Brush/Fabric Barrier (BFB)

Practice Description

A brush/fabric barrier is a dam-like structure constructed from woody residue and faced with a geotextile fabric to provide a temporary sediment basin. This practice is applicable on sites with a small drainage area where brush and other woody debris are available from a clearing and grubbing operation.

Planning Considerations

This practice is intended to be a temporary sediment basin with a limited life span and applicable only for small drainage areas.

The barrier should be located downslope from areas with potential sheet and rill erosion, with adequate storage volume in front of the barrier, and with no more than 2 acres of drainage area.

Adequate woody material from clearing and grubbing required on the site must be available for the construction of the barrier.

The practice should be located and designed so that adequate storage volume and detention time can be obtained, and failure of the barrier will not result in hazard to the public or damage to work on either on-site or off-site property.

Design Criteria and Construction

Prior to start of construction, a qualified design professional should determine the location and storage for the barrier. Typically, brush/fabric barriers are constructed where materials are readily available and at a location with adequate storage characteristics.

Drainage Area

Brush/fabric barriers should be designed with no more than 2 acres of drainage area. A sediment basin should be considered for larger drainage areas (see *Sediment Basin Practice*).

Structure Life

The design life of the structure should be 1 year or less. The barrier should be removed, and sediment accumulations properly stabilized prior to completion of the construction project.

Sediment Storage

The barrier should be designed to provide 67 cubic yards of sediment storage per acre of disturbed drainage area. Sediment should be removed and properly utilized on-site when half of the sediment storage volume has been filled.

Site Location and Preparation

The site for the barrier should be located so that a basin capable of providing the sediment storage required can be obtained or created. The site for the barrier should be smoothed prior to placement of the brush.

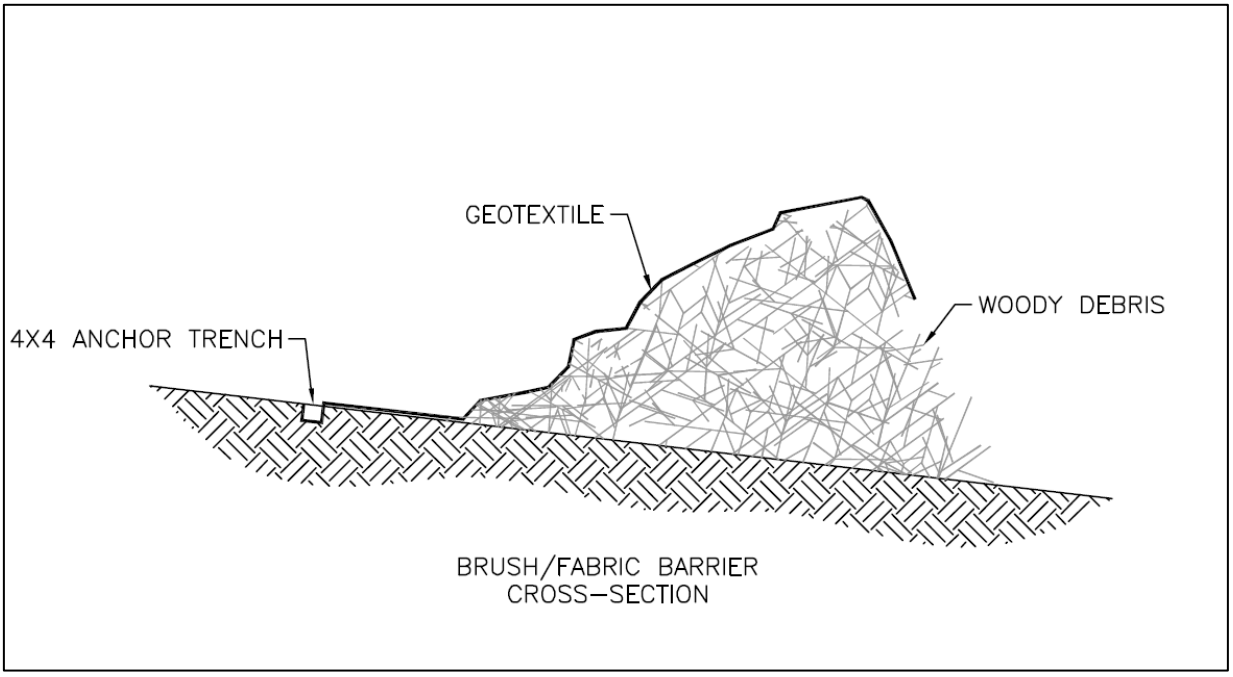


Figure BFB-1 Typical Installation

Materials Installation

Place the cleared and grubbed material in a densely compacted row, mostly on the contour, with each end upturned so that excessive flows will go over the top of the barrier and not around the ends of the barrier. Figure BFB–1 shows the typical installation.

Densely packed material should be placed so that the main stems of the woody debris are aligned with the length of the barrier. Small stems and limbs protruding from the bundle that could damage the fabric should be trimmed.

Generally, the barrier should be at least 3 feet tall, but no more than 6 feet tall. The width of the barrier perpendicular to the direction of flow should be at least 5 feet at its base.

Geotextile filter fabric consistent with the fabric used for silt fencing can be used to cover the face of the barrier. It is best to use wide and long rolls of the fabric so that splicing is minimized or eliminated. The fabric used to face the upstream surface of the brush should be non-woven geotextile equivalent to Class II fabric (see Table BFB-1).

The fabric should be securely buried at the bottom of an excavated trench that is at least 6″ deep in front of the barrier. Prior to backfilling the trench, the fabric should be securely staked at 3-foot centers with minimum 18″ long wooden stakes.

The fabric to be used should be supplied in lengths and widths to minimize vertical splices and eliminate horizontal splices. Avoid longitudinal splices of the fabric. Vertical splices must be securely fastened to each other so that flows will not short-circuit through the splice. The minimum vertical splice overlap should be 3 feet. Vertical splices must be securely fastened to each other so that flows will not short-circuit through the splice.

The top edge of the fabric should be secured so that it will not sag below the designed storage elevation. The upper edge can be anchored with twine fastened to the fabric and secured to stakes behind the barrier.

Table BFB-1 Requirements for Nonwoven Geotextile

Property	Test method	Class I	Class II	Class III	Class IV [1]
Tensile strength (lb) [2]	ASTM D 4632 grab test	180 minimum	120 minimum	90 minimum	115 minimum
Elongation at failure (%) [2]	ASTM D 4632	≥ 50	≥ 50	≥ 50	≥ 50
Puncture (pounds)	ASTM D 4833	80 minimum	60 minimum	40 minimum	40 minimum
Ultraviolet light (% residual tensile strength)	ASTM D 4355 150-hr exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent opening size (AOS)	ASTM D 4751	As specified max. no. 40 [3]	As specified max. no. 40 [3]	As specified max. no. 40 [3]	As specified max. no. 40 [2]
Permittivity sec^{-1}	ASTM D 4491	0.70 minimum	0.70 minimum	0.70 minimum	0.10 minimum

Table copied from NRCS Material Specification 592.

1 Heat-bonded or resin-bonded geotextiles may be used for Classes III and IV. They are particularly well suited to Class IV. Needle-punched geotextile is required for all other classes.

2 Minimum average roll value (weakest principal direction).

3 U.S. standard sieve size.

Construction Verification

Check finished size, elevation, storage, and shape for compliance with standard drawings and materials list. (Check for compliance with specifications if included in contract specifications.)

Common Problems

Consult with a qualified design professional if any of the following occurs:

Variations in topography on-site indicate brush/fabric barrier will not function as intended. Change in design plan will be needed.

There is not adequate cleared, woody material to construct the barrier.

Materials specified in the plan are not available.

Maintenance

Inspect the barrier for short-circuiting of water or flow around the ends of the barrier after each significant rainfall event.

Sediment should be removed if it reaches a depth half of the original fabric height. If the area behind the barrier fills with sediment, there is a greater likelihood that water will flow around the end of the barrier and cause the practice to fail.

Large rainfall events that overtop the structure can result in gully erosion behind the barrier. This should be repaired as needed.

Brush/fabric barriers are temporary structures and should be removed when their useful life has been completed. All accumulated sediment should be properly stabilized. and the area where the barrier was located should be seeded and mulched immediately unless a different treatment is prescribed.

References

BMPs from Volume 1

Chapter 4

Sediment Basin (SBN) 4-298

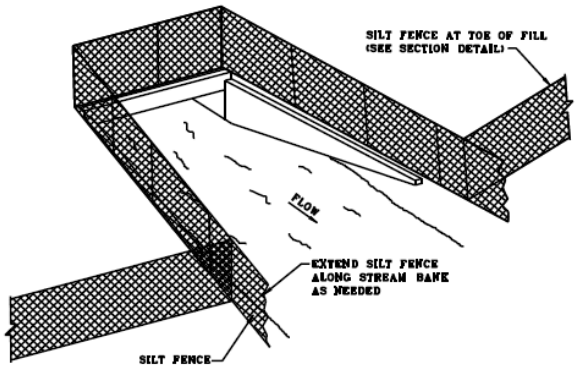
MDOT Drawing ECD-2

Details of Sediment Barrier Applications 4-259

MDOT Drawing TEC-1

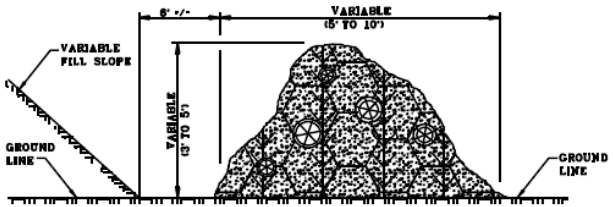
Typical Temporary Erosion Control Measures 4-260

STATE	PROJECT NO.
MISS.	



SEDIMENT BARRIER AT CROSS DRAIN

FRONT ELEVATION

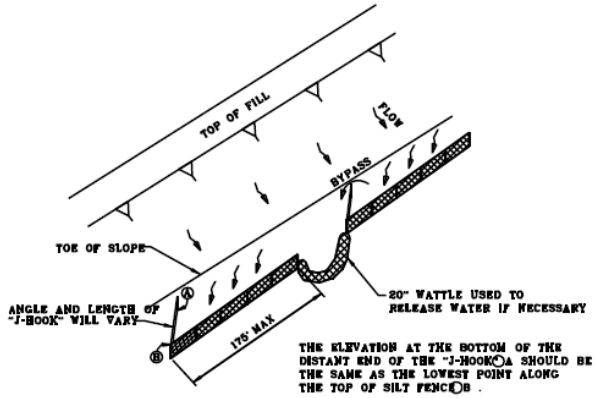


SIDE ELEVATION

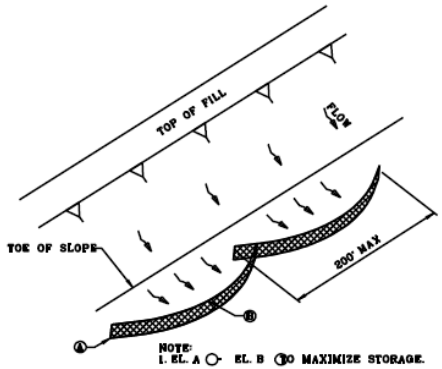
TEMPORARY BRUSH BARRIER

NOTES:
1. BRUSH BARRIER MAY BE USED WHERE NATURAL GROUND IS LEVEL OR SLOPING AWAY FROM PROJECT.
2. PLACE BRUSH, LOG AND TREE LAPS APPROXIMATELY PARALLEL TO TOE OF FILL SLOPE WITH SOME OF THE HEAVIER MATERIALS BEING PLACED ON TOP TO PROPERLY SECURE THE BARRIER AS DETAILED AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED OR PERMITTED BY THE ENGINEER.
3. TO ALLOW WATER TO SEEP THROUGH BRUSH BARRIER, INTERMINGLE THE BRUSH, LOG AND TREE LAPS SO AS NOT TO FORM A SOLID DAM.
4. THE BRUSH BARRIER MAY BE CHOKED WITH FILTER FABRIC.
5. TEMPORARY BRUSH BARRIER WILL NOT BE MEASURED FOR SEPERATE PAYMENT

NOTE:
1. ANCHOR AND INSTALL SILT FENCE PER DETAILS SHOWN ON ECD-3

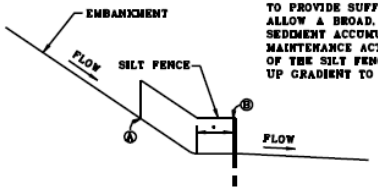


"J-HOOK" SILT FENCE APPLICATION



"SMILE-CONFIGURATION" SILT FENCE APPLICATION

* SILT FENCE SHOULD BE LOCATED AWAY FROM THE TOE OF THE SLOPE TO PROVIDE SUFFICIENT SPACE TO ALLOW A BROAD, FLAT AREA FOR SEDIMENT ACCUMULATION AND MAINTENANCE ACTIVITIES. THE ENDS OF THE SILT FENCE SHOULD BE TURNED UP GRADIENT TO MAXIMIZE STORAGE.



SILT FENCE SECTION AT TOE OF FILL

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

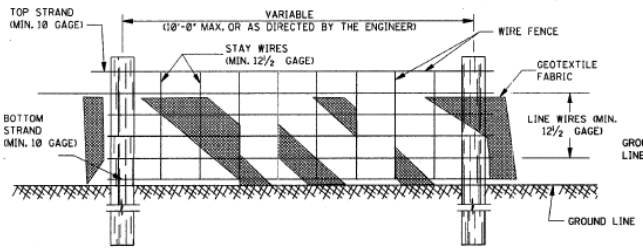
DETAILS OF SEDIMENT BARRIER APPLICATIONS

BY	DESIGNED	DRAWN	CHECKED	DATE

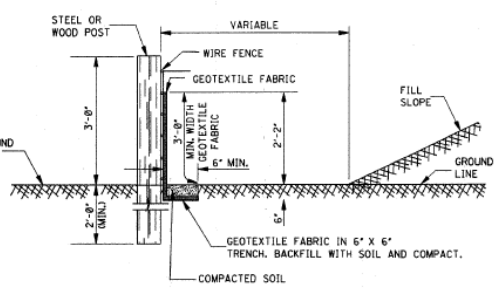
WORKING NUMBER ECD-2

SHEET NUMBER

FILENAME: EROSION CONTROL\ECD-2.DGN



FRONT ELEVATION

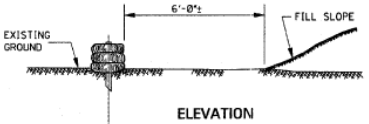


SIDE ELEVATION

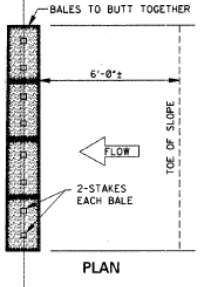
TEMPORARY SILT FENCE

NOTES:

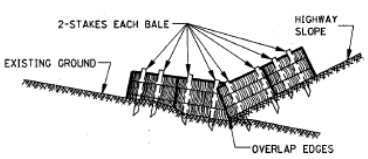
1. WIRE SHALL BE MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
2. GEOTEXTILE FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER.
3. STEEL POST SHALL BE 5'-0" IN HEIGHT AND OF THE SELF-FASTENER ANGLE STEEL TYPE. WOOD POST SHALL BE A MINIMUM OF 5'-0" IN HEIGHT AND 3" OR MORE IN DIAMETER. WIRE FENCE SHALL BE FASTENED TO WOODEN POST WITH NOT LESS THAN 9 GAGE WIRE STAPLES 1" LONG.
4. GEOTEXTILE FABRIC MEETING THE TYPE II MATERIAL REQUIREMENTS AND INSTALLED ACCORDING TO SPECIFICATIONS MAY BE USED WITHOUT WIRE FENCE.



ELEVATION



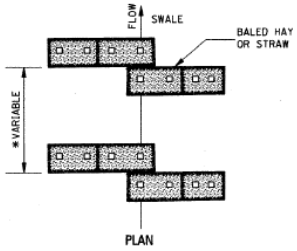
PLAN



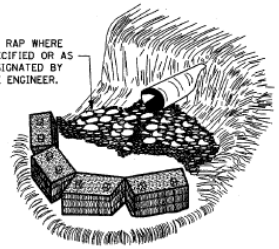
ELEVATION

NOTE: SIMILAR TREATMENT TO BE USED IN DITCHES.

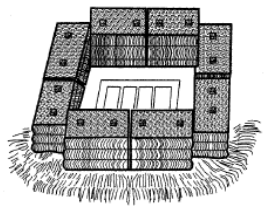
FALL OF DITCH (%)	DISTANCE* (ft)
0 - 1	100'
1 - 2	50'
>2	25'



PLAN



CULVERT

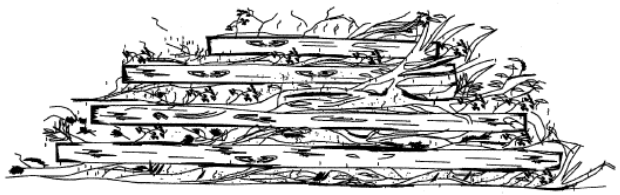


DROP INLET

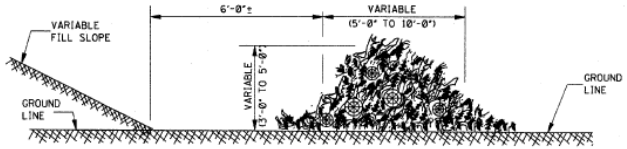
TEMPORARY EROSION CHECKS USING HAY OR STRAW BALES

NOTE: EMBED ALL BALES 3" MINIMUM INTO GROUND AND STAKE (2" X 2" X 36") SECURELY.

STATE	PROJECT NO.
MISS.	



FRONT ELEVATION



SIDE ELEVATION

TEMPORARY BRUSH BARRIER

NOTES:

1. BRUSH BARRIER TO BE USED WHERE NATURAL GROUND IS LEVEL OR SLOPING AWAY FROM PROJECT.
2. PLACE BRUSH, LOG AND TREE LAPS APPROXIMATELY PARALLEL TO TOE OF FILL SLOPE WITH SOME OF THE HEAVIER MATERIALS BEING PLACED ON TOP TO PROPERLY SECURE THE BARRIER AS DETAILED AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
3. TO ALLOW WATER TO FLOW THROUGH BRUSH BARRIER, INTERMINGLE THE BRUSH, LOG AND TREE LAPS SO AS NOT TO FORM A SOLID DAM.

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE REQUIRED TO FURNISH ALL MATERIALS AND PERFORM ALL WORK FOR THE PROPER INSTALLATION, MAINTENANCE AND REMOVAL OF TEMPORARY EROSION CONTROL MEASURES NECESSARY TO CONTROL SILTATION.
2. TEMPORARY BRUSH BARRIERS SHALL BE USED AS REQUIRED BUT WILL NOT BE MEASURED FOR SEPARATE PAYMENT.
3. THE USE OF TEMPORARY EROSION CONTROL MEASURES OTHER THAN TEMPORARY BRUSH BARRIERS WILL ONLY BE REQUIRED AND MEASURED FOR SEPARATE PAYMENT WHEN APPROPRIATE PAY ITEM(S) IS INCLUDED IN THE BID SCHEDULE OF THE PROPOSAL.

BY | REVISION | DATE

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN DIVISION
STANDARD PLAN

TYPICAL TEMPORARY EROSION CONTROL MEASURES

(SILT FENCE, HAY BALES & BRUSH BARRIER)

ENGLISH

WORKING NUMBER TEC-1

ISSUE DATE: OCTOBER 1, 1998

SHEET NUMBER 142