHECK DAM
L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION



CONSTRUCTION SPECS
Stone check dams should be constructed of graded size 2"-10" stone. Mechanical or hand placement shall be required to insure complete coverage of the entire width of the ditch or swale and that the center of the dam is lower than the edges. The center of the check dam must be at least 9" lower than the outer edges.

MAINTENANCE
Periodic inspection and required maintenance must be provided. Sediment shall be removed when it reaches a depth of ½ original dam height of before. If area is to be mowed, check dams shall be removed once final stabilization has occurred. Otherwise check dams may remain in place permanently. After removal, the area beneath the dam shall be seeded and mulched immediately.

NOTES
1. CHECK DAMS ARE TO BE USED ONLY IN SMALL OPEN CHANNELS (THEY ARE NOT TO BE USED IN LIVE STREAMS).
2. THE DRAINAGE AREA FOR STONE CHECK DAMS SHALL NOT EXCEED TWO ACRES.
3. THE CENTER OF THE CHECK DAM MUST BE AT LEAST 9" LOWER THAN THE OUTER EDGES.
4. THE DAM HEIGHT SHOULD BE A MAXIMUM OF 2' FROM CENTER TO RIM EDGE.
5. THE SIDE SLOPES OF THE CHECK DAM SHALL NOT EXCEED A 2:1 SLOPE.
6. GEOTEXTILE SHALL BE USED TO PREVENT THE MITIGATION OF SUBGRADE SOIL PARTICLES INTO THE STONES (REFER TO AASHTO M288-96, SECTION 7.3, TABLE 3)

N.T.S.

STONE CHECK DAMS - (Cd-S)

Cd-Hb

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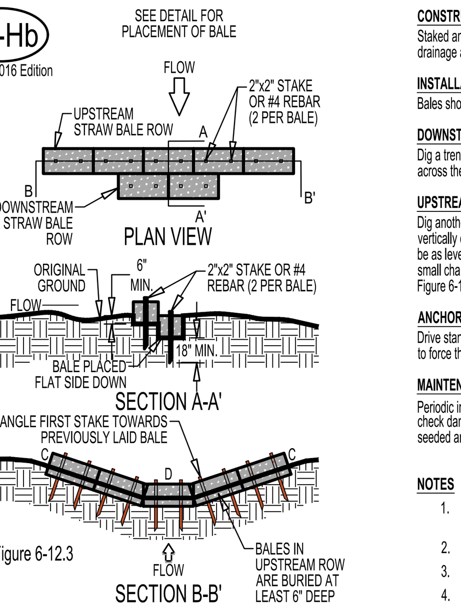

CONSTRUCTION SPECS
Staked and embedded straw-bales may be used as temporary check dams in concentrated flow areas while vegetation is becoming established. They shall not be used where the drainage area exceeds one acre. Straw-bales should be installed per Figure 6-12.3.

INSTALLATION
Bales should be bound with wire or nylon string. Twine bound bales are less durable. The bales should be placed in rows with bale ends tightly abutting the adjacent bales.

DOWNSTREAM ROW (REFER TO FIGURE 6-12.3)
Dig a trench across the small channel, wide enough and deep enough so that the top of the row of bales placed on their long, wide side is level with the ground. The tops of bales across the center of the channel should all be level and set at the same elevation. Place the bales in position and stake them according to the instructions below.

UPSTREAM ROW
Dig another trench across the small channel, upstream and immediately adjacent to the first row of bales. The trench should be wide enough to accommodate a row of bales set vertically on their long edge. The trench should be deep enough so that at least 6 inches of each bale is below ground starting with the bale in the channel bottom. The trench should be as level as possible so that the tops of the bales across the center of the channel are level and water can flow evenly across them. Continue this trench up the side slopes of the small channel to a point where the unburied bottom line of the highest bale (Point "C", Figure 6-12.3) is higher than the top of the bales that are in the center of the channel (Point "D", Figure 6-12.3).

ANCHORAGE
Drive standard 2 x 2 stakes or #4 rebar through the bales and into the ground 1 1/2 to 2 feet for anchorage. The first stake in each bale should be driven toward a previously laid bale to force the bales together (See Figure 6-12.3).

MAINTENANCE
Periodic inspection and required maintenance must be provided. Sediment shall be removed when it reaches a depth of ½ original dam height or before. If area is to be mowed, check dams shall be removed once final stabilization has occurred. Otherwise check dams may remain in place permanently. After removal, the area beneath the dam shall be seeded and mulched immediately.

NOTES
1. BALES SHOULD BE BOUND WITH WIRE OR NYLON STRING AND SHOULD BE PLACED IN ROWS WITH BALE ENDS **TIGHTLY** ABUTTING ADJACENT BALES.
2. REMOVE #4 REBAR AFTER STRAW BALES ARE NO LONGER IN PLACE.
3. POINT "C" OF SECTION B-B' SHOULD ALWAYS BE HIGHER THAN POINT "D".
4. STRAW-BALE CHECK DAMS SHALL NOT BE USED WHERE THE DRAINAGE AREA EXCEEDS ONE ACRE.

N.T.S.

STRAW-BALE CHECK DAMS - (Cd-Hb)

St

STORM DRAIN OUTLET PROTECTION (USING RIP-RAP)

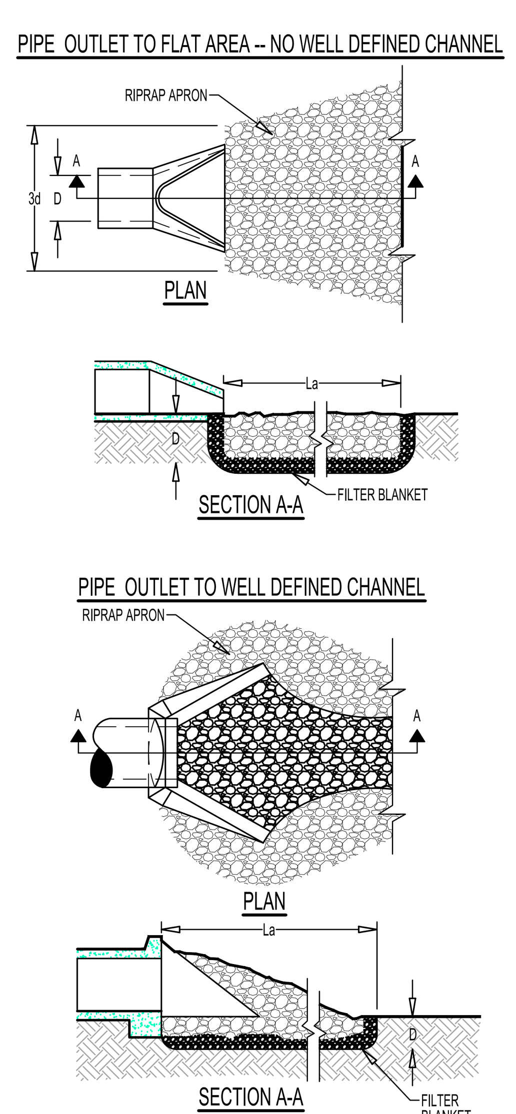

Figure 6-34.3 - Riprap Outlet Protection

NOTES:
1. La IS THE LENGTH OF THE RIP-RAP APRON.
2. D = 1.5 TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6".
3. IN A WELL-DEFINED CHANNEL, EXTEND THE APRON UP THE CHANNEL BANKS TO AN ELEVATION OF 6" ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK (WHICHEVER IS LESS).
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

CONSTRUCTION SPECIFICATIONS
1. Ensure that the subgrade for the filter and rip-rap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the rip-rap thickness.
2. The rip-rap and gravel filter must conform to the specified grading limits shown on the plans.
3. Geotextile must meet design requirements and be properly protected from punching or tearing during installation. Repair any damage by removing the rip-rap and placing another piece of filter fabric over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire filter fabric.
4. Rip-rap may be placed by equipment, but take care to avoid damaging the filter.
5. The minimum thickness of the rip-rap should be 1.5 times the maximum stones diameter.
6. Construct the apron on zero grade with no overfall at the end. Make the top of the rip-rap at the downstream end level with the receiving area or slightly below it.
7. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
8. Immediately after construction, stabilize all disturbed areas with vegetation.
9. Stone quality - Select stone for rip-rap from field stone or quarry stone. The stone should be hard, angular, and highly weather-resistant. The specific Gravity of the individual stones should be at least 2.5.
10. Filter - Install a filter to prevent soil movement through the openings in the rip-rap. The filter should consist of a graded gravel layer or a synthetic filter cloth.

MAINTENANCE
Inspect rip-rap outlet structures after heavy rains to see if any erosion around or below the rip-rap has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

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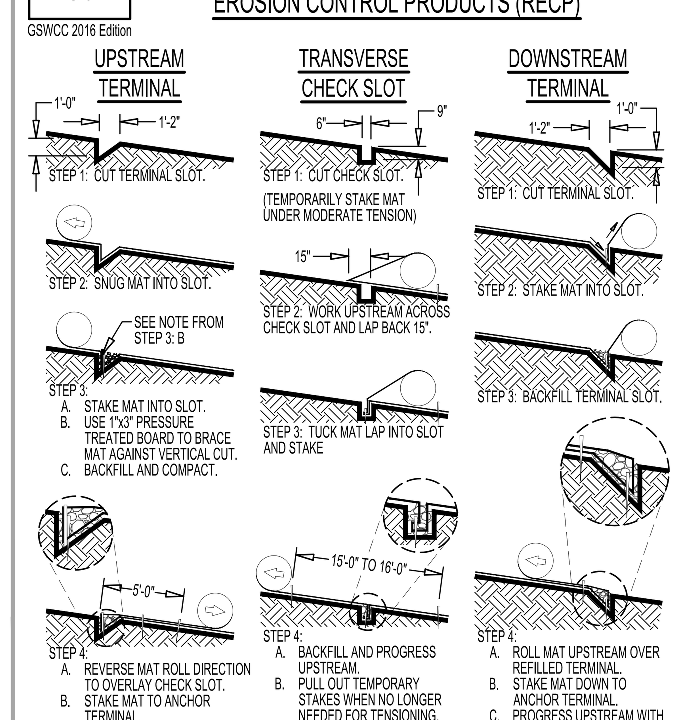
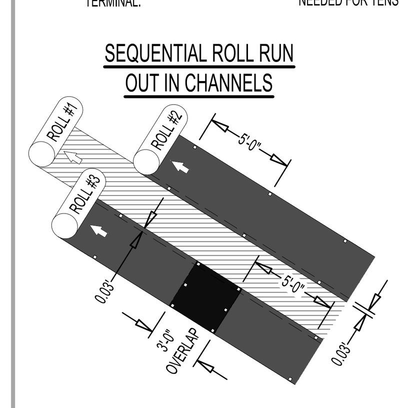
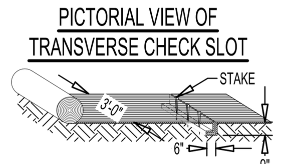
TYPICAL INSTALLATION GUIDELINES FOR ROLLED EROSION CONTROL PRODUCTS (RECP)



SEQUENTIAL ROLL RUN OUT IN CHANNELS



PICTORIAL VIEW OF TRANSVERSE CHECK SLOT



NOTES:
1. START AT DOWNSTREAM TERMINAL AND PROGRESS UPSTREAM.
2. FIRST ROLL IS CENTERED LONGITUDINALLY IN MID-CHANNEL AND PINNED WITH TEMPORARY STAKES TO MAINTAIN ALIGNMENT.
3. SUBSEQUENT ROLLS FOLLOW IN STAGGERED SEQUENCE BEHIND THE FIRST ROLL. USE THE CENTER ROLL FOR ALIGNMENT TO THE CHANNEL CENTER.
4. WORK OUTWARDS FROM THE CHANNEL CENTER TO THE EDGE.
5. USE 3" OVERLAPS AND STAKE AT 5'-0" INTERVALS ALONG THE SEAMS.
6. USE 3" OVERLAPS AND SHINGLE DOWNSTREAM TO CONNECT THE LINING AT THE ROLL ENDS.

TYPICAL INSTALLATION GUIDELINES FOR MATTING AND BLANKETS
(Figure 6-10.1)

CONDITIONS
Slope stabilization can be applied to flat areas or slopes where the erosion hazard is high and slope protection is needed during the establishment of vegetation.

PLANNING CONSIDERATIONS
Care must be taken to choose the type of slope stabilization product that is most appropriate for the specific needs of a project. Two general types of slope stabilization products are discussed within this specification.

Rolled Erosion Control Products (RECP)
A natural fiber blanket with single or double photodegradable or biodegradable nets.

Hydraulic Erosion Control Products (HECP)
HECP shall utilize straw, cotton, wood or other natural based fibers held together by a soil binding agent that works to stabilize soil particles. Paper mulch should not be used for erosion control.

CRITERIA
Rolled Erosion Control Products (RECPs) and Hydraulic Erosion Control Products (HECPs):
- Installation and stapling of RECPs and application rates for HECPs shall conform to manufacturer's guidelines for application.
- Short-Term RECPs as a minimum shall be used to stabilize concentrated flow areas with a velocity less than 5ft/sec on slopes 3:1 or greater with a height of 10' or greater.

MATERIALS

HECP
Hydraulic erosion control products shall be prepackaged from the manufacturer. Field mixing of performance enhancing additives will not be allowed. Fibrous components should be all natural or biodegradable. Products shall be determined to be non-toxic in accordance with EPA-821-R-02-012.

RECP
Blankets shall be non-toxic to vegetation, seed, or wildlife. Products shall be determined to be non-toxic in accordance with EPA821-R-02-012. At minimum, the plastic or biodegradable netting shall be stitched to the fibrous matrix to maximize strength and provide for ease of handling.

RECPs are categorized as follows:

a. **Short-Term** (functional longevity 12 mo.)
   i. Photodegradable
   Straw blankets with a top and bottom side photodegradable net. The maximum size of the mesh should be openings of ½" x ½". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.35" and minimum density should be 0.5 lbs per square yard.
   ii. Biodegradable
   Straw blanket with a top and bottom side biodegradable jute net. The top side net should consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh should be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.5 lbs per square yard.
b. **Extended-Term** (functional longevity 24 mo.)
   i. Photodegradable
   Blankets that consist of 70% straw and 30% coconut with a top and bottom side photodegradable net. The top net should have ultraviolet additives to delay breakdown. The maximum size of the mesh should be openings of 0.65" x 0.65". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.35" and minimum density should be 0.6 lbs per square yard.
   ii. Biodegradable
   Blankets that consist of 70% straw and 30% coconut with a top and bottom side biodegradable jute net. The top side net should consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh should be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.65 lbs per square yard.
c. **Long-Term** (functional longevity 36 mo.)
   i. Photodegradable
   Blankets that consist of 100% coconut with a top and bottom side photodegradable net. Each net should have ultraviolet additives to delay breakdown. The maximum size of the mesh should be openings of 0.65" X 0.65". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.3" and minimum density should be 0.5 lbs per square yard.
   ii. Biodegradable
   Blankets that consist of 100% coconut with a top and bottom side biodegradable jute net. The top side net should consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh should be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.5 lbs per square yard.

NOTES
It is the intention of this section to allow interchangeable use of RECPs and HECPs for erosion protection on slopes. The project engineer should select the type of erosion control product that best fits the need of the particular site.

SITE PREPARATION
After the site has been shaped and graded to the approved design, prepare a friable seedbed relatively free from clods and rocks more than 1" in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface. Surface must be smooth to ensure proper contact of blankets or matting to the soil surface. If necessary, redirect any runoff from the ditch or slope during installation.

MAINTENANCE
All erosion control blankets and matting should be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure should be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope or ditch. Continue to monitor these areas until they become permanently stabilized.

N.T.S.

SLOPE STABILIZATION - (Ss)

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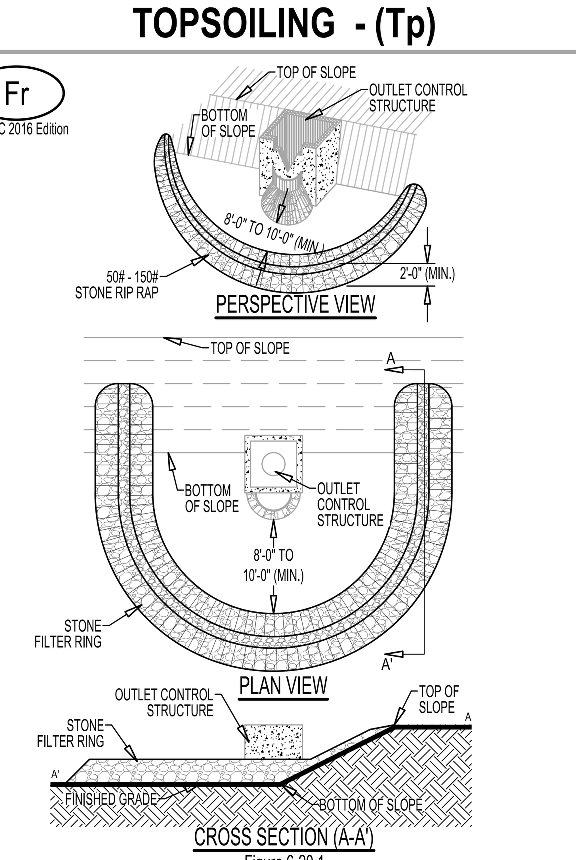

Figure 6-20.1

PURPOSE
This structure reduces flow velocities, preventing the failure of other sediment control devices. It also helps prevent sediment from leaving the site or entering drainage systems, prior to permanent stabilization of the disturbed area.

CONDITIONS
Filter rings shall be used in conjunction with other sediment control measures, except where other practices defined in this Manual are not appropriate (such as inlets to concrete fumes). They can be installed at or around devices such as inlet sediment traps, temporary downdrain inlets, and detention pond retrofits to provide additional sediment filtering capacity.

DESIGN CRITERIA
Formal design is not required. The following standards shall be used:

Location
The filter ring shall surround all sides of the structure receiving runoff from disturbed areas. It should be placed a minimum of 4' from the structure. The ring is not intended to substantially impound water, causing flooding or damage to adjacent areas. The filter ring may also be placed below storm drains discharging into detention ponds, creating a centralized area, or "forebay", for sediment accumulation. This provides for easier, more localized clean-out of the pond. If utilized above a retrofit structure, it should be a min. of 8' to 10' from the retrofit.

Stone Size
When utilized at inlets with diameters less than 12", the filter ring shall be constructed of stone no smaller than 3"-5" (15 - 30 lbs.). When utilized at pipes with diameters greater than 12", the filter ring shall be constructed of stone no smaller than 10"-15" (50 - 100 lbs.). The larger stone can be faced with smaller filter stone on the upstream side for added sediment filtering capabilities. However, the smaller filter stone is more prone to clogging, requiring higher maintenance.

Height
The filter ring shall be constructed at a height no less than 2' from grade.

CONSTRUCTION SPECIFICATIONS
Mechanical or hand placement of stone shall be required to uniformly surround the structure to be supplemented. Refer to Appendix C for rock riprap specifications. The filter ring may be constructed on natural ground surface, on an excavated surface, or on machine compacted fill. A common failure of a filter ring is caused by placing it too close to or too high above the structure it is enhancing. When utilized below a storm drain outlet, it shall be placed such that it does not create a condition causing water to back-up into the storm drain and inhibit the function of the storm drain system.

MAINTENANCE
The filter ring must be kept clear of trash and this will require continuous monitoring and maintenance, which includes sediment removal when one-half full. Structures are temporary and should be removed when the land disturbing project has been stabilized.

N.T.S.

FILTER RING - (Fr)

georgia civil
CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
LAND SURVEYING
311 N. Main St, Ste. 101, Unit C
P.O. Box 896 | Madison, GA 30650
P: 706.342.1104
www.georgiacivil.com

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Project Information

RFP 2027-3500-01

CITY OF MADISON FIRE STATION

1100 MARY MAGNAN BLVD
MADISON, GA 30650
ZONING: I1 - LIGHT INDUSTRIAL / LIMITED MANUFACTURING

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Sheet Title

EROSION, SEDIMENTATION, AND POLLUTION CONTROL DETAILS

Sheet Number

C-6.6