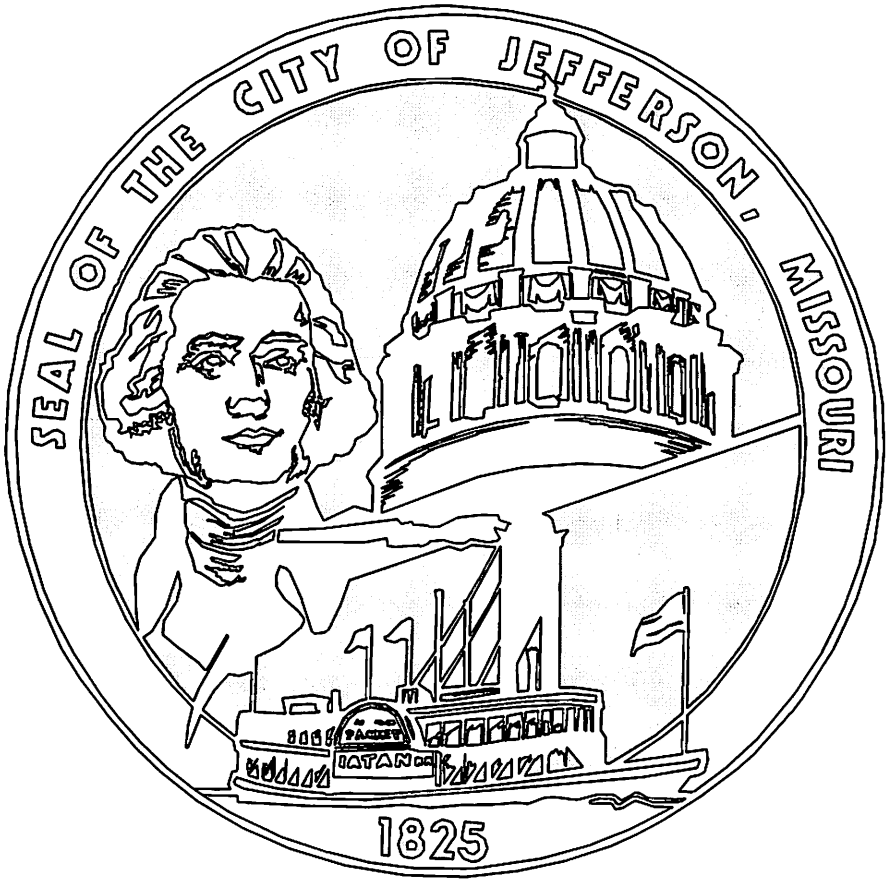
City of Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

# CITY OF JEFFERSON STANDARD DRAWINGS

## REVISED : 1/2013

## 7TH EDITION

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ENGINEERING DIVISION
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# INDEX OF SHEETS

## DIVISION IV STORMWATER (continued)

Index of sheets for
A.P.W.A. Division III Standard Drawings,
As per City of Jefferson Ordinance No. 14154
requirements to follow.

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* Denotes Modification/Addition for year 2013
City of Jefferson Standards

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# DIVISION III
# STANDARD DRAWINGS

## AMERICAN PUBLIC WORKS ASSOCIATION
## KANSAS CITY METROPOLITAN CHAPTER

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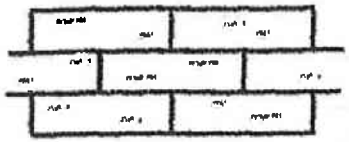
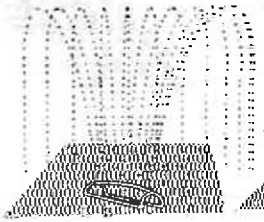
## SODDING



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.

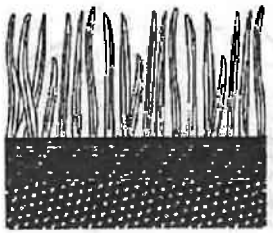
ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.



WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

MOW WHEN THE SOD IS ESTABLISHED, TYPICALLY IN 2–3 WEEKS. SET THE MOWER AT 2 TO 3 INCHES HIGH.

## APPEARANCE OF GOOD SOD



SHOOTS – GRASS BLADES SHOULD BE GREEN AND HEALTHY, MOWED AT A 2"–3" CUTTING HEIGHT.

THATCH – GRASS CLIPPINGS AND DEAD LEAVES, UP TO 1/2" THICK.

ROOT ZONE – SOIL AND ROOTS SHOULD BE 1/2"–3/4" THICK, WITH DENSE ROOT MAT FOR STRENGTH.

SOURCE: MODIFIED FROM VA. DCR, 1992

## SODDING NOTES:

### A) SODDING:

1. THE SOD SHALL BE DENSELY ROOTED NURSERY GROWN, AND A PERENNIAL GRASS. THE SOD SHALL CONTAIN A GROWTH OF NOT MORE THAN 10 PERCENT OF OTHER GRASSES, SHALL BE FREE FROM ALL PROHIBITED AND NOXIOUS WEEDS, AND SHALL BE CUT IN STRIPS OF UNIFORM THICKNESS. THE RANGE OF ACCEPTABLE THICKNESS SHALL BE 1/2 TO 1 1/2 INCH, WITH EACH STRIP CONTAINING AT LEAST ONE (1) SQUARE YARD. SOD SHALL BE CUT IN STRIPS NOT LESS THAN 12 INCHES WIDE.
2. FERTILIZER SHALL BE INORGANIC 12–12–12 OR 13–13–13 GRADE, UNIFORM IN COMPOSITION, FREE FLOWING, SUITABLE FOR APPLICATION WITH APPROVED EQUIPMENT, AND DELIVERED TO THE SITE IN CONVENIENT CONTAINERS, EACH FULLY LABELED. LABELS SHALL CONFORM TO APPLICABLE STATE FERTILIZER LAWS AND BEARING THE NAME, TRADE NAME OR TRADEMARK, AND WARRANTY OF THE PRODUCER.
3. BEFORE TILLING OPERATIONS, FERTILIZER SHALL BE SPREAD UNIFORMLY AT THE RATE OF 300 POUNDS PER ACRE FERTILIZING RATE IS EQUIVALENT TO 3.5 POUND PER 500 SQUARE FEET.
4. THE SOD BED SHALL HAVE A UNIFORM SURFACE FREE FROM WASHES AND DEPRESSIONS. IT SHALL CONFORM TO THE FINISHED GRADE PROFILE AND CROSS SECTION SHOWN ON THE PLANS. THE SOIL, EXCEPT WHERE FRESH TOP SOIL HAS BEEN APPLIED AND COMPACTED, SHALL BE THOROUGHLY TILLED TO A DEPTH OF 2 INCHES.
5. FRESHLY GRADED AREAS WHICH HAVE SET LONG ENOUGH TO BECOME DRY AND CRUSTED OVER SHALL BE TILLED, AS SPECIFIED ABOVE, BEFORE PLACING THE SOD.
6. SOD SHALL NOT BE PLACED DURING A DROUGHT NOR ON FROZEN GROUND UNLESS AUTHORIZED BY THE ENGINEER.
7. SOD SHALL BE MOIST WHEN IT IS PLACED. SOD STRIPS SHALL BE LAID ALONG CONTOUR LINES, COMMENCING AT THE LOWEST POINT OF THE AREA AND WORKING UPWARD. THE TRANSVERSE JOINTS OF SOD STRIPS SHALL BE STAGGERED AND THE SOD CAREFULLY PLACED TO PRODUCE TIGHT JOINTS. THE SOD SHALL BE FIRMED AND WATERED IMMEDIATELY AFTER IT IS PLACED. THE FIRMING SHALL BE ACCOMPLISHED BY APPLICATION OF A ROLLER WEIGHING BETWEEN 60 AND 90 POUNDS PER LINEAL FOOT OF ROLLER.
8. ON 2H:1V SLOPES OR STEEPER THE SOD SHALL BE ANCHORED WITH 1/2–INCH SQUARE BY 8–INCH LONG WOODEN PEGS DRIVEN INTO THE GROUND, 3 PEGS TO THE SQUARE YARD OR OTHER APPROVED CONFIGURATION. PEGGING SHALL BE DONE IMMEDIATELY AFTER SOD IS FIRMED. THE AREA SHALL THEN BE CLEARED OF LOOSE SOD, EXCESS OR BROKEN ANCHORS, EXCESSIVE SOIL, AND OTHER FOREIGN MATERIALS.

### B) TROUBLESHOOTING:

1. CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL IF ANY OF THE FOLLOWING OCCUR:
   a. VARIATION IN TOPOGRAPHY ON SITE INDICATE THE SODDING MATERIALS WILL NOT FUNCTION AS INTENDED; CHANGES IN PLAN MAY BE NEEDED.
   b. DESIGN SPECIFICATIONS FOR SOD VARIETY CANNOT BE MET OR IRRIGATION IS NOT POSSIBLE; SUBSTITUTION OR SEEDING MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD RESULT IN EROSION OR SODDING FAILURE.
2. COMMON PROBLEMS:
   a. SOD LAID ON POORLY PREPARED SOIL OR UNSUITABLE SURFACE DIES BECAUSE IT IS UNABLE TO ROOT – REMOVE DEAD SOD, PREPARE SURFACE, AND RESOD.
   b. SOD NOT ADEQUATELY IRRIGATED AFTER INSTALLATION CAUSES ROOT DIEBACK, GRASS TO NOT ROOT RAPIDLY, AND DRYING OUT – IRRIGATE SOD AND UNDERLYING SOIL TO THE DEPTH OF 4 INCHES AND KEEP MOIST UNTIL ROOTS ARE ESTABLISHED.
   c. SOD NOT ANCHORED PROPERLY IS LOOSENED BY RUNOFF – REPLACE DAMAGED AREAS AND ANCHOR SOD.
   d. SLOW GROWTH DUE TO LACK OF NITROGEN CAUSES YELLOWING OF LEAF BLADES – REFERTILIZE SOD, BUT AVOID FERTILIZING COOL SEASON GRASSES FROM LATE MAY THROUGH JULY.

### C) MAINTENANCE AND INSPECTION:

1. THE SODDED AREA SHALL BE THOROUGHLY WATERED DAILY FOR A PERIOD OF FIFTEEN DAYS AFTER PLACING EXCEPT WHEN THOROUGHLY WETTED BY RAIN. ANY PORTION OF THE SOD THAT IS NOT IN GOOD GROWING CONDITION FOLLOWING THE FIRST FULL GROWING SEASON (SPRING TO FALL), SHALL BE REPLACED WITH FRESH LIVE SOD.

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|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| SODDING | STANDARD DRAWING NUMBER: SC-02 ADOPTED: |

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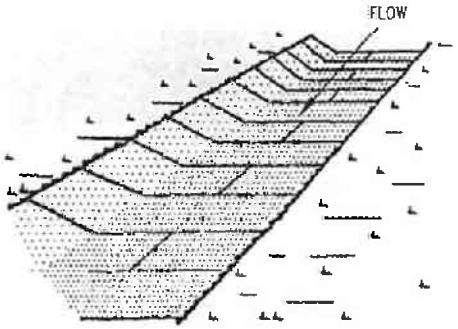
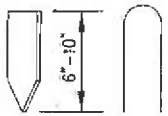
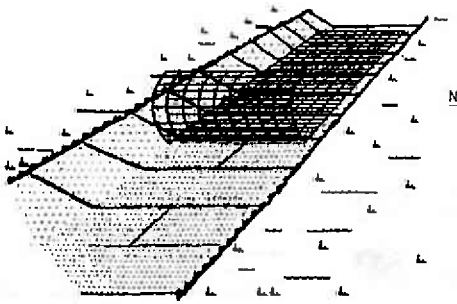
## SODDED WATERWAYS




NOTE:
LAY SOD ACROSS THE DIRECTION OF FLOW.




NOTE:
USE PEGS OR STAPLES TO FASTEN SOD FIRMLY – AT THE ENDS OF STRIPS AND IN THE CENTER, OR EVERY 3-4 FEET IF THE STRIPS ARE LONG. WHEN READY TO MOW, DRIVE PEGS OR STAPLES FLUSH WITH THE GROUND.



NOTE:
IN CRITICAL AREAS, SECURE SOD WITH NETTING. USE STAPLES.

SOURCE: MODIFIED FROM VA. DCR, 1992

## SODDED WATERWAYS NOTES:

### A) INSTALLATION:

1. LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP.
2. CARE SHOULD BE TAKEN TO PREPARE THE SOIL ADEQUATELY IN ACCORDANCE WITH THE SODDING SPECIFICATIONS ON ESC-02.
3. SOD STRIPS IN WATERWAYS SHALL BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY.
4. AFTER ROLLING OR TAMPING, SOD SHALL BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. JUTE MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.
5. ALL OTHER SODDING SPECIFICATIONS SHALL BE ADHERED TO WHEN SODDING A WATERWAY.

### B) TROUBLESHOOTING:

1. CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL IF ANY OF THE FOLLOWING OCCUR:
   a. VARIATION IN TOPOGRAPHY ON SITE INDICATE THE SODDING MATERIALS WILL NOT FUNCTION AS INTENDED; CHANGES IN PLAN MAY BE NEEDED.
   b. DESIGN SPECIFICATIONS FOR SOD VARIETY CANNOT BE MET OR IRRIGATION IS NOT POSSIBLE; SUBSTITUTION OR SEEDING MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD RESULT IN EROSION OR SODDING FAILURE.
2. COMMON PROBLEMS:
   a. SOD LAID ON POORLY PREPARED SOIL OR UNSUITABLE SURFACE DIES BECAUSE IT IS UNABLE TO ROOT – REMOVE DEAD SOD, PREPARE SURFACE, AND RESOD.
   b. SOD NOT ADEQUATELY IRRIGATED AFTER INSTALLATION CAUSES ROOT DIEBACK GRASS TO NOT ROOT RAPIDLY, AND DRYING OUT – IRRIGATE SOD AND UNDERLYING SOIL TO THE DEPTH OF 4 INCHES AND KEEP MOIST UNTIL ROOTS ARE ESTABLISHED.
   c. SOD NOT ANCHORED PROPERLY IS LOOSENED BY RUNOFF – REPLACE DAMAGED AREAS AND ANCHOR SOD.
   d. SLOW GROWTH DUE TO LACK OF NITROGEN CAUSES YELLOWING OF LEAF BLADES – REFERTILIZE SOD, BUT AVOID FERTILIZING COOL SEASON GRASSES FROM LATE MAY THROUGH JULY.

### C) MAINTENANCE & INSPECTION:

1. KEEP SOD MOIST UNTIL IT IS FULLY ROOTED.
2. MOW TO A HEIGHT OF 2 TO 3 INCHES AFTER SOD IS WELL-ROOTED, IN 2 TO 3 WEEKS. DO NOT REMOVE MORE THAN 1/3 OF THE LEAF BLADES IN ANY MOWING.
3. PERMANANT, FINE TURF AREAS REQUIRE YEARLY FERTILIZATION. FERTILIZE WARM-SEASON GRASS IN LATE SPRING TO EARLY SUMMER; COOL-SEASON GRASS IN LATE WINTER AND AGAIN IN EARLY FALL.

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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| SODDED WATERWAYS | STANDARD DRAWING NUMBER: ESC-03 ADOPTED: |

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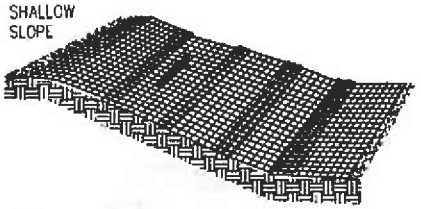
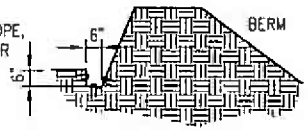
## EROSION CONTROL BLANKET

SHALLOW SLOPE

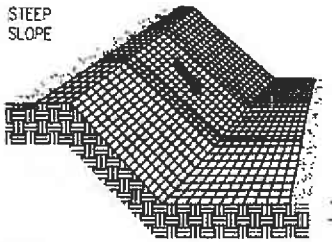


**NOTE:**
ON SHALLOW SLOPES, PROTECTIVE EROSION CONTROL BLANKETS MAY BE APPLIED ACROSS THE SLOPE.

**NOTE:**
WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATERIAL OVER THE BERM AND ANCHOR IT BEHIND THE BERM.



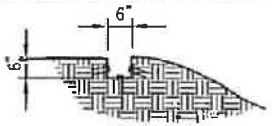

STEEP SLOPE



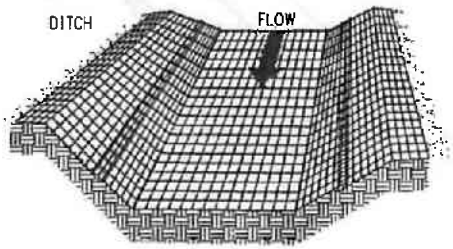
**NOTE:**
ON STEEP SLOPES, APPLY PROTECTIVE BLANKET PERPENDICULAR TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.

**NOTE:**
BRING MATERIAL DOWN TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION.

### TOP OF SLOPE BLANKET ANCHOR SLOT




DITCH




**NOTE:**
IN DITCHES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS AS REQUIRED AVOID JOINING MATERIAL IN THE CENTER OF THE DITCH IF AT ALL POSSIBLE. FOLLOW BLANKET MANUFACTURER'S RECOMMENDATIONS FOR ALLOWABLE VELOCITY AND SHEAR STRESS.

SOURCE: MODIFIED FROM VA. DCR, 1992

## EROSION CONTROL BLANKET NOTES (1 OF 2):

### A) SITE PREPARATION:

AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FREE FROM CLODS AND ROCKS MORE THAN 1 1/2 INCHES IN DIAMETER AND ANY FOREIGN MATERIAL THAT WILL PREVENT UNIFORM CONTACT OF THE PROTECTIVE COVERING WITH THE SOIL SURFACE.

### B) PLANTING:

LIME, FERTILIZE, AND SEED IN ACCORDANCE WITH SEEDING OR PLANTING PLAN. WHEN USING JUTE MESH ON A SEEDED AREA, APPLY APPROXIMATELY ONE HALF THE SEED AFTER LAYING THE MAT. THE PROTECTIVE COVERING CAN BE LAID OVER SPRIGGED AREAS WHERE SMALL GRASS PLANTS HAVE BEEN INSERTED INTO THE SOIL. WHERE GROUND COVERS ARE TO BE PLANTED, LAY THE PROTECTIVE COVERING FIRST AND THEN PLANT THROUGH THE MATERIAL AS PER PLANTING PLAN.

### C) LAYING AND STAPLING:

IF INSTRUCTIONS HAVE BEEN FOLLOWED, ALL NEEDED CHECK SLOTS WILL HAVE BEEN INSTALLED, AND THE PROTECTIVE COVERING WILL BE LAID ON A FRIABLE SEEDBED FREE FROM CLODS, ROCKS, ROOTS, ETC. THAT MIGHT IMPEDE GOOD CONTACT.

1. START LAYING THE PROTECTIVE COVERING FROM THE TOP OF THE CHANNEL OR SLOPE AND UNROLL DOWN-GRADE. ALLOW TO LAY LOOSELY ON SOIL; DO NOT STRETCH.
2. UPSLOPE ENDS OF THE BLANKET SHOULD BE BURIED IN AN ANCHOR SLOT NO LESS THAN 6-INCHES DEEP. TAMP EARTH
3. FIRMLY OVER THE MATERIAL. WHEN TOP IS RELATIVELY FLAT, EXTEND BLANKET ABOUT 40 INCHES AWAY FROM SLOPE. STAPLE THE MATERIAL AT A MINIMUM OF EVERY 12 INCHES ACROSS THE TOP END.
4. EDGES OF THE MATERIAL SHALL BE STAPLED EVERY 3 FEET. WHERE MULTIPLE WIDTHS ARE LAID SIDE BY SIDE, THE ADJACENT EDGES SHALL BE OVERLAPPED A MINIMUM OF 6 INCHES AND STAPLED TOGETHER.
5. STAPLES SHALL BE PLACED DOWN THE CENTER, STAGGERED WITH THE EDGES AT 3-FOOT INTERVALS.

### D) TROUBLESHOOTING:

CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL, IF ANY OF THE FOLLOWING OCCUR:

1. MOVEMENT OF THE BLANKET OR EROSION UNDER THE BLANKET IS OBSERVED.
2. VARIATIONS IN TOPOGRAPHY ON SITE INDICATE EROSION CONTROL MAT WILL NOT FUNCTION AS INTENDED; CHANGES IN PLAN MAY BE NEEDED, OR A BLANKET WITH A SHORTER OR LONGER LIFE MAY BE NEEDED.
3. DESIGN SPECIFICATIONS FOR SEED VARIETY, SEEDING DATES, OR EROSION CONTROL MATERIALS CANNOT BE MET; SUBSTITUTION MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD RESULT IN FAILURE TO ESTABLISH VEGETATION.

### E) MAINTENANCE & INSPECTION

INSPECT CONTROLS AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER, AND EVERY 7 DAYS UNTIL VEGETATION IS ESTABLISHED, FOR EROSION OR UNDERMINING BENEATH THE NETTING, BLANKETS, OR MATS. IF ANY AREA SHOWS EROSION, PULL BACK THAT PORTION OF THE MATERIAL, ADD SOIL, TAMP DOWN, AND RESEED; RESECURE THE MATERIAL IN PLACE. IF NETTING, BLANKETS OR MATS BECOME DISLOCATED OR DAMAGED, REPAIR OR REPLACE AND RESECURE IMMEDIATELY.

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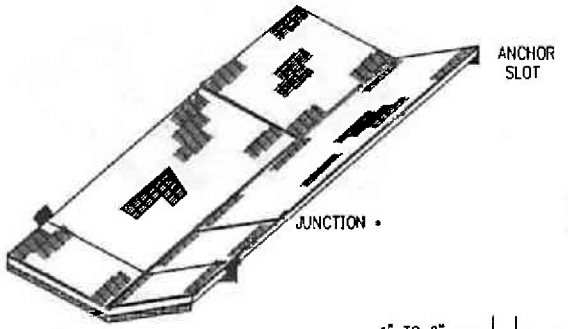
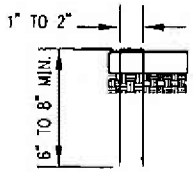
| EROSION CONTROL BLANKET SHEET 1 OF 2 | STANDARD DRAWING NUMBER ESC-04 ADOPTED: |

J:\MCIC\APWA\27787\CIVIL\erosb\draft 4-22-03\design INTERIM-04.DWG 04-22-2003 16:34 BA

## EROSION CONTROL BLANKET INSTALLATION FOR CHANNELS

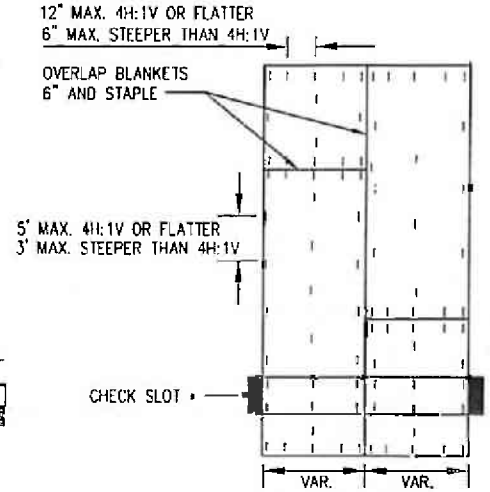



NOTE:
• JUNCTION: OVERLAP TOP BLANKET 6 INCHES MINIMUM AND STAPLE EVERY 6 INCHES ACROSS.




NOT TO SCALE

NOTE:
STAPLE FORMED FROM NO.11 STEEL WIRE.
MIN. 8" STAPLE LENGTH FOR SANDY SOIL.
MIN. 6" STAPLE LENGTH FOR OTHER SOIL.

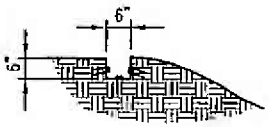



**PLAN VIEW STAPLING DIAGRAM**

NOT TO SCALE

NOTE:
• CHECK SLOTS AT MIN. 50' INTERVALS; NOT REQUIRED WITH ALL COMBINATION BLANKETS

NOTE:
APPROXIMATELY 200 STAPLES ARE REQUIRED PER 100 SQ. YDS. OF MATERIAL ROLL. ANCHOR SLOTS, JUNCTION SLOTS, AND CHECK SLOTS TO BE BURIED 6" TO 12" DEEP.




**ANCHOR SLOT**

## EROSION CONTROL BLANKET NOTES (2 OF 2):

F) **STAPLES:**

STAPLES FOR ANCHORING BLANKET SHALL BE NO. 11-GAUGE WIRE OR HEAVIER. THEIR LENGTH SHALL BE A MINIMUM OF 6 INCHES. A LARGER STAPLE WITH A LENGTH OF UP TO 12 INCHES SHALL BE USED ON LOOSE, SANDY, OR UNSTABLE SOILS.

G) **JOINING PROTECTIVE COVERINGS:**

OVERLAP THE END OF THE PREVIOUS ROLL A MINIMUM OF 6 INCHES AND STAPLE. STAPLE ACROSS THE END OF THE ROLL JUST BELOW THE ANCHOR SLOT AND ACROSS THE MATERIAL EVERY 6 INCHES.

H) **TERMINAL END:**

AT THE POINT AT WHICH THE MATERIAL IS DISCONTINUED, OR WHERE THE PROTECTIVE COVERING MEETS A STRUCTURE OF SOME TYPE, STAPLE A MINIMUM OF EVERY 12 INCHES.

I) **FINAL CHECK:**

THESE INSTALLATION CRITERIA MUST BE ADHERED TO:
1. ALL DISTURBED AREAS ARE SEEDED.
2. PROTECTIVE BLANKET IS IN UNIFORM CONTACT WITH THE SOIL.
3. ALL LAP JOINTS ARE SECURE.
4. ALL STAPLES ARE DRIVEN FLUSH WITH THE GROUND.

SOURCE: MODIFIED FROM VA. DCR, 1992

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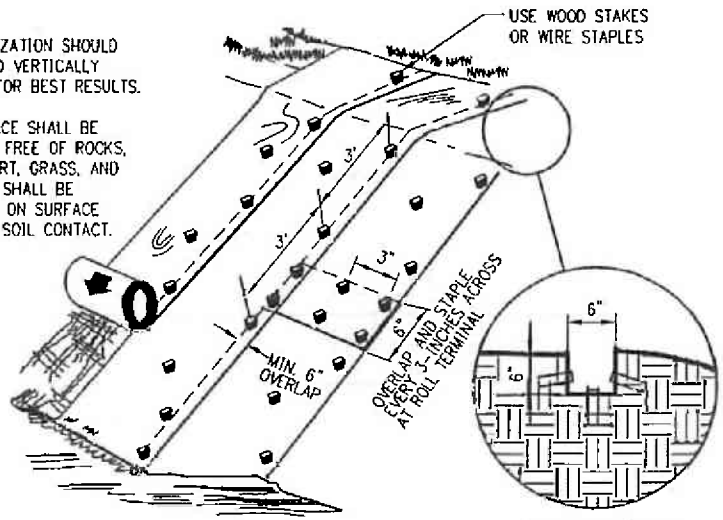
| EROSION CONTROL BLANKET SHEET 2 OF 2 | STANDARD DRAWING NUMBER ESC-05 ADOPTED: |

## TURF REINFORCEMENT MAT SLOPE INSTALLATION

**NOTES:**

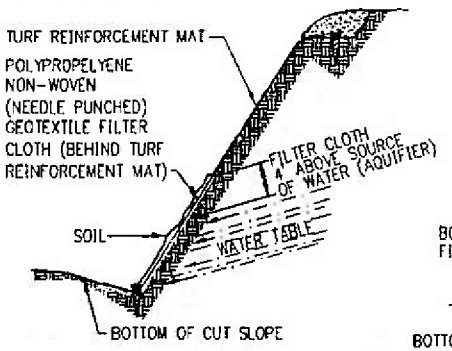
1. SOIL STABILIZATION SHOULD BE INSTALLED VERTICALLY DOWNSLOPE FOR BEST RESULTS.
2. SLOPE SURFACE SHALL BE SMOOTH AND FREE OF ROCKS, LUMPS OF DIRT, GRASS, AND STICKS. MAT SHALL BE PLACED FLAT ON SURFACE FOR PROPER SOIL CONTACT.



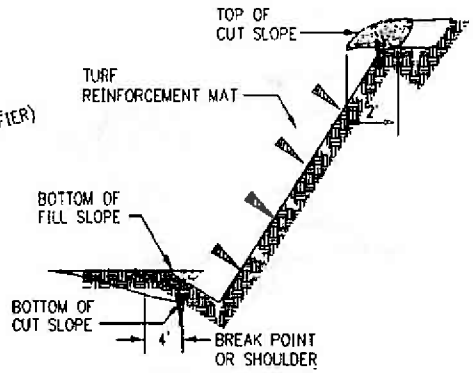

**FILL SLOPE SECTION**
NOT TO SCALE

**ANCHOR SLOT**
NOT TO SCALE
TRENCH INTO BERM AND PROGRESS DOWNSLOPE

**TOE**
MAINTAIN SLOPE ANGLE




**SLOPE LINING (WET SLOPE)**
NOT TO SCALE




**SLOPE LINING (DRY SLOPE)**
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## TURF REINFORCEMENT MAT SLOPE INSTALLATION NOTES:

### A) TURF REINFORCEMENT MAT:

1. THE MAJORITY OF THESE PRODUCTS PROVIDE A THREE DIMENSIONAL GEOMATRIX OF NYLON, POLYETHYLENE, OR RANDOMLY ORIENTED MONOFILAMENTS, FORMING A MAT. THESE PRODUCTS CONTAIN ULTRAVIOLET (UV) INHIBITING STABILIZERS, ADDED TO THE COMPOUNDS TO ENSURE ENDURANCE, AND PROVIDE "PERMEANENT ROOT REINFORCEMENT." THE THREE DIMENSIONAL FEATURE CREATES AN OPEN SPACE WHICH IS ALLOWED TO FILL WITH SOIL. THE ROOTS OF THE GRASS PLANT BECOME ESTABLISHED WITHIN THE MAT ITSELF, FORMING A SYNERGISTIC ROOT AND MAT SYSTEM. AS THE GRASS BECOMES ESTABLISHED, THE TWO ACTUALLY "REINFORCE" EACH OTHER, PREVENTING MOVEMENT OR DAMAGE TO THE SOIL. ALLOWABLE VELOCITIES ARE INCREASED CONSIDERABLY OVER NATURAL TURF STANDS. SELECTION OF THE APPROPRIATE MATTING MATERIALS ALONG WITH PROPER INSTALLATION BECOME CRITICAL FACTORS IN THE SUCCESS OF THIS PRACTICE. CONSULTATION WITH THE SUPPLIER OR THE MANUFACTURER AND THOROUGH EVALUATION OF PERFORMANCE DATA TO ENSURE PROPER SELECTION OF A SOIL STABILIZATION MATTING ARE ALSO ESSENTIAL.

### B) INSTALLATION REQUIREMENTS:

1. SITE PREPARATION:

   AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FREE OF CLODS AND ROCKS MORE THAN 1-INCH IN DIAMETER AND ANY FOREIGN MATERIAL THAT WILL PREVENT CONTACT OF THE SOIL STABILIZATION MAT WITH THE SOIL SURFACE. IF NECESSARY, REDIRECT ANY RUNOFF AWAY FROM THE DITCH OR SLOPE DURING INSTALLATION.

2. PLANTING:

   LIME, FERTILIZE, AND SEED IN ACCORDANCE WITH THE APPROVED PLAN, PAYING SPECIAL ATTENTION TO THE PLANT SELECTION CHOSEN FOR THE MATTED AREA. IF THE AREA HAS BEEN SEEDED PRIOR TO INSTALLING THE MAT, RESEED ALL AREAS DISTURBED DURING INSTALLATION.

3. LAYING AND SECURING:

   SIMILAR TO INSTALLING OTHER EROSION CONTROL BLANKETS, BUT PLAN-APPROVING AUTHORITY'S REQUIREMENTS OR MANUFACTURER'S RECOMMENDATIONS MUST BE FOLLOWED AS DETAILED. THE KEY TO ACHIEVING DESIRED PERFORMANCE IS DEPENDENT UPON PROPER INSTALLATION.

4. SECURING THE MATERIAL AND JOINING BLANKETS:

   PRODUCT SPECIFICATIONS VARY. UPSTREAM AND DOWNSTREAM TERMINAL SLOTS, NEW ROLL OVERLAPS, AND MULTIPLE WIDTH INSTALLATIONS DIFFER BY PRODUCT AND MANUFACTURER.

5. FINAL CHECK:

   ENSURE THAT THESE INSTALLATION CRITERIA ARE COMPLETED:

   a. ALL DISTURBED AREAS ARE SEEDED.
   b. SOIL STABILIZATION BLANKET IS IN UNIFORM CONTACT WITH THE SOIL
   c. ALL REQUIRED SLOTS AND LAPPED JOINTS ARE IN PLACE.
   d. THE MATERIAL IS PROPERLY ANCHORED.

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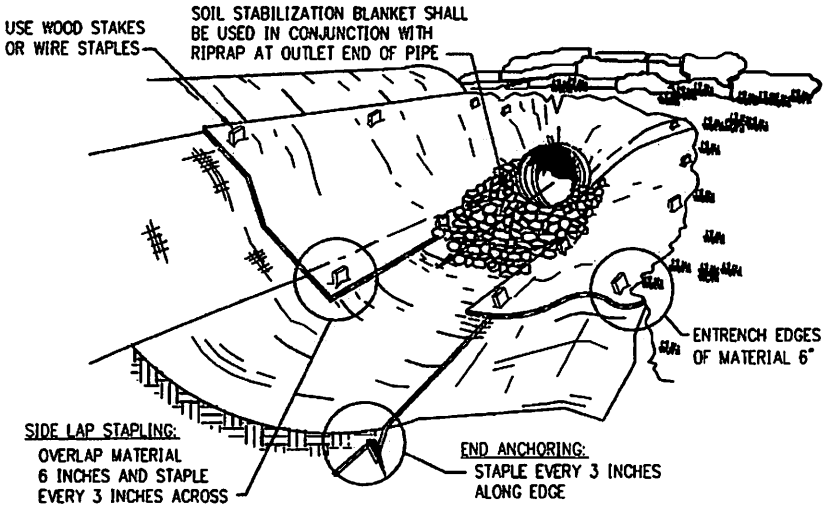
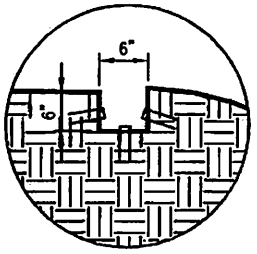
| TURF REINFORCEMENT MAT SLOPE INSTALLATION | STANDARD DRAWING NUMBER: ESC-06 ADOPTED: |

## TURF REINFORCEMENT MAT CHANNEL INSTALLATION




**ANCHOR SLOT DETAIL**
NOT TO SCALE

## TURF REINFORCEMENT MAT CHANNEL INSTALLATION NOTES:

### A) TURF REINFORCEMENT MAT:

1. THE MAJORITY OF THESE PRODUCTS PROVIDE A THREE DIMENSIONAL GEOMATRIX OF NYLON, POLYETHYLENE, OR RANDOMLY ORIENTED MONOFILAMENTS TO FORM A MAT. THESE PRODUCTS CONTAIN ULTRAVIOLET (UV) INHIBITING STABILIZERS ADDED TO THE COMPOUNDS TO ENSURE ENDURANCE AND PROVIDE PERMEANENT ROOT REINFORCEMENT. THE THREE DIMENSIONAL FEATURE CREATES AN OPEN SPACE WHICH IS ALLOWED TO FILL WITH SOIL. THE ROOTS OF THE GRASS BECOME ESTABLISHED WITHIN THE MAT ITSELF, FORMING A SYNERGISTIC ROOT AND MAT SYSTEM. AS THE GRASS BECOMES ESTABLISHED, THE TWO ACTUALLY REINFORCE EACH OTHER PREVENTING MOVEMENT OF THE SOIL. ALLOWABLE VELOCITIES ARE INCREASED CONSIDERABLY OVER NATURAL TURF STANDS.
SELECTION OF THE APPROPRIATE MATTING MATERIALS ALONG WITH PROPER INSTALLATION BECOME CRITICAL FACTORS IN THE SUCCESS OF THIS PRACTICE. CONSULTATION WITH THE SUPPLIER OR THE MANUFACTURER AND THOROUGH EVALUATION OF PERFORMANCE DATA TO ENSURE PROPER SELECTION OF A SOIL STABILIZATION MATTING ARE ALSO ESSENTIAL.

### B) INSTALLATION REQUIREMENTS:

1. SITE PREPARATION:

   AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FREE OF CLODS AND ROCKS MORE THAN 1-INCH IN DIAMETER AND ANY FOREIGN MATERIAL THAT WILL PREVENT CONTACT OF THE SOIL STABILIZATION MAT WITH THE SOIL SURFACE. IF NECESSARY, REDIRECT ANY RUNOFF AWAY FROM THE DITCH OR SLOPE DURING INSTALLATION.

2. PLANTING:

   LIME, FERTILIZE, AND SEED IN ACCORDANCE WITH THE APPROVED PLAN, PAYING SPECIAL ATTENTION TO THE PLANT SELECTION CHOSEN FOR THE MATTED AREA. IF THE AREA HAS BEEN SEEDED PRIOR TO INSTALLING THE MAT, RESEED ALL AREAS DISTURBED DURING INSTALLATION.

3. LAYING AND SECURING:

   SIMILAR TO INSTALLING OTHER EROSION CONTROL BLANKETS, BUT PLAN APPROVING AUTHORITY'S REQUIREMENTS OR MANUFACTURER'S RECOMMENDATIONS MUST BE FOLLOWED AS DETAILED. THE KEY TO ACHIEVING DESIRED PERFORMANCE IS DEPENDENT UPON PROPER INSTALLATION.

4. SECURING THE MATERIAL AND JOINING BLANKETS:

   PRODUCT SPECIFICATIONS VARY. UPSTREAM AND DOWNSTREAM TERMINAL SLOTS, NEW ROLL OVERLAPS, AND MULTIPLE WIDTH INSTALLATIONS DIFFER BY PRODUCT AND MANUFACTURER.

5. FINAL CHECK:

   THESE INSTALLATION CRITERIA MUST BE COMPLETED:
   a. ALL DISTURBED AREAS ARE SEEDED.
   b. SOIL STABILIZATION BLANKET IS IN UNIFORM CONTACT WITH THE SOIL
   c. ALL REQUIRED SLOTS AND LAPPED JOINTS ARE IN PLACE.
   d. THE MATERIAL IS PROPERLY ANCHORED.

SOURCE: MODIFIED FROM VA. DCR, 1992

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| TURF REINFORCEMENT MAT CHANNEL INSTALLATION | STANDARD DRAWING NUMBER ESC-07<br>ADOPTED: |

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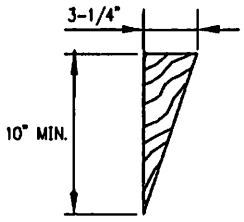
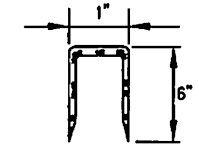
## STAKES, STAPLES, AND PINS




**1. STAKE**

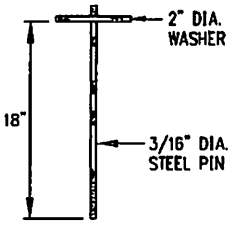
SEE NOTE 1




11 GAUGE STEEL 6"x1"x6" STAPLE

**2. STAPLE**

SEE NOTE 2




**3. PIN**

SEE NOTE 3

**STAKES, STAPLES, AND PINS FOR INSTALLATION OF ROLLED EROSION CONTROL PRODUCTS**

NOT TO SCALE

## STAKES, STAPLES, AND PINS NOTES:

### GENERAL NOTES:

1. STAKES SHALL BE 1x4 TRIANGULAR SURVEY STAKES A MINIMUM OF 10" IN LONG.
2. STAPLES SHALL BE 11 GAUGE STEEL A MINIMUM OF 1" WIDE BY 6" IN LONG. A 2"x8" STAPLE MAY BE REQUIRED IN CERTAIN SOIL CONDITIONS.
3. STEEL PINS SHALL BE 3/16 DIAMETER BY 18" IN LONG WITH A 2" DIAMETER WASHER ON TOP. (SEE ILLUSTRATION.)
4. ANCHORING METHODS AND RECOMMENDATIONS VARY BY MANUFACTURERS. THE EXPECTATION OF HIGH VELOCITIES SHOULD DICTATE THE USE OF MORE SUBTANTIAL ANCHORING.

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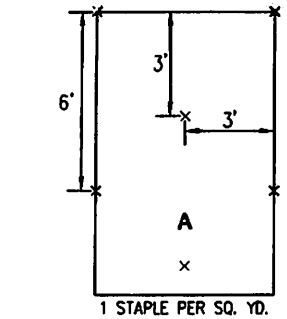
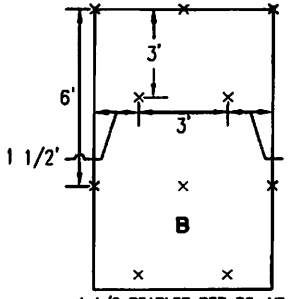
| STAKES, STAPLES, AND PINS | STANDARD DRAWING NUMBER: ESC-08 ADOPTED: |

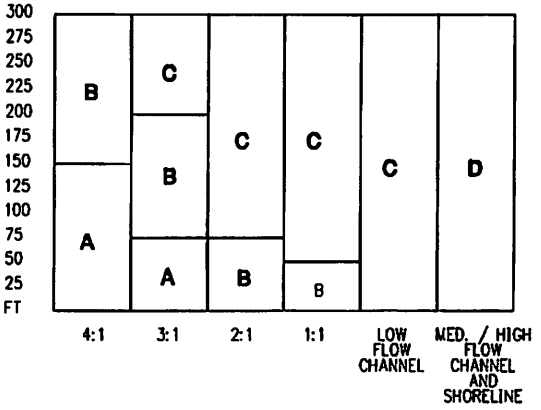
## STAPLE PATTERNS FOR ROLLED EROSION CONTROL PRODUCTS

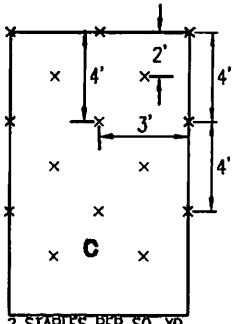



1 STAPLE PER SQ. YD.

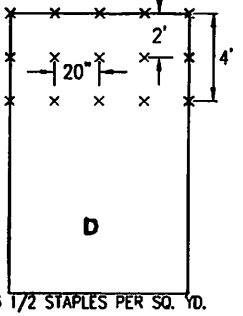



1 1/2 STAPLES PER SQ. YD.




2 STAPLES PER SQ. YD.




3 1/2 STAPLES PER SQ. YD.

### GENERAL STAPLE PATTERN GUIDE AND RECOMMENDATIONS FOR ROLLED EROSION CONTROL PRODUCTS

NOT TO SCALE

**NOTE:**

FOR OPTIMUM RESULTS, THESE RECOMMENDED STAPLE PATTERN GUIDES MUST BE FOLLOWED UNLESS OTHERWISE DICTATED BY THE MANUFACTURER. SUGGESTED ANCHORING METHODS VARY BY MANUFACTURER. THIS CHART SHOWS HOW SLOPE LENGTHS AND GRADIENTS AFFECT STAPLING PATTERNS.

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| STAPLE PATTERNS FOR ROLLED EROSION CONTROL PRODUCTS | STANDARD DRAWING NUMBER ESC-09<br>ADOPTED: |

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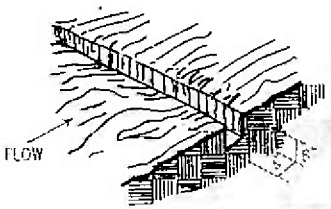
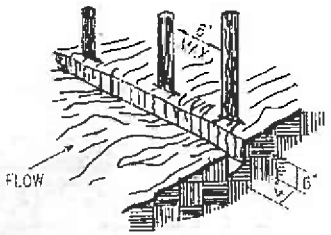
## SEDIMENT FENCE

1. EXCAVATE A 6"x4" TRENCH.

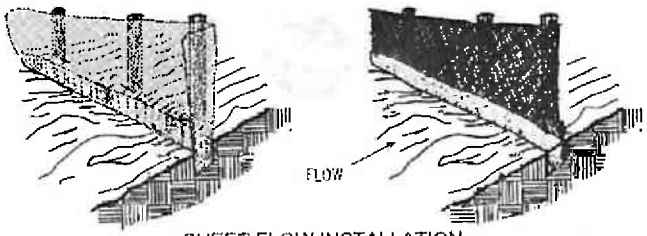



2. SET THE STAKES ALONG THE DOWN SLOPE SIDE OF THE TRENCH.

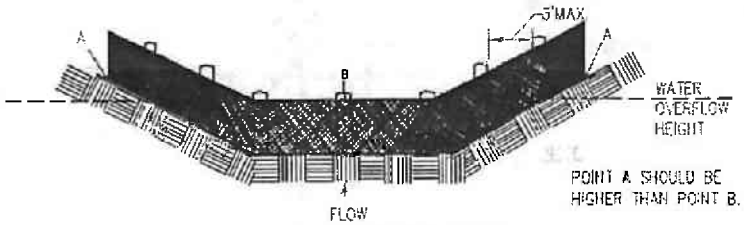



3. STAPLE GEOTEXTILE MATERIAL TO STAKES AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL OVER THE GEOTEXTILE IN THE TRENCH.




SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)
NOT TO SCALE




DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## SEDIMENT FENCE NOTES:

### A) INSTALLATION:

1. THE HEIGHT OF SEDIMENT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE THE GROUND SURFACE.
2. THE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SECURELY SPLICED TOGETHER ONLY AT SUPPORT POSTS, WITH A MAX 6-INCH OVERLAP.
3. DIG A TRENCH AT LEAST 6 INCHES DEEP AND 4 INCHES WIDE ALONG THE FENCE ALIGNMENT.
4. DRIVE POSTS AT LEAST 24 INCHES INTO THE GROUND ON THE DOWNSLOPE SIDE OF THE TRENCH. SPACE POSTS A MAXIMUM OF 6 FEET APART.
5. EXTRA-STRENGTH SEDIMENT FENCE FABRIC SHALL BE USED. POSTS FOR THIS TYPE OF FABRIC SHALL BE PLACED A MAXIMUM OF 6 FEET APART. THE SEDIMENT FABRIC SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING A MINIMUM OF ONE INCH LONG, HEAVY-DUTY WIRE STAPLES OR TIE-WIRES, AND EIGHT INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE THE BOTTOM 1 FOOT OF FABRIC IN THE MINIMUM-OF-6-INCH DEEP TRENCH, LAPPING TOWARD THE UPSLOPE SIDE. BACKFILL WITH COMPACTED EARTH OR GRAVEL.
7. IF A SEDIMENT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE, PLACED ON A CONTOUR, WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH SEDIMENT FABRIC SHALL BE USED WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
8. TO REDUCE MAINTENANCE, EXCAVATE A SHALLOW SEDIMENT STORAGE AREA IN THE UPSLOPE SIDE OF THE FENCE. PROVIDE GOOD ACCESS IN AREAS OF HEAVY SEDIMENTATION FOR CLEAN OUT AND MAINTENANCE.
9. SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

### B) TROUBLESHOOTING:

1. DETERMINE THE EXACT LOCATION OF UNDERGROUND UTILITIES, BEFORE FENCE INSTALLATION SO UTILITIES ARE NOT DISTURBED.
2. GRADE ALIGNMENT OF FENCE AS NEEDED TO PROVIDE A BROAD, NEARLY LEVEL AREA UPSTREAM OF FENCE TO ALLOW SEDIMENT COLLECTION AREA.

### C) INSPECTION MAINTENANCE:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY AND COMPLETELY STABILIZED.

APWA

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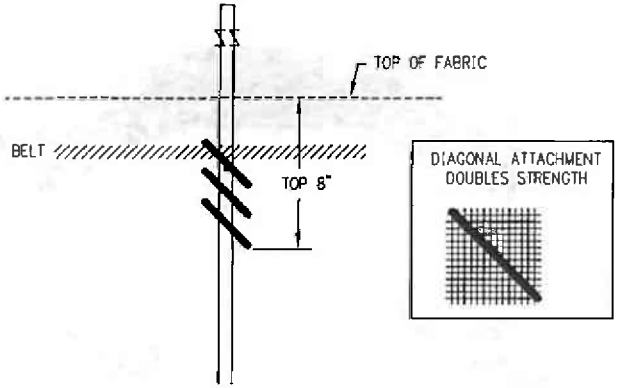
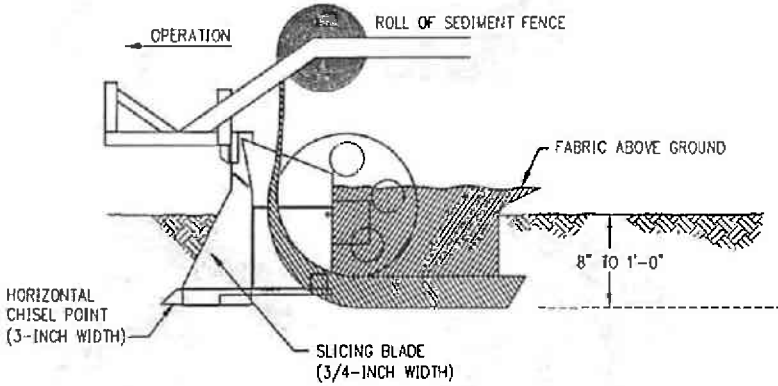
## SEDIMENT FENCE INSTALLATION SLICING METHOD



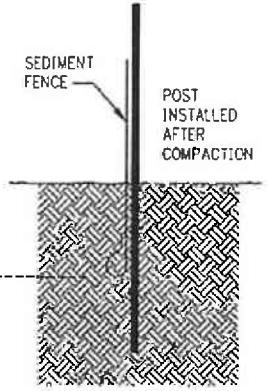



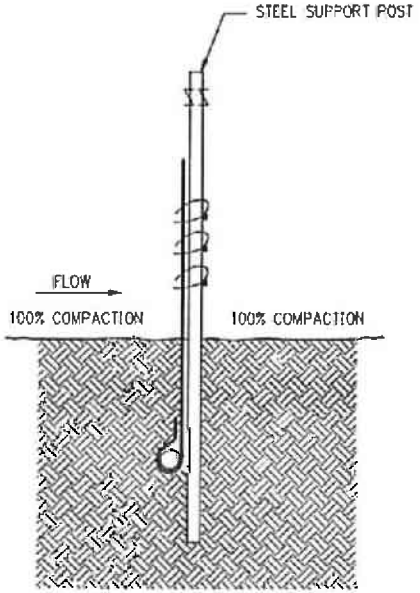

**NOTE**

VIBRATORY PLOW IS NOT ACCEPTABLE BECAUSE OF HORIZONTAL COMPACTION.

## SEDIMENT FENCE INSTALLATION SLICING METHOD NOTES:

1. LIMIT PONDING HEIGHT TO 24"
2. ATTACH FABRIC TO UPSTREAM SIDE OF POST.
3. DRIVE OVER EACH SIDE OF SEDIMENT FENCE 2 TO 4 TIMES WITH DEVICE EXERTING 60 PSI OR GREATER AFTER MATERIAL IS SLICED INTO THE GROUND.
4. SPACE POSTS A MAX OF 7' ON OPEN RUNS AND 4' ON POOLING AREAS.
5. SINK POSTS AS FAR BELOW GROUND AS FABRIC ABOVE GROUND.




SOURCE: TOM CARPENTER, 2000

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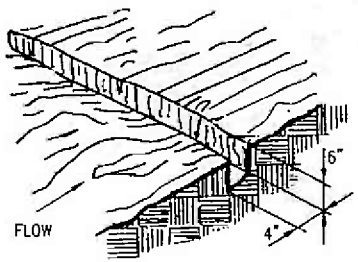
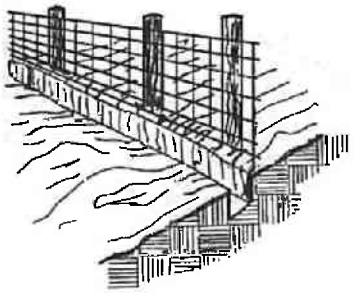
| SEDIMENT FENCE INSTALLATION SLICING METHOD | STANDARD DRAWING NUMBER ESC-11 ADOPTED |

## SUPER SEDIMENT FENCE

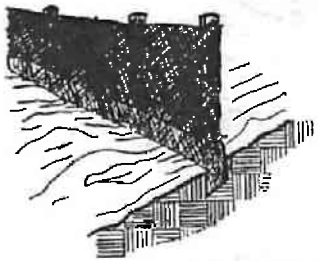
1. EXCAVATE A 6"X4" TRENCH



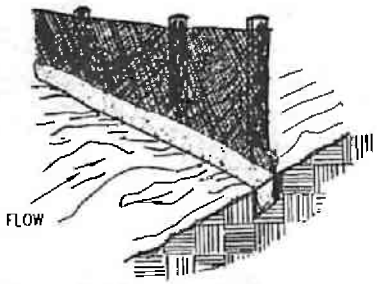

2. SET THE METAL T-POSTS OR FENCE POSTS ON THE DOWNSLOPE SIDE OF THE TRENCH. SECURE WIRE FENCING TO THE POSTS.



3. ATTACH THE GEOTEXTILE FABRIC TO THE WIRE FENCE AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.

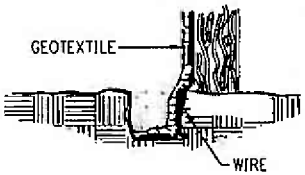


4. BACKFILL AND COMPACT THE EXCAVATED SOIL.




### EXTENSION OF FABRIC AND WIRE INTO THE TRENCH

NOT TO SCALE




### SECTIONAL FENCE ANCHOR DETAIL

SOURCE: MODIFIED FROM VA. DCR, 1992

## SUPER SEDIMENT FENCE NOTES:

### A) CONSTRUCTION SPECIFICATIONS:

1. FENCING SHALL BE 42-INCHES IN HEIGHT.
2. WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES AND STAPLES. THE LOWER TENSION WIRE, BRACE AND TRUSS RODS, DRIVE ANCHORS, AND POST CAPS ARE NOT REQUIRED EXCEPT ON THE ENDS OF THE FENCE.
3. SEDIMENT FENCE SHALL BE FASTENED SECURELY TO THE WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID-SECTION.
4. SEDIMENT FENCE AND WIRE SHALL BE EMBEDDED A MINIMUM OF 8-INCHES INTO THE GROUND.
5. WHEN TWO SECTIONS OF GEOTEXTILE FABRIC ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6-INCHES AND FOLDED.
6. WIRE FENCE WILL BE BETWEEN 9 AND 14 GAUGE AND SHALL HAVE A MAXIMUM MESH SPACING OF 6-INCHES.
7. SEDIMENT FENCE SHALL MEET THE FOLLOWING REQUIREMENTS FOR GEOTEXTILE CLASS F: ADDITIONAL SPECIFICATIONS ARE FOUND IN ASTM 6461.

SEDIMENT FENCE REQUIREMENTS

| | | |
|---|---|---|
| TENSION STRENGTH | 50 LB/IN OR MORE | ASTM 4632 |
| TENSION MODULUS | 20 LB/IN OR MORE | ASTM 4632 |
| FLOW RATE | 0.3 GAL/FT$^2$/MINUTE OR LESS | ASTM 5141 |
| FILTERING EFFICIENCY | 75 % OR MORE | ASTM 5141 |

### B) INSTALLATION:

1. THE HEIGHT OF A SEDIMENT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34-INCHES ABOVE GROUND SURFACE.
2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY
3. SEALED.
   A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 6 INCHES DEEP ON THE UPSLOPE
4. SIDE OF THE PROPOSED LOCATION OF THE FENCE.
   WHEN WIRE SUPPORT IS USED, STANDARD-STRENGTH FILTER CLOTH MAY BE USED. POSTS FOR THIS TYPE OF INSTALLATION SHALL BE PLACED A MAXIMUM OF 10 FEET APART. THE WIRE MESH FENCE MUST BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 2 INCHES AND SHALL NOT EXTEND MORE THAN 34 INCHES ABOVE THE ORIGINAL GROUND SURFACE. THE STANDARD-STRENGTH FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 8 INCHES OF THE FABRIC
5. SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
   IF A SEDIMENT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH FILTER FABRIC SHALL BE USED FOR
6. THIS APPLICATION WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
   THE 4 INCH BY 6 INCH TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER
7. FABRIC.
   SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.

### C) INSPECTION AND MAINTENANCE:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. MAINTENACE SHALL BE PERFORMED AS NEEDED AND SEDIMENT BUILD-UPS REMOVED WHEN BULGES DEVELOP IN THE SEDIMENT FENCE OR WHEN SEDIMENT REACHES 50% OF THE FENCE HEIGHT. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

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| SUPER SEDIMENT FENCE | STANDARD DRAWING NUMBER ESC-12 ADOPTED: |

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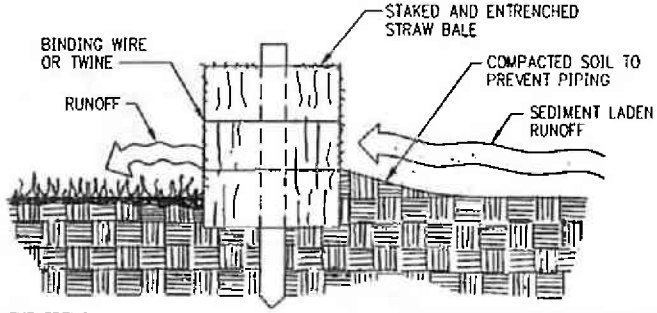
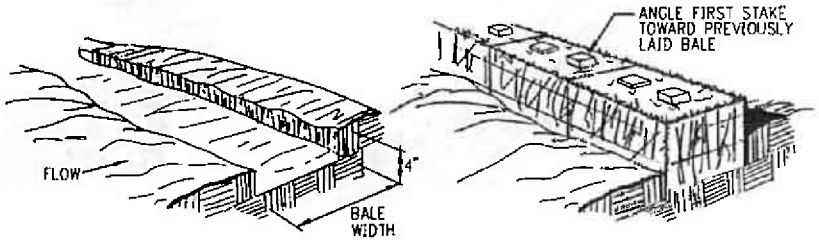
## STRAW BALE BARRIER



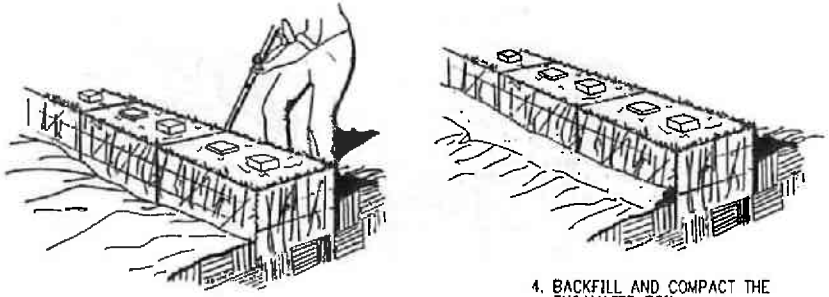

1. EXCAVATE THE TRENCH.

2. PLACE AND STAKE STRAW BALES.




**PROPERLY INSTALLED STRAW BALE (CROSS SECTION)**

NOT TO SCALE



3. WEDGE LOOSE STRAW BETWEEN BALES.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

**CONSTRUCTION OF STRAW BALE BARRIER**

SOURCE: MODIFIED FROM VA. DCR, 1992

## STRAW BALE BARRIER NOTES:

### A) INSTALLATION:

1. EXCAVATE A TRENCH AT LEAST 4 INCHES DEEP, A BALE'S WIDTH, AND LONG ENOUGH THAT THE END BALES ARE SOMEWHAT UPSLOPE OF THE SEDIMENT POOL.
2. PLACE EACH BALE END TO END IN THE TRENCH SO THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN TOP TO BOTTOM.
3. ANCHOR THE BALES BY DRIVING TWO 36-INCH LONG, 2X2-INCH HARDWOOD STAKES THROUGH EACH BALE UNTIL NEARLY FLUSH WITH THE TOP. DRIVE THE FIRST STAKE TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER.
4. WEDGE LOOSE STRAW INTO ANY GAPS BETWEEN THE BALES TO PREVENT SEDIMENT-LADEN WATER FROM LEAKING THROUGH.
5. BACKFILL AND COMPACT THE EXCAVATED SOIL AGAINST THE BALES TO GROUND LEVEL ON THE DOWNSLOPE SIDE AND TO 4 INCHES ABOVE GROUND LEVEL ON THE UPSLOPE SIDE.

### B) CONSTRUCTION SPECIFICATIONS:

1. ONLY USE AS PERIMETER CONTROL FOR LESS THAN ONE ACRE OF RUNOFF AREA.
2. DETERMINE EXACT LOCATION OF UNDERGROUND UTILITIES.
3. GRADE ALIGNMENT OF BARRIER AS NEEDED TO PROVIDE BROAD, NEARLY LEVEL AREA UPSTREAM OF BARRIER.

### C) INSPECTION AND MAINTENANCE:

1. INSPECT STRAW BALE BARRIERS AFTER EACH STORM EVENT AND REMOVE ANY SEDIMENT DEPOSITS PROMPTLY, TAKING CARE NOT TO UNDERMINE THE ENTRENCHED BALES.
2. INSPECT PERIODICALLY FOR DETERIORATION OR DAMAGE FROM CONSTRUCTION ACTIVITIES. REPLACE DAMAGED BALES IMMEDIATELY.
3. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE ALL STRAW BALES AND SEDIMENT, BRING THE DISTURBED AREA TO GRADE, AND STABILIZE.

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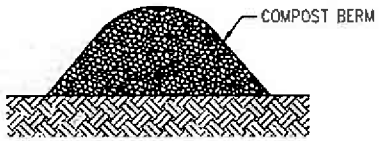
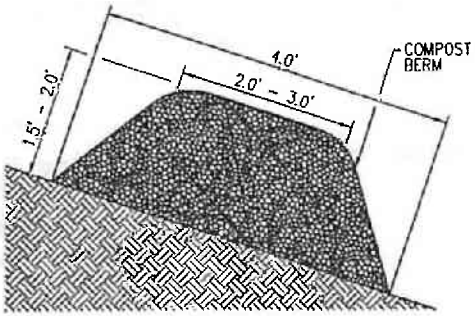
| STRAW BALE BARRIER | STANDARD DRAWING NUMBER ESC-13 ADOPTED: |

## COMPOST BERM




## CROSS SECTION




**DETAIL**
NOT TO SCALE

## COMPOST BERM MULCH NOTES:

### A) GENERAL NOTES:

1. THE SEDIMENT CONTROL BERM SHALL BE PLACED UNCOMPACTED IN A WINDROW AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. PARALLEL TO THE BASE OF THE SLOPE, OR AROUND THE PERIMETER OF OTHER AFFECTED AREAS, CONSTRUCT A 1 TO 1.5 FOOT HIGH BY 2.5 TO 3 FOOT WIDE BERM. FOR MAXIMUM WATER TREATMENT ABILITY OR FOR STEEP SLOPES, CONSTRUCT A 1.5 TO 2 FOOT HIGH TRAPEZOIDAL BERM THAT IS APPROXIMATELY 2 TO 3 FOOT WIDE AT THE TOP AND A MINIMUM OF 4 FEET WIDE AT THE BASE. IN EXTREME CONDITIONS, OR WHERE SPECIFIED BY THE ENGINEER, A SECOND BERM SHALL BE CONSTRUCTED AT THE TOP OF THE SLOPE. ENGINEER SHALL SPECIFY BERM REQUIREMENTS.
3. IF BERM IS TO BE LEFT AS PERMANENT OR PART OF THE NATURAL LANDSCAPE, THE COMPOST BERM MAY BE SEEDED DURING APPLICATION FOR PERMANENT VEGETATION. THE ENGINEER/LANDSCAPE ARCHITECT SHALL SPECIFY SEED REQUIREMENTS.
4. DO NOT USE COMPOST BERMS IN ANY RUNOFF CHANNELS.

SOURCE: MODIFIED FROM 1998 REXIUS FOREST BY-PRODUCTS, INC.

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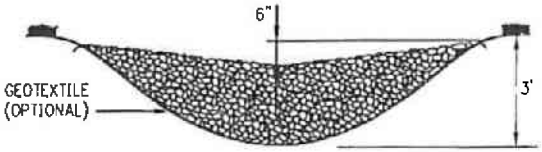
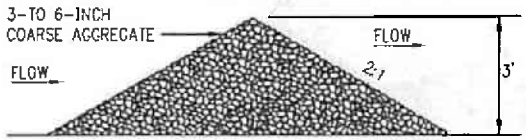
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| COMPOST BERM | STANDARD DRAWING NUMBER ESC-14<br>ADOPTED: |

## ROCK CHECK DAM



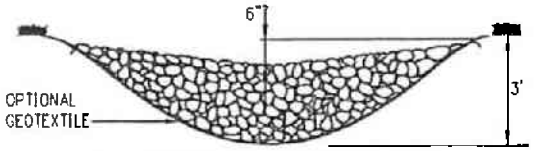

## ROCK CHECK DAM
## 2 ACRES OR LESS OF DRAINAGE AREA

NOT TO SCALE



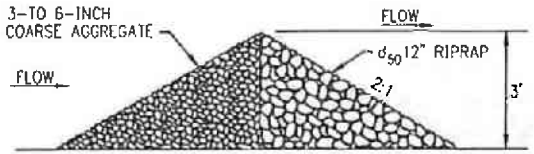

## (SIDE VIEW)

NOT TO SCALE




## 2-10 ACRES OF DRAINAGE AREA

NOT TO SCALE




## (SIDE VIEW)

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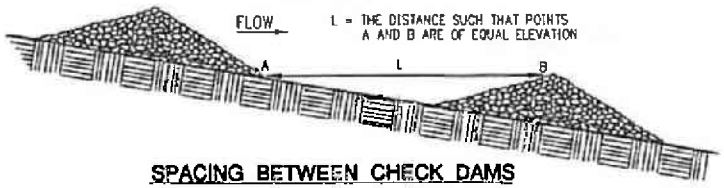


## SPACING BETWEEN CHECK DAMS

NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## ROCK CHECK DAM NOTES:

### A) CONSTRUCTION SPECIFICATIONS & INSTALLATION:

1. THE DRAINAGE AREA OF THE DITCH OR SWALE BEING PROTECTED SHALL NOT EXCEED 2 ACRES WHEN A COARSE AGGREGATE IS USED ALONE AND SHALL NOT EXCEED 10 ACRES WHEN A COMBINATION OF CLASS I RIPRAP AND COARSE AGGREGATE IS USED. AN EFFORT SHOULD BE MADE TO EXTEND THE STONE TO THE TOP OF CHANNEL BANKS.
2. THE MAXIMUM HEIGHT OF THE DAM SHALL BE 3 FEET. THE CENTER OF THE CHECK DAM IS AT THE SAME ELEVATION AS THE TOP OF THE OUTER EDGES.
3. FOR ADDED STABILITY, THE BASE OF THE CHECK DAM CAN BE KEYED INTO THE SOIL APPROXIMATELY 6 INCHES.
4. THE MAXIMUM SPACING BETWEEN THE DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM.
5. STONE SHOULD BE PLACED ACCORDING TO THE CONFIGURATION TO THE LEFT. HAND OR MECHANICAL PLACEMENT WILL BE NECESSARY TO ACHIEVE COMPLETE COVERAGE OF THE DITCH OR SWALE AND TO INSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES.
6. GEOTEXTILE MAY BE USED UNDER THE STONE TO PROVIDE A STABLE FOUNDATION AND TO FACILITATE REMOVAL OF THE STONE.

### C) INSPECTION AND MAINTENANCE:

1. CHECK DAMS SHOULD BE CHECKED FOR SEDIMENT ACCUMULATION AFTER EACH STORM EVENT OF 1/2-INCH OR GREATER. SEDIMENT SHOULD BE REMOVED WHEN IT REACHES ONE HALF OF THE ORIGINAL HEIGHT OF THE DAM.
2. REGULAR INSPECTIONS SHOULD BE MADE TO ENSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES. EROSION CAUSED BY HIGH FLOWS AROUND THE EDGES OF THE DAM SHOULD BE CORRECTED

### D) REMOVAL OF PRACTICE:

UNLESS THEY ARE TO BE PERMINENT, CHECK DAMS MUST BE REMOVED WHEN THEIR USEFUL LIFE HAS BEEN COMPLETED. IN TEMPORARY DITCHES AND SWALES, CHECK DAMS SHOULD BE REMOVED AND THE DITCH FILLED WHEN THEY ARE NO LONGER NEEDED. IN PERMANENT STRUCTURES, CHECK DAMS SHOULD BE REMOVED WHEN A PERMANENT LINING CAN BE INSTALLED. IN THE CASE OF GRASS-LINED DITCHES, CHECK DAMS SHOULD BE REMOVED WHEN THE GRASS HAS MATURED SUFFICIENTLY TO PROTECT THE DITCH OR SWALE. THE AREA BENEATH THE CHECK DAMS SHOULD BE SEEDED AND MULCHED IMMEDIATELY AFTER THEY ARE REMOVED. THE USE OF FILTER CLOTH UNDERNEATH THE STONE WILL MAKE REMOVAL OF THE STONE EASIER.

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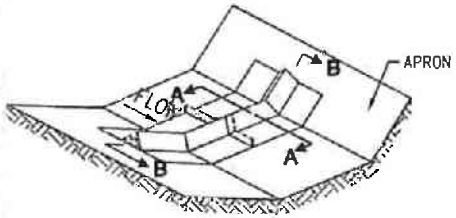
| ROCK CHECK DAM | STANDARD DRAWING NUMBER: ESC-15<br>ADOPTED: |

## TRIANGULAR SILT DIKE™

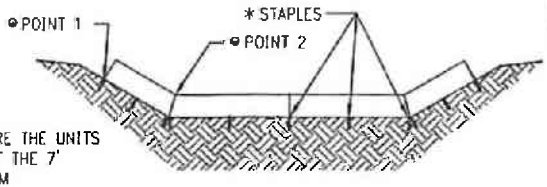



**SILT DIKE UNIT CUT SECTION**

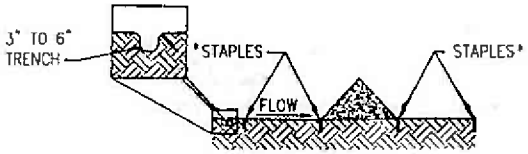
NOTES:

* STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE 7' UNIT AS SHOWN ON THE DIAGRAM

⊖ POINT 1 MUST BE HIGHER THAN POINT 2 TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.

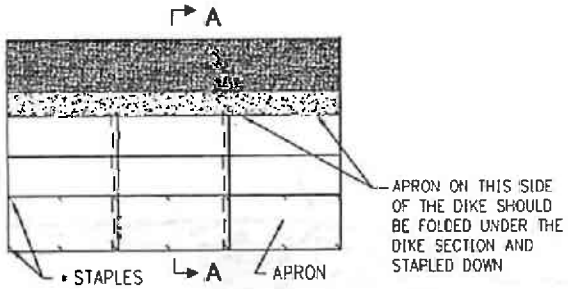



**DIKE SECTION DETAIL B-B**

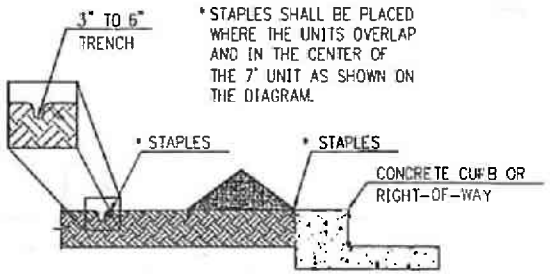



**DETAIL A-A**

### DITCH CHECK

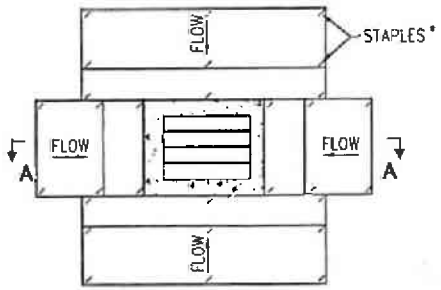



**DIKE PLAN VIEW**

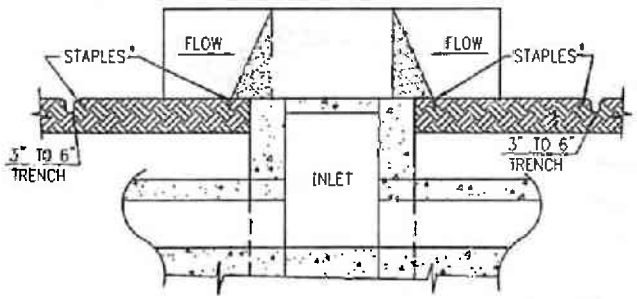



**DETAIL A-A**

### CONTINUOUS BARRIER




**PLAN VIEW**




**DETAIL A-A**

### DROP INLET

## TRIANGULAR SILT DIKE™ NOTES:

### A) GENERAL NOTES:

1. TRIANGULAR SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST EIGHT TO TEN INCHES IN THE CENTER WITH EQUAL SIDES AND A SIXTEEN- TO TWENTY- INCH BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL AND ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE TWO TO THREE FEET.
2. LENGTH SHALL BE THREE TO SEVEN FEET. STANDARD LENGTH WILL BE SEVEN UNLESS OTHERWISE INDICATED ON THE PLANS.
3. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST SIX TO EIGHT INCHES LONG. STAPLES SHALL BE PLACED AS SHOWN ON THE INSTALLATION DETAIL.

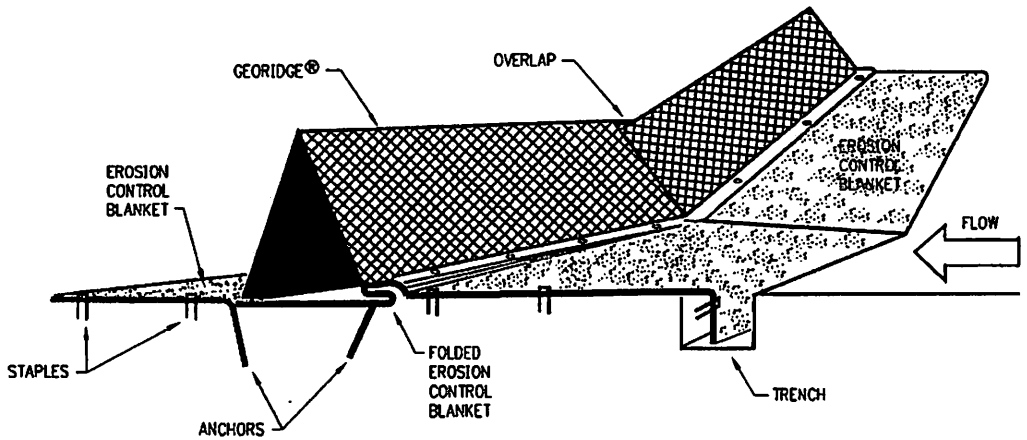
### B) INSPECTION AND MAINTENANCE:

1. THE CONTRACTOR SHALL INSPECT ALL DIKES AFTER EACH RAINFALL EVENT OF 1/2 INCH OR GREATER. ANY DEFICIENCIES OR DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR.
2. ACCUMULATED SEDIMENT OR DEBRIS SHALL BE REMOVED AND RELOCATED AS DIRECTED BY THE ENGINEER. IF THE DIKES ARE DAMAGED OR INADVERTENTLY MOVED DURING THE SEDIMENT REMOVAL PROCESS, THE CONTRACTOR SHALL RE-ESTABLISH CONTINUITY.

SOURCE: TRIANGULAR SILT DIKE COM., INC.

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| TRIANGULAR SILT DIKE™ | STANDARD DRAWING NUMBER ESC-15 ADOPTED: |

## GEO-RIDGE®




SOURCE: WWW.GEORIDGE.COM

## GEO-RIDGE® NOTES:

### A) GEO-RIDGE® INSTALLATION:

1. PREPARE THE CHANNEL BY FORMING THE SHAPE AND GRADE OF THE CHANNEL AND COMPACTING THE SUBGRADE.
2. APPLY SOIL ADDITIVES SUCH AS FERTILIZER AND LIME, AND SEED AS REQUIRED.
3. SURVEY LOCATIONS OF DITCH CHECKS ALONG THE LENGTH OF CHANNEL.
4. INSTALL EROSION CONTROL BLANKETS.
   a. FOR FULL CHANNEL LINING, FOLLOW MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES. LEAVE A 4" FLAP OF EROSION CONTROL BLANKET TO FOLD OVER THE UPSTREAM LEG OF THE GEO-RIDGE.®
   b. FOR EROSION CONTROL BLANKETS UNDER THE GEO-RIDGE® ONLY, USE A COCONUT BLANKET AS A MINIMUM GRADE OF EROSION CONTROL BLANKET. INSTALL A 3.3-FOOT-WIDE EROSION CONTROL BLANKET PERPENDICULAR TO THE DIRECTION OF FLOW, CENTERED UNDER THE GEO-RIDGE®. ALLOW 4" SLACK ACROSS EROSION CONTROL BLANKET WIDTH FOR FOLDING OVER THE UPSTREAM FOOT OF THE GEO-RIDGE® BERM. PROVIDE A 6" X 6" TRENCH AT THE UPSTREAM EDGE OF THE EROSION CONTROL BLANKET. STAPLE THE EROSION CONTROL BLANKET ONTO BOTTOM OF THE TRENCH WITH MINIMUM 6" STAPLES AT 20" SPACING ON CENTER. RE-COMPACT THE SOIL INTO THE TRENCH.
5. PLACE GEO-RIDGE® BERMS PERPENDICULAR TO THE DIRECTION OF FLOW. OVERLAP PANELS BY MINIMUM 2". CUT A SLOT IN THE CREST OF THE OVERLAPPING BERM TO ALLOW CONTACT BETWEEN THE FOOT OF THE BERM AND THE SOIL.
6. SECURE BERMS WITH 10" PINS AND 1.5" WASHERS THROUGH THE FOLDED EROSION CONTROL BLANKET AND THE FOOT OF THE UNIT. THE PIN SPACING ACROSS THE WIDTH OF THE PANEL SHOULD BE 19.7" ON CENTER FOR THE UPSTREAM LEG AND 39.6" ON CENTER FOR THE DOWNSTREAM LEG.

### B) INSPECTION AND MAINTENANCE:

1. THE CONTRACTOR SHALL INSPECT ALL GEO-RIDGE® AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER. ANY DEFICIANCIES OR DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR.
2. ACCUMULATED SEDIMENT OR DEBRIS SHALL BE REMOVED AND RELOCATED AS DIRECTED BY THE ENGINEER. IF THE GEO-RIDGE® IS DAMAGED OR INADVERTENTLY MOVED DURING THE SEDIMENT REMOVAL PROCESS, THE CONTRACTOR SHALL RE-ESTABLISH CONTINUITY.

| AMERICAN PUBLIC WORKS ASSOCIATION | |
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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| GEO-RIDGE® | STANDARD DRAWING NUMBER ESC-17<br>ADOPTED: |

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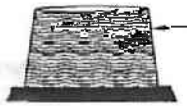
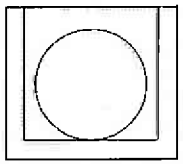
## SILT SAVER





**SIDE VIEW**

**TYPICAL SILT SAVER® COVER**
NOT TO SCALE

## SILT SAVER® NOTES:

### A) CONSTRUCTION SEQUENCE FOR SILT SAVER®:

1. EXCAVATE APPROXIMATELY 4" TO 6" BELOW THE TOP OF THE INLET STRUCTURE.
2. PLACE THE FRAME ONTO THE INLET STRUCTURE; ENSURE THE FRAME COVERS THE STRUCTURE COMPLETLY.
3. PLACE THE FABRIC OVER THE FRAME.
4. FILL THE POCKETS WITH SOIL, #57 GRAVEL, OR EQUIVALENT; THE POCKETS SHOULD BE COMPLETELY FILLED TO ENSURE A GOOD SEAL BETWEEN THE GROUND AND THE INLET STRUCTURE.
5. BACKFILL AROUND THE FRAME AND FABRIC ASSEMBLY IS NOT REQUIRED TO COMPLETE INSTALLATION; HOWEVER BACKFILLING MAY BE NECESSARY TO COMPLETE EXCAVATION REQUIREMENTS FOR THE SITE.

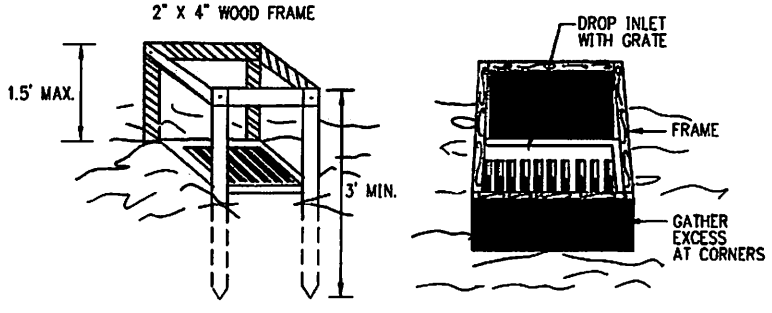
### B) MAINTENANCE REQUIREMENTS FOR SILT SAVER® FRAME AND FABRIC:

1. MAINTENANCE IS REQUIRED WHEN ERODED SOILS REACH A POINT OF 65% OF THE TOTAL HEIGHT OF THE FRAME OR APPROXIMATELY 7 TO 9 INCHES OF THE GREY FABRIC MATERIAL IS SHOWING.
2. REMOVE THE IMPACTED MATERIAL BY HAND OR MACHINE. DO NOT DAMAGE THE FRAME OR FABRIC.
3. BRUSH, SWEEP, OR WASH FABRIC AND INSPECT FOR ANY CUTS OR ABRASIONS; REPLACE FABRIC AS NECESSARY.
4. INSPECT FRAME FOR ANY STRESS OR DAMAGE, AND REPLACE AS NESCESSARY.
5. REFILL FABRIC POCKETS AND BACKFILL AS REQUIRED BY JOBSITE CONDITIONS.

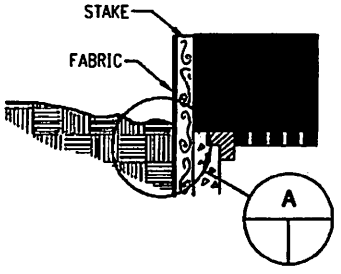
SOURCE: WWW.SILTSAVER.COM

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| SILT SAVER® | STANDARD DRAWING NUMBER ESC-18 ADOPTED: |

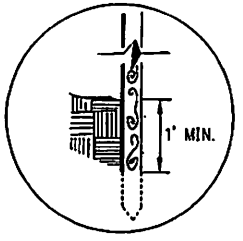
## SEDIMENT FENCE DROP INLET PROTECTION




**PERSPECTIVE VIEWS**
NOT TO SCALE




**ELEVATION OF STAKE AND FABRIC ORIENTATION**




**DETAIL A**
NOT TO SCALE

## SEDIMENT FENCE DROP INLET PROTECTION NOTES:

### A) CONSTRUCTION SPECIFICATIONS:

1. SEDIMENT FENCE SHALL CONFORM TO THE CONSTRUCTION SPECIFICATIONS FOR EXTRA STRENGTH FOUND IN THE TABLE BELOW AND SHALL BE CUT FROM A CONTINUOUS ROLL TO AVOID JOINTS.

   PHYSICAL PROPERTIES OF FABRIC IN SEDIMENT FENCE:

| PHYSICAL PROPERTY | TEST | REQUIREMENTS |
|---|---|---|
| FILTERING EFFICIENCY | ASTM 5141 | 75% |
| TENSILE STRENGTH AT 20% (MAX.) ELONGATION* | ASTM 4632 AASHTO M288-96 | EXTRA STRENGTH - 50 LBS./LINEAR INCH |
| FLOW RATE | ASTM 5141 | 0.2 GAL./SQ.FT/ MINUTE** |
| ULTRAVIOLET RADIATION STABILITY % | ASTM D 4355 | 90% |

   * REQUIREMENTS REDUCED BY 50% AFTER SIX MONTHS OF INSTALLATION.
   ** HIGH POROSITY FABRIC MADE BY BETTER SUITED FOR THIS DEVICE.

2. FOR STAKES, USE 2X4 WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3 FEET.
3. SPACE STAKES EVENLY AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART, AND SECURELY DRIVE THEM INTO THE GROUND, APPROXIMATELY 18 INCHES DEEP.
4. TO PROVIDE NEEDED STABILITY TO THE INSTALLATION, FRAME WITH 2X4 WOOD STRIPS AROUND THE CREST OF THE OVERFLOW AREA AT A MAXIMUM OF 1.5 FEET ABOVE THE DROP INLET CREST.
5. PLACE THE BOTTOM 12 INCHES OF THE FABRIC IN A TRENCH AND BACKFILL THE TRENCH WITH 12-INCHES OF COMPACTED SOIL.
6. FASTEN FABRIC SECURELY BY STAPLES, OR WIRE IT TO THE STAKES AND FRAME. JOINTS MUST BE OVERLAPPED TO THE NEXT STAKE.
7. IT MAY BE NECESSARY TO BUILD A TEMPORARY DIKE ON THE DOWNSLOPE SIDE OF THE STRUCTURE TO PREVENT BYPASS FLOW.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| SEDIMENT FENCE DROP INLET PROTECTION | STANDARD DRAWING NUMBER ESC-19 ADOPTED: |

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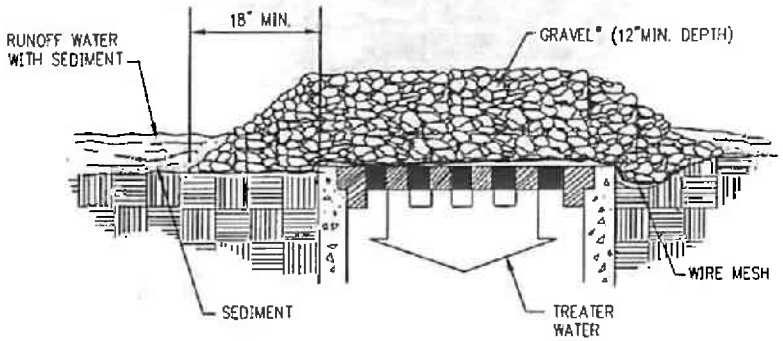
## GRAVEL AND WIRE MESH DROP INLET SEDIMENT TRAP




NOTE:
- USE CLEAN GRAVEL, 1/2" DIAMETER.

## GRAVEL AND WIRE MESH DROP INLET SEDIMENT TRAP NOTES:

### A) GENERAL NOTES:

1. WIRE MESH SHALL BE LAID OVER THE DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF 1 FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. WIRE MESH WITH 1/2-INCH OPENINGS SHALL BE USED. IF MORE THAN ONE STRIP OF MESH IS NECESSARY, THE STRIPS SHALL BE OVERLAPPED.
2. COARSE AGGREGATE SHALL BE PLACED OVER THE WIRE MESH. THE DEPTH OF STONE SHALL BE AT LEAST 12-INCHES OVER THE ENTIRE INLET OPENING. THE STONE SHALL EXTEND BEYOND THE INLET OPENING AT LEAST 18-INCHES ON ALL SIDES.
3. IF THE STONE BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONES MUST BE PULLED AWAY FROM THE INLET AND CLEANED OR REPLACED.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

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|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| GRAVEL AND WIRE MESH DROP INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER ESC-20 ADOPTED: |

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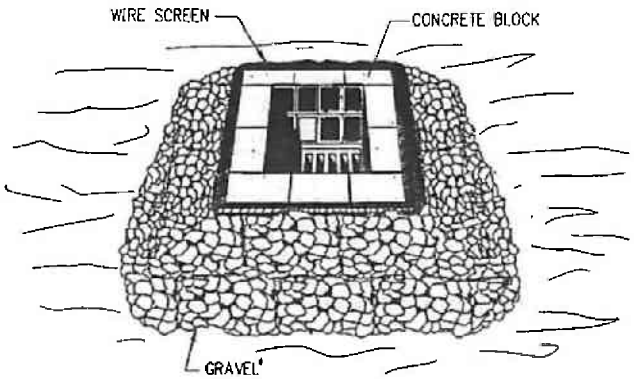
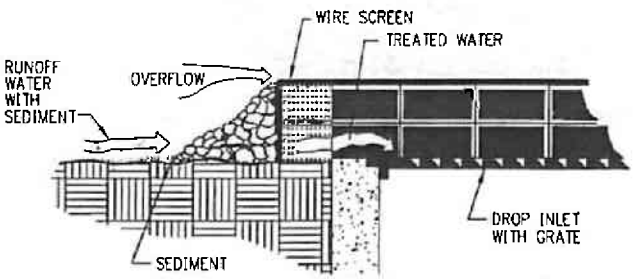
## BLOCK AND GRAVEL DROP INLET SEDIMENT TRAP




**NOTE:**
- USE CLEAN GRAVEL, 1/2" TO 1" DIAMETER




**CROSS SECTION**

## BLOCK AND GRAVEL DROP INLET SEDIMENT TRAP NOTES:

### A) GENERAL NOTES:

1. PLACE CONCRETE BLOCKS LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET WITH THE ENDS OF THE ADJACENT BLOCKS ABUTTING. THE HEIGHT OF THE BARRIER CAN BE VARIED, DEPENDING ON THE DESIGN NEEDS, BY STACKING COMBINATIONS OF 4-INCH, 8-INCH, AND 12-INCH BLOCKS. THE BARRIER OF BLOCKS SHALL BE AT LEAST 12 INCHES HIGH AND NO GREATER THAN 24 INCHES HIGH.
2. WIRE MESH, OR WEBBING, SHALL BE PLACED OVER THE OUTSIDE VERTICAL FACE OF THE CONCRETE BLOCKS TO PREVENT STONE FROM BEING WASHED THROUGH THE HOLES IN THE BLOCKS. WIRE MESH WITH 1/2-INCH OPENINGS SHALL BE USED.
3. STONE SHALL BE PILED AGAINST THE WIRE TO THE TOP OF THE BLOCK BARRIER.
4. IF THE STONE BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONE MUST BE PULLED AWAY FROM THE BLOCKS AND CLEANED OR REPLACED.

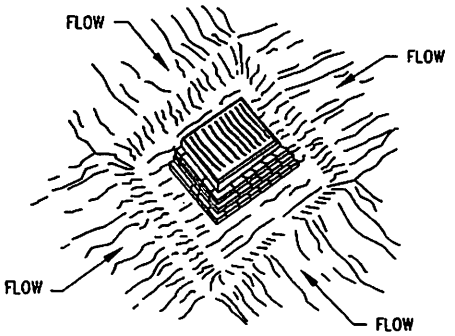
### B) INSPECTION AND MAINTENANCE:

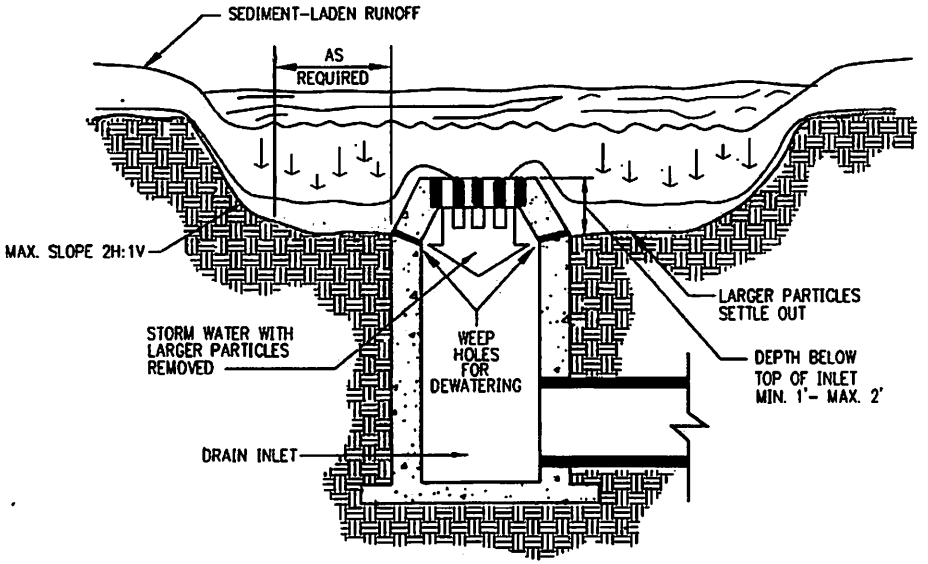
1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| BLOCK AND GRAVEL DROP INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER: ESC-21 ADOPTED: |

## EXCAVATED DROP INLET SEDIMENT TRAP




**CROSS SECTION**
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## EXCAVATED DROP INLET SEDIMENT TRAP NOTES:

### A) GENERAL NOTES:

1. THE EXCAVATED TRAP SHALL BE SIZED TO PROVIDE A MINIMUM STORAGE CAPACITY CALCULATED AT THE RATE OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. A TRAP SHALL BE NO LESS THAN 1 FOOT NOR MORE THAN 2 FEET DEEP MEASURED FROM THE TOP OF THE INLET STRUCTURE. SIDE SLOPES SHALL NOT BE STEEPER THAN 2H:1V.

2. THE SLOPE OF THE BASIN MAY VARY TO FIT THE DRAINAGE AREA AND TERRAIN. CHECK TRAP EFFICIENCY AND MAKE MODIFICATIONS AS NECESSARY TO ENSURE SATISFACTORY TRAPPING OF SEDIMENT. WHERE AN INLET IS LOCATED SO AS TO RECEIVE CONCENTRATED FLOWS, SUCH AS IN A HIGHWAY MEDIAN, IT IS RECOMMENDED THAT THE BASIN HAVE A RECTANGULAR SHAPE IN A 2:1, LENGTH:WIDTH RATIO, WITH THE LENGTH ORIENTED IN THE DIRECTION OF THE FLOW.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2-INCH OR GREATER AND REPAIRS MADE AS NEEDED.

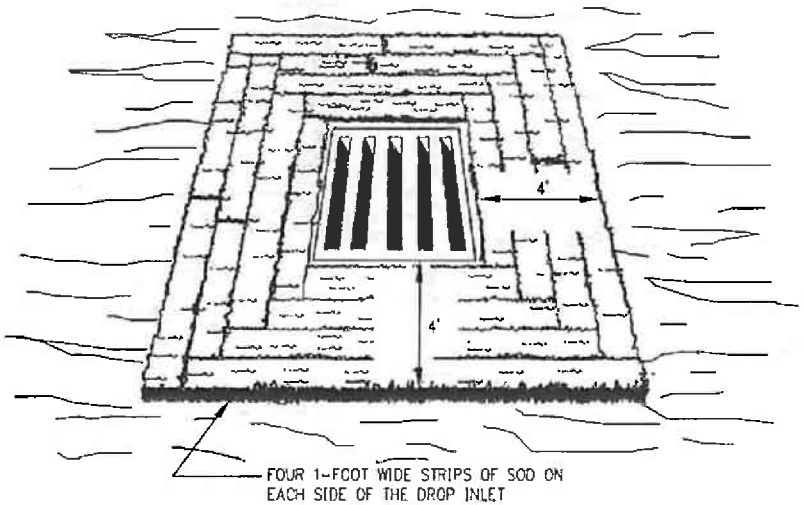
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE.

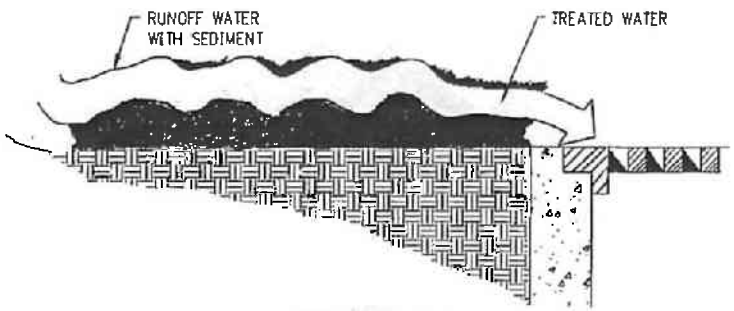
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| EXCAVATED DROP INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER: ESC-22<br>ADOPTED: |

## SOD DROP INLET SEDIMENT TRAP

NOT TO SCALE




**CROSS SECTION**

### SOD DROP INLET SEDIMENT TRAP NOTES:

**A) GENERAL NOTES:**

1. SOIL SHALL BE PREPARED AND SOD INSTALLED ACCORDING TO THE SPECIFICATIONS IN ESC-02.
2. SOD SHALL BE PLACED TO FORM A TURF MAT COVERING THE SOIL FOR A DISTANCE TO THE INLET STRUCTURE.

**B) INSPECTION AND MAINTENANCE:**

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT 1/2-INCH OR GREATER AND REPAIRS MADE AS NEEDED.

SOURCE: MODIFIED FROM VA. DCR, 1992

| AMERICAN PUBLIC WORKS ASSOCIATION | |
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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| SOD DROP INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER: ESC-23<br>ADOPTED: |

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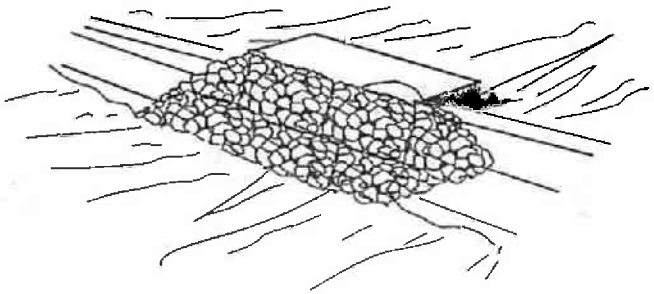
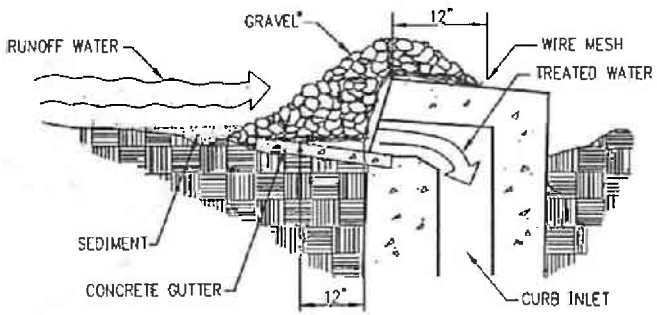
## GRAVEL CURB INLET SEDIMENT TRAP






**CROSS SECTION**
NOT TO SCALE

NOTE:

*USE CLEAN GRAVEL 1/2" TO 1" IN DIAMETER.

## GRAVEL CURB INLET SEDIMENT TRAP NOTES:

### A) GENERAL NOTES:

1. WIRE MESH WITH 1/2-INCH OPENINGS SHALL BE PLACED OVER THE CURB INLET OPENING SO THAT AT LEAST 12 INCHES OF WIRE EXTENDS ACROSS THE INLET COVER AND AT LEAST 12 INCHES OF WIRE EXTENDS ACROSS THE CONCRETE GUTTER FROM THE INLET OPENING.
2. STONE SHALL BE PILED AGAINST THE WIRE SO AS TO ANCHOR IT AGAINST THE GUTTER AND INLET COVER AND TO COVER THE INLET OPENING COMPLETELY.
3. IF THE STONE BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONE MUST BE PULLED AWAY FROM THE BLOCK AND CLEANED OR REPLACED.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2-INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

| AMERICAN PUBLIC WORKS ASSOCIATION | |
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| GRAVEL CURB INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER: ESC-24<br>ADOPTED: |

SOURCE: MODIFIED FROM VA. DCR, 1992

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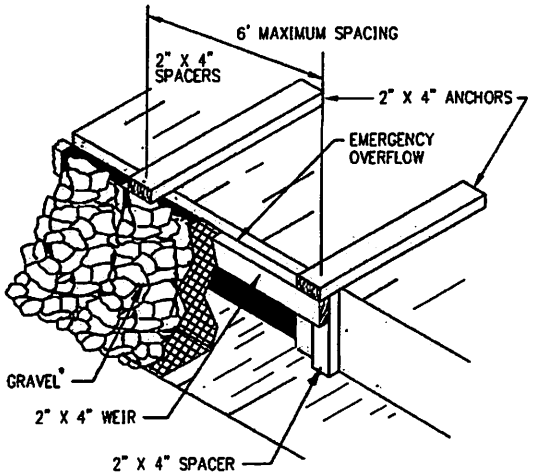
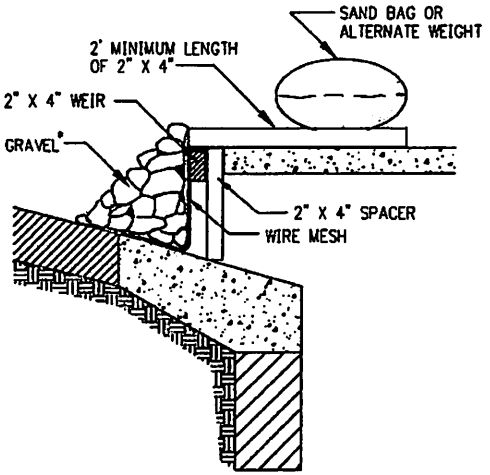
## WOODEN WEIR CURB INLET PROTECTION




**PERSPECTIVE VIEW**
NOT TO SCALE

**NOTE:**
*GRAVEL SHALL BE COARSE AGGREGATE FROM 1/2" TO 1" IN DIAMETER.




**CROSS SECTION**
NOT TO SCALE

## WOODEN WEIR CURB INLET PROTECTION NOTES:

### A) GENERAL NOTES:

1. ATTACH A CONTINUOUS PIECE OF WIRE MESH THAT IS 30-INCH MINIMUM WIDTH X INLET THROAT LENGTH PLUS 4 FEET TO A 2 X 4 WOODEN WEIR WITH LENGTH EQUAL TO THROAT LENGTH PLUS 2 FEET. WOOD SHOULD BE CONSTRUCTION GRADE LUMBER.
2. PLACE A PIECE OF APPROVED EXTRA-STRENGTH GEOTEXTILE OF THE SAME DIMENSIONS AS THE WIRE MESH OVER THE WIRE MESH AND SECURELY ATTACH IT TO THE 2 X 4 WOODEN WEIR.
3. SECURELY NAIL THE 2 X 4 WEIR TO THE 9-INCH LONG VERTICAL SPACERS WHICH ARE TO BE LOCATED BETWEEN THE WEIR AND INLET FACE AT A MAXIMUM 6-FOOT SPACING.
4. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL A MINIMUM OF 2-FOOT LENGTHS OF 2 X 4 BOARD TO THE TOP OF THE WEIR AT SPACER LOCATIONS. THESE 2 X 4 ANCHORS SHALL EXTEND ACROSS THE INLET TOPS AND BE HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHT.
5. THE ASSEMBLY SHALL BE PLACED SO THAT THE END SPACERS ARE A MINIMUM OF 1 FOOT BEYOND BOTH ENDS OF THE THROAT OPENING.
6. FORM THE WIRE MESH AND GEOTEXTILE TO THE CONCRETE GUTTER AND AGAINST THE FACE OF CURB ON BOTH SIDES OF THE INLET. PLACE COARSE AGGREGATE OVER THE WIRE MESH AND GEOTEXTILE TO PREVENT WATER FROM ENTERING THE INLET UNDER OR AROUND THE GEOTEXTILE.
7. THIS TYPE OF PROTECTION MUST BE INSPECTED FREQUENTLY AND THE GEOTEXTILE AND STONE REPLACED WHEN CLOGGED WITH SEDIMENT.
8. ASSURE THAT STORM FLOW DOES NOT BYPASS INLET BY INSTALLING TEMPORARY EARTH OR ASPHALT DIKES DIRECTING FLOW INTO INLET.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2-INCH OR GREATER AND REPAIRS SHALL BE MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

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| WOODEN WEIR CURB INLET PROTECTION | STANDARD DRAWING NUMBER ESC-25<br>ADOPTED: |

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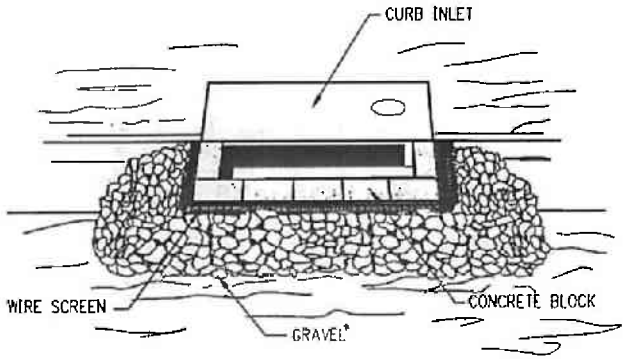
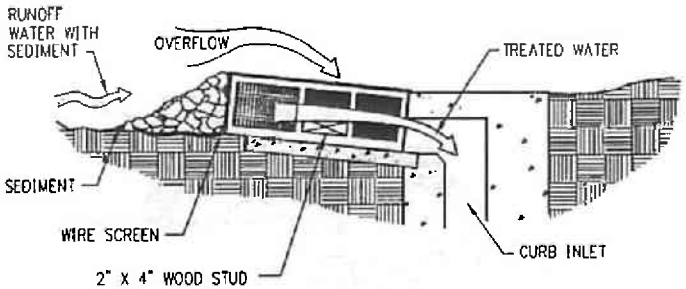
## BLOCK AND GRAVEL CURB INLET PROTECTION




*GRAVEL SHALL BE COARSE AGGREGATE FROM 1/2" TO 1" IN DIAMETER




**CROSS SECTION**
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## BLOCK AND GRAVEL CURB INLET PROTECTION NOTES:

### A) GENERAL NOTES:

1. TWO CONCRETE BLOCKS SHALL BE PLACED ON THEIR SIDES ABUTTING THE CURB AT EITHER SIDE OF THE INLET OPENING.
2. A 2 X 4 STUD SHALL BE CUT AND PLACED THROUGH THE OUTER HOLES OF EACH SPACER BLOCK TO HELP KEEP THE FRONT BLOCKS IN PLACE.
3. CONCRETE BLOCKS SHALL BE PLACED ON THEIR SIDES ACROSS THE FRONT OF THE INLET AND ABUTTING THE SPACER BLOCKS.
4. WIRE MESH WEBBING SHALL BE PLACED OVER THE OUTSIDE VERTICAL FACE OF THE CONCRETE BLOCKS TO PREVENT STONE FROM BEING WASHED THROUGH THE HOLES IN THE BLOCKS. WIRE MESH WITH 1/2-INCH OPENINGS SHALL BE USED.
5. COARSE AGGREGATE SHALL BE PILED AGAINST THE WIRE TO THE TOP OF THE BARRIER.
6. IF THE STONE BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONE MUST BE PULLED AWAY FROM THE BLOCKS AND CLEANED OR REPLACED.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2-INCH OR GREATER, AND REPAIRS SHALL BE MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

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| BLOCK AND GRAVEL CURB INLET PROTECTION | STANDARD DRAWING NUMBER [illegible] ADOPTED: |

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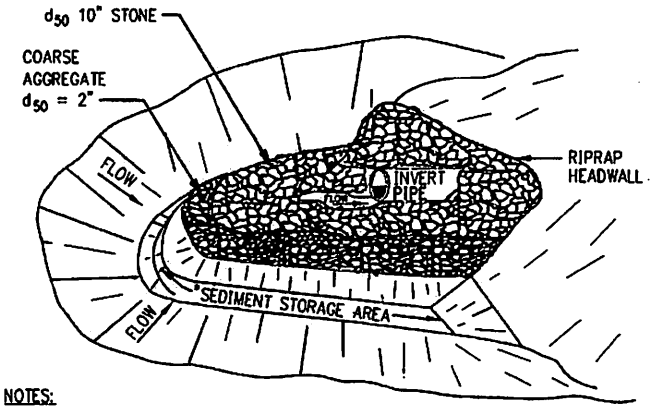
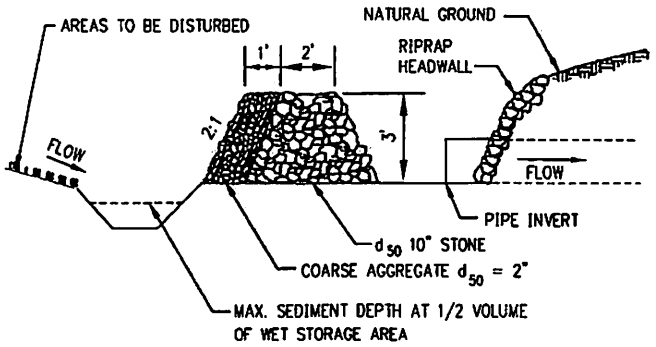
## CULVERT INLET SEDIMENT TRAP




NOTES:

1. STORAGE REQUIREMENTS EQUIVALENT TO THAT OF TEMPORARY SEDIMENT TRAP.
2. 67 C.Y./ACRE WET STORAGE BELOW BASE OF STONE.
3. 67 C.Y./ACRE DRY STORAGE FROM BASE OF STONE TO TOP OF STONE BERM.

**PERSPECTIVE VIEW**

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SOURCE: MODIFIED FROM VA. DCR, 1992

## CULVERT INLET SEDIMENT TRAP NOTES:

### A) CONSTRUCTION SPECIFICATIONS:

1. GEOMETRY OF THE DESIGN WILL BE A HORSESHOE SHAPE AROUND THE CULVERT INLET.
2. THE TOE OF RIPRAP SHALL BE NO CLOSER THAN 24" FROM THE CULVERT OPENING TO PROVIDE AN ACCEPTABLE EMERGENCY OUTLET FOR FLOWS FROM LARGER STORM EVENTS.
3. ALL CONSTRUCTION SPECIFICATIONS FOUND WITHIN TEMPORARY SEDIMENT TRAP SPECIFICATIONS APPLY TO THIS PRACTICE.
4. THE PROPER INSTALLATION OF THE CULVERT INLET SEDIMENT TRAP IS A VIABLE SUBSTITUTE FOR THE INSTALLATION OF THE TEMPORARY SEDIMENT TRAP.

### B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2-INCH OR GREATER, AND REPAIRS SHALL BE MADE AS NEEDED.
2. AGGREGATE SHALL BE REPLACED OR CLEANED WHEN INSPECTION REVEALS THAT CLOGGED VOIDS ARE CAUSING PONDING PROBLEMS WHICH INTERFERE WITH ON-SITE CONSTRUCTION.
3. SEDIMENT SHALL BE REMOVED AND THE IMPOUNDMENT RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA SO THAT IT WILL NOT ERODE AND CAUSE SEDIMENTATION PROBLEMS.
4. TEMPORARY STRUCTURES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

### C) GENERAL GUIDELINES:

1. THE INLET PROTECTION DEVICE SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN-OUT AND DISPOSAL OF TRAPPED SEDIMENT AND MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES.
2. THE INLET PROTECTION DEVICES SHALL BE CONSTRUCTED IN SUCH A MANNER THAT ANY RESULTANT PONDING STORMWATER WILL NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.

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| CULVERT INLET SEDIMENT TRAP | STANDARD DRAWING NUMBER ESC-27 | |
| | ADOPTED: | |

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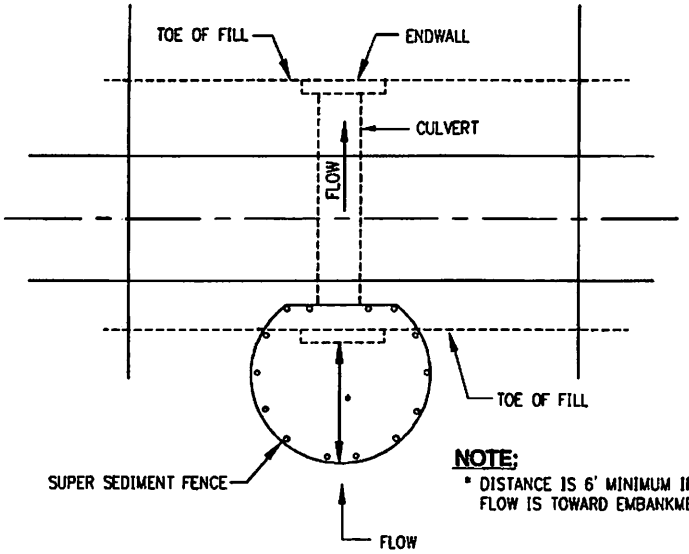
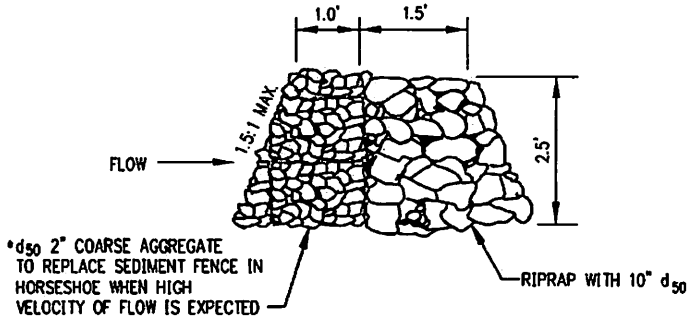
## SEDIMENT FENCE CULVERT INLET PROTECTION




**NOTE;**
* DISTANCE IS 6' MINIMUM IF FLOW IS TOWARD EMBANKMENT.




***OPTIONAL STONE COMBINATION**
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SOURCE: MODIFIED FROM VA. DCR, 1992

## SEDIMENT FENCE CULVERT INLET PROTECTION NOTES:

### A) GENERAL NOTES:

1. THE INLET PROTECTION DEVICE SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN-OUT AND DISPOSAL OF TRAPPED SEDIMENT AND MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES.
2. THE INLET PROTECTION DEVICES SHALL BE CONSTRUCTED IN SUCH A MANNER THAT ANY RESULTANT PONDING STORMWATER WILL NOT CAUSE EXCESSIVE INCONVIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.
3. DESIGN CRITERIA MORE SPECIFIC TO EACH PARTICULAR INLET PROTECTION DEVICE ARE FOUND IN SECTION 5108.8.

### B) SUPER SEDIMENT FENCE INSTALLATION NOTES:

1. THE HEIGHT OF A SEDIMENT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE GROUND SURFACE.
2. THE GEOTEXTILE SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, GEOTEXTILE SHALL BE SPLICED TOGETHER AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED.
3. DIG A TRENCH AT LEAST 6 INCHES DEEP AND 4 INCHES WIDE ALONG THE FENCE ALIGNMENT.
4. DRIVE POSTS AT LEAST 24 INCHES INTO THE GROUND ON THE DOWNSLOPE SIDE OF THE TRENCH. SPACE POSTS A MAXIMUM OF 6 FEET APART.
5. EXTRA-STRENGTH SEDIMENT FENCE FABRIC SHALL BE USED. POSTS FOR THIS TYPE OF FABRIC SHALL BE PLACED A MAXIMUM OF 6 FEET APART. THE SEDIMENT FABRIC SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING MINIMUM ONE-INCH LONG HEAVY-DUTY WIRE STAPLES OR TIE WIRES, AND EIGHT INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE THE BOTTOM 1 FOOT OF FABRIC IN THE 6-INCH DEEP TRENCH, LAPPING TOWARD THE UPSLOPE SIDE. BACKFILL WITH COMPACTED EARTH OR GRAVEL.
7. IF A SEDIMENT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH SEDIMENT FABRIC SHALL BE USED FOR THIS APPLICATION WITH A MAXIMUM 3-FOOT SPACING OF POSTS. ALL OTHER INSTALLATION REQUIREMENTS NOTED IN #5 APPLY.
8. TO REDUCE MAINTENANCE, EXCAVATE A SHALLOW SEDIMENT STORAGE AREA ON THE UPSLOPE SIDE OF THE FENCE. PROVIDE GOOD ACCESS IN AREAS OF HEAVY SEDIMENTATION FOR CLEAN OUT AND MAINTENANCE.
9. SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

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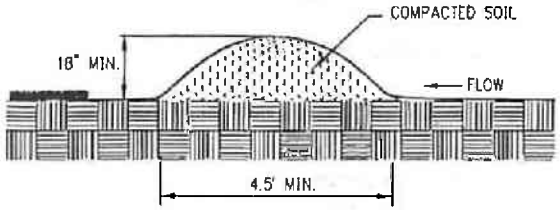
## DIVERSIONS




### TEMPORARY DIVERSION DIKE
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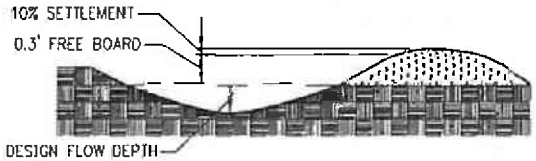
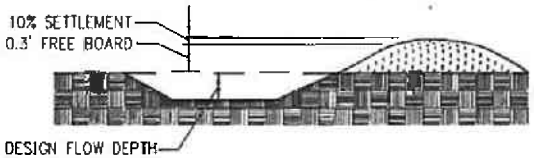
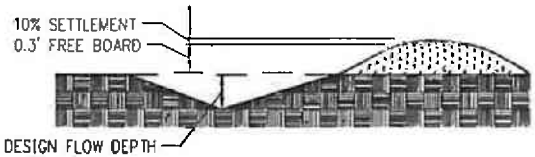



### TYPICAL PARABOLIC DIVERSION



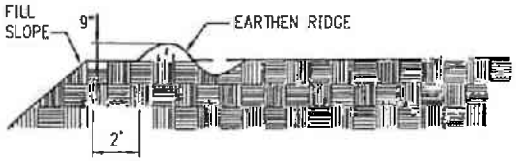

### TYPICAL TRAPEZOIDAL DIVERSION




### TYPICAL VEE-SHAPED DIVERSION

SOURCE: MODIFIED FROM VA. DCR, 1992

## TEMPORARY RIGHT-OF-WAY DIVERSIONS




### TEMPORARY FILL DIVERSION
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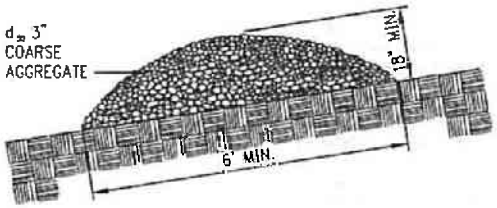
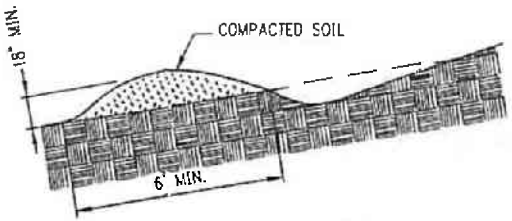



### TYPICAL GRAVEL STRUCTURE




### TYPICAL EARTHEN STRUCTURE

## TEMPORARY DIVERSION DIKE NOTES:

1. TEMPORARY DIVERSION DIKES MUST BE INSTALLED AS A FIRST STEP IN THE LAND-DISTURBING ACTIVITY AND MUST BE FUNCTIONAL PRIOR TO UPSLOPE LAND DISTURBANCE.
2. THE DIKE SHOULD BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. TEMPORARY OR PERMANENT SEEDING AND MULCH SHALL BE APPLIED TO THE DIKE IMMEDIATELY FOLLOWING ITS CONSTRUCTION.
4. THE DIKE SHOULD BE LOCATED TO MINIMIZE DAMAGES BY CONSTRUCTION OPERATIONS AND TRAFFIC.

## TEMPORARY FILL DIVERSION NOTES:

1. THE DIVERSION SHALL BE CONSTRUCTED AT THE TOP OF THE FILL AT THE END OF EACH WORK DAY AS NEEDED.
2. THE DIVERSION SHALL BE LOCATED AT LEAST 2 FEET INSIDE THE TOP EDGE OF THE FILL.
3. THE SUPPORTING RIDGE SHALL BE CONSTRUCTED WITH A UNIFORM HEIGHT ALONG ITS ENTIRE LENGTH. WITHOUT UNIFORM HEIGHT, THE FILL DIVERSION MAY BE SUSCEPTIBLE TO BREACHING.

## RIGHT-OF-WAY DIVERSION DETAIL NOTES:

1. THE DIVERSION SHALL BE INSTALLED AS SOON AS THE RIGHT-OF-WAY HAS BEEN CLEARED AND/OR GRADED.
2. ALL EARTHEN DIVERSIONS SHALL BE MACHINE- OR HAND-COMPACTED IN 8-INCH LIFTS.
3. THE OUTLET OF THE DIVERSION SHALL BE LOCATED IN AN UNDISTURBED AND STABILIZED AREA WHEN AT ALL POSSIBLE. THE FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED OUTLET.
4. EARTHENED DIVERSIONS WHICH WILL NOT BE SUBJECT TO CONSTRUCTION TRAFFIC SHOULD BE STABLIIZED IN ACCORDANCE WITH TEMPORARY SEEDING.

## DIVERSION DETAIL NOTES:

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS-SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, FREE OF IRREGULARITIES WHICH WILL IMPEDE FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETED DIVERSION. FILL SHALL BE COMPOSED OF SOIL WHICH IS FREE FROM EXCESSIVE ORGANIC DEBRIS, ROCKS, OR OTHER OBJECTIONABLE MATERIALS.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. PERMANENT STABILIZATION OF DISTURBED AREAS SHALL BE DONE IN ACCORDANCE WITH SECTION 2151.

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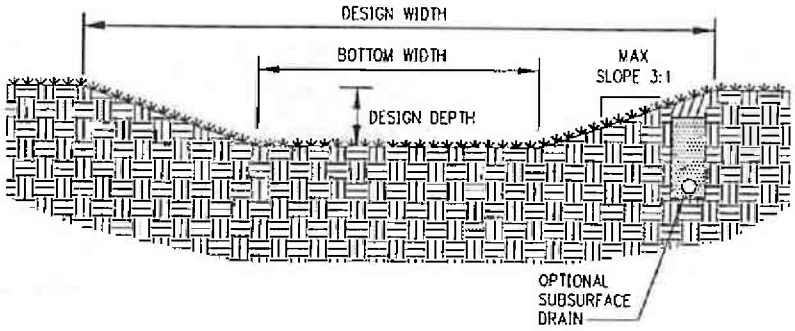
## TRAPEZOIDAL GRASS-LINED CHANNEL




### NOTES:

1. SIDE SLOPES SHOULD BE 3H:1V OR FLATTER.
2. USE MULCH, EROSION CONTROL BLANKETS, TURF REINFORCEMENT MAT, OR OTHER APPROPRIATE PRACTICES AS SPECIFIED IN THE DESIGN PLAN.
3. CHANNELS SHOULD EMPTY INTO SEDIMENT TRAPS, DETENTION/RETENTION BASINS, OR STABLE OUTLETS.
4. USE A SUBSURFACE DRAIN IN AREAS WITH SEASONABLY HIGH WATER TABLES OR SEEPAGE PROBLEMS.

### TRAPEZOIDAL GRASS-LINED CHANNEL NOTES:

#### A) CONSTRUCTION SPECIFICATIONS:

1. REMOVE ALL TREES, BRUSH, STUMPS, AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA.
2. EXCAVATE THE CHANNEL AND SHAPE IT TO MEET LINES AND DIMENSIONS ON THE PLANS PLUS A 0.2-FT OVERCUT AROUND THE CHANNEL PERIMETER TO ALLOW FOR BULKING DURING SEEDBED PREPARATIONS AND SOD BUILDUP.
3. REMOVE AND PROPERLY DISPOSE OF ALL EXCESS SOIL SO THAT SURFACE WATER MAY ENTER THE CHANNEL FREELY.
4. THE PROCEDURE USED TO ESTABLISH GRASS IN THE CHANNEL WILL DEPEND UPON THE SEVERITY OF THE CONDITIONS AND SELECTION OF SPECIES. PROTECT THE CHANNEL WITH MULCH OR A ROLLED EROSION CONTROL PRODUCT SUFFICIENT TO WITHSTAND ANTICIPATED VELOCITY AND SHEAR STRESS DURING THE ESTABLISHMENT PERIOD.

#### B) INSPECTION AND MAINTENANCE:

1. CHECK THE DEVICE AFTER EVERY 1/2-INCH OR GREATER RAINFALL EVENT. IMMEDIATELY MAKE REPAIRS. CHECK THE CHANNEL OUTLET AND ALL ROAD CROSSINGS FOR BANK STABILITY AND EVIDENCE OF PIPING OR SCOUR HOLES. REMOVE ALL SIGNIFICANT SEDIMENT ACCUMULATIONS TO MAINTAIN THE DESIGN CARRYING CAPACITY. KEEP THE GRASS IN A HEALTHY, VIGOROUS CONDITION AT ALL TIMES SINCE IT IS THE PRIMARY EROSION PROTECTION FOR THE CHANNEL.

SOURCE: MODIFIED FROM MDNR, 1998

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| TRAPEZOIDAL GRASS-LINED CHANNEL | STANDARD DRAWING NUMBER ESL-30<br>ADOPTED: |

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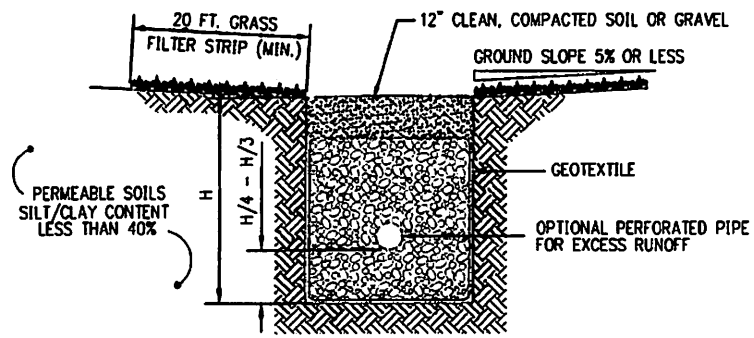
## INFILTRATION TRENCH




## INFILTRATION TRENCH NOTES:

### A) SITE PREPARATION

1. FOLLOW EROSION CONTROL PLANS TO ENSURE THAT SEDIMENT AND RUNOFF ARE KEPT FROM THE TRENCH AREA DURING CONSTRUCTION. ALL DEVELOPMENT SHOULD BE COMPLETE BEFORE THE TRENCH IS EXCAVATED.
2. LOCATE ALL UTILITIES AT THE SITE.
3. CLEAR, GRUB, AND STRIP THE DAM FOUNDATION REMOVING ALL WOODY VEGETATION, ROCKS, AND OTHER OBJECTIONABLE MATERIAL.
4. DISPOSE OF TREES, LIMBS, LOGS, AND OTHER DEBRIS IN DESIGNATED DISPOSAL AREAS.

### B) SWALE TRENCH:

1. EXCAVATE THE TRENCH TO DIMENSIONS SPECIFIED IN THE DESIGN PLAN WITH A BACKHOE OR TRENCHER EQUIPPED WITH TRACKS TO AVOID COMPACTING THE TRENCH AREA. THE BOTTOM OF THE TRENCH SHOULD BE LEVEL.
2. SLOPE TRENCH SIDES OR PROVIDE SHORING ACCORDING TO SAFETY REGULATIONS.
3. LINE THE BOTTOM AND SIDES OF THE TRENCH WITH GEOTEXTILE FABRIC. THE FABRIC SHOULD BE PERMEABLE ENOUGH TO ALLOW THE TRENCH TO DRAIN WITHIN 72 HOURS.
4. BACKFILL THE TRENCH WITH UNIFORMLY GRADED SAND OR GRAVEL. DO NOT USE CRUSHED LIMESTONE, SHALE, OR ANY CRUSHED ROCK THAT WILL BECOME CEMENTED OVER TIME.
5. THE INSTALLATION OF A PERFORATED PIPE TO COLLECT AND TRANSPORT EXCESS RUNOFF IS OPTIONAL. THE TRENCH SHOULD BE DESIGNED SO THAT ALL RUNOFF INFILTRATES WITHIN 72 HOURS.
6. A PERFORATED PIPE MAY BE PLACED IN THE UPPER PART OF THE TRENCH TO QUICKLY DRAIN THE TOP OF THE TRENCH AFTER EACH RUNOFF EVENT; HOWEVER, THIS MAY ALLOW POLLUTANTS TO BE TRANSPORTED OFF SITE WITH THE SURFACE RUNOFF.
7. PLACE AT LEAST ONE OBSERVATION WELL IN EACH INFILTRATION TRENCH TO MONITOR THE PERFORMANCE OF THE TRENCH. PERFORATED POLYVINYL CHLORIDE (PVC) PIPE OR HIGH-DENSITY POLYETHYLENE (HDPE) PIPE IS RECOMMENDED. THE BOTTOM OF THE PIPE SHOULD EXTEND TO WITHIN 1 INCH OF THE GEOTEXTILE IN THE BOTTOM OF THE TRENCH.
8. OVERLAP THE GEOTEXTILE FABRIC ON THE TOP OF THE GRAVEL APPROXIMATELY 6 INCHES BELOW THE TOP OF THE TRENCH. FOLLOW MANUFACTURER'S RECOMMENDATIONS REGARDING THE AMOUNT OF OVERLAP, BUT IN NO CASE SHALL THE OVERLAP BE LESS THAN 12 INCHES. BACKFILL THE TOP OF THE TRENCH WITH GRAVEL.

### C) UNDERGROUND TRENCH:

1. UNDERGROUND TRENCHES CAN BE APPLIED TO A VARIETY OF SITUATIONS AND ARE AESTHETICALLY PLEASING BUT MORE DIFFICULT TO MAINTAIN.
2. EXCAVATE THE TRENCH TO DIMENSIONS SPECIFIED IN THE DESIGN PLAN, LINE WITH GEOTEXTILE, AND BACKFILL THE BOTTOM OF THE TRENCH AS RECOMMENDED FOR SWALE TRENCHES. PLACE A PERFORATED PIPE ON TOP OF THE GRAVEL APPROXIMATELY 1/4 TO 1/3 OF THE DISTANCE TO THE TOP OF THE TRENCH. THE PIPE SHOULD BE PLACED WITH ZERO GRADE. THE SIZE OF THE PIPE WILL VARY; A LARGER PIPE CAN BE PLACED IN THE TRENCH, BUT THE WIDTH OF THE TRENCH WILL HAVE TO BE INCREASED. THE TRENCH WIDTH SHOULD BE A MINIMUM OF TWICE THE DIAMETER OF THE PIPE.
3. CONNECT THE PERFORATED PIPE TO THE COLLECTION PIPE. THE COLLECTION PIPE MAY BE CONNECTED TO AN INLET STRUCTURE USED TO TRAP SEDIMENT.
4. BACKFILL CLEAN GRAVEL OVER THE PIPE TO WITHIN 12 INCHES OF THE TOP OF THE TRENCH.
5. THE INSTALLATION OF A PERFORATED PIPE TO COLLECT AND TRANSPORT EXCESS RUNOFF IS OPTIONAL. THE TRENCH SHOULD BE DESIGNED TO DRAIN ALL RUNOFF WITHIN 72 HOURS. A PERFORATED PIPE MAY BE PLACED IN THE UPPER PART OF THE TRENCH TO QUICKLY DRAIN THE TOP OF THE TRENCH AFTER EACH RUNOFF EVENT.
6. OVERLAP THE GEOTEXTILE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, BUT IN NO CASE SHOULD THE AMOUNT OF OVERLAP BE LESS THAN 12 INCHES.
7. BACKFILL OVER THE GEOTEXTILE WITH AT LEAST 12 INCHES OF CLEAN, COMPACTED SOIL.

### D) EROSION CONTROL:

1. DURING DEVELOPMENT, USE TEMPORARY DIVERSIONS TO PREVENT SURFACE WATER FROM RUNNING ONTO DISTURBED AREAS.
2. MINIMIZE THE SIZE OF DISTURBED AREAS AND VEGETATE ALL BUFFER STRIPS AS SOON AS THE TRENCH IS CONSTRUCTED.
3. DIVERT SEDIMENT-LADEN WATER TO SHALLOW VEGETATED BASINS OR A SEDIMENT COLLECTION SYSTEM CAPABLE OF REMOVING SEDIMENT TO PREVENT THE INFILTRATION TRENCH FROM BECOMING CLOGGED.
4. DIRECT ALL RUNOFF INTO SWALE TRENCHES AT LOW VELOCITY. ESTABLISH THE SLOPE OF THE TOP OF THE SWALE TO PREVENT PONDING OF WATER LONGER THAN 12 HOURS.

### E) TROUBLESHOOTING:

BECAUSE SWALE INFILTRATION TRENCHES CAN IMPOUND WATER FOR SHORT PERIODS OF TIME, THEY CAN BE HAZARDOUS:

1. AVOID STEEP SLOPES; SLOPES AROUND THE SWALE INFILTRATION TRENCH SHOULD BE KEPT AT 20H:1V OR FLATTER.
2. FENCE AREA AND POST WARNING SIGNS IF TRESPASSING IS LIKELY.
3. DRAIN THE TRENCH BETWEEN STORM EVENTS.
4. SLOPE SIDES OF TRENCH OR PROVIDE SHORING.

CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL IF ANY OF THE FOLLOWING OCCUR:

1. VARIATIONS IN TOPOGRAPHY ON SITE INDICATE INFILTRATION TRENCH WILL NOT FUNCTION AS INTENDED.
2. DESIGN SPECIFICATIONS FOR FILL, PIPE, GRAVEL, OR GEOTEXTILE CANNOT BE MET; SUBSTITUTIONS MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD LEAD TO FAILURE.

CHECK THE FINISHED GRADES AND CONFIGURATION FOR ALL EARTHWORK. CHECK ELEVATIONS AND DIMENSIONS OF ALL PIPES AND STRUCTURES.

### F) INSPECTION AND MAINTENANCE:

1. INSPECT THE INFILTRATION TRENCH AFTER EACH 1/2-INCH OR GREATER STORM EVENT. WATER LEVELS IN THE OBSERVATION WELLS SHOULD BE RECORDED OVER SEVERAL DAYS TO CHECK TRENCH DRAINAGE.
2. ANNUALLY INSPECT THE CONDITION OF THE GRASS BUFFER STRIPS IN SWALE TRENCHES. GROWTH SHOULD BE VIGOROUS AND DENSE. BARE SPOTS, ERODED AREAS, OR BURNED OUT AREAS SHOULD BE RESEEDED OR RESODDED.
3. MOW GRASS FILTER STRIPS AT LEAST TWICE A YEAR TO PREVENT WOODY GROWTH.
4. SEDIMENT REMOVAL INLETS SHOULD BE CLEANED OUT WHEN SEDIMENT FILLS 25% OF THE AVAILABLE CAPACITY.
5. PRUNE TREE LIMBS OVERHANGING THE SWALE TRENCH TO PREVENT LEAVES FROM FALLING ONTO THE TRENCH.

SOURCE: MODIFIED FROM MDNR, 1998

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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| INFILTRATION TRENCH | STANDARD DRAWING NUMBER ESC-31<br>ADOPTED: |

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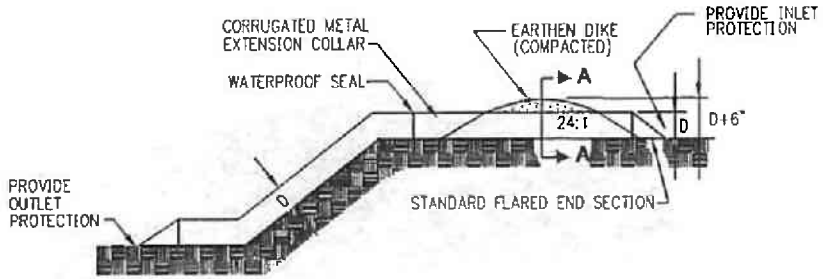
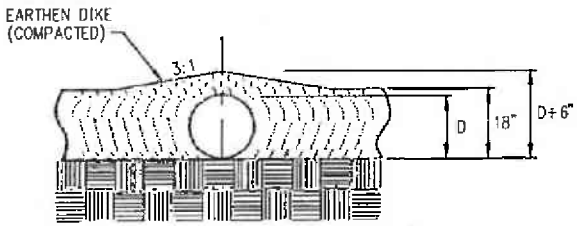
## TEMPORARY SLOPE DRAIN




**SECTION VIEW**
NOT TO SCALE




**SECTION A-A**
NOT TO SCALE

## TEMPORARY SLOPE DRAIN NOTES:

### A) GENERAL NOTES:

1. PLACE ON UNDISTURBED SOIL OR WELL-COMPACTED FILL.
2. THE ENTRANCE SECTION SHALL SLOPE TOWARD THE SLOPE DRAIN AT A MINIMUM OF 1/2 INCH PER FOOT.
3. THE SOIL AROUND AND UNDER THE ENTRANCE SECTION SHALL BE HAND-TAMPED IN 8-INCH LIFTS TO THE TOP OF THE DIKE TO PREVENT PIPING FAILURE AROUND THE INLET.
4. SEDIMENT MAY BE CONTROLLED AT THE OUTLET IF UPLAND PONDING WILL CREATE PROBLEMS

### B) INSPECTION AND MAINTENANCE:

1. THE SLOPE DRAIN STRUCTURE SHALL BE INSPECTED WEEKLY AND AFTER EVERY STORM EVENT OF 1/2-INCH OR GREATER, AND REPAIRS SHALL BE MADE IF NECESSARY. THE CONTRACTOR SHALL AVOID THE PLACEMENT OF ANY MATERIAL ON AND PREVENT CONSTRUCTION TRAFFIC ACROSS THE SLOPE DRAIN.

SOURCE: MODIFIED FROM VA. DCR, 1992

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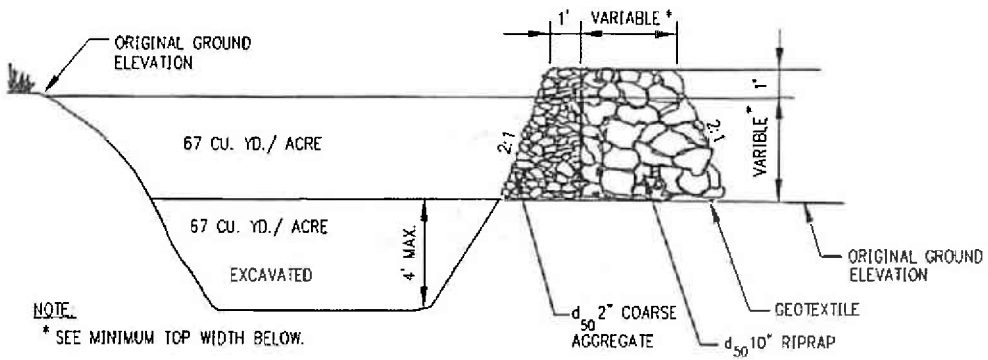
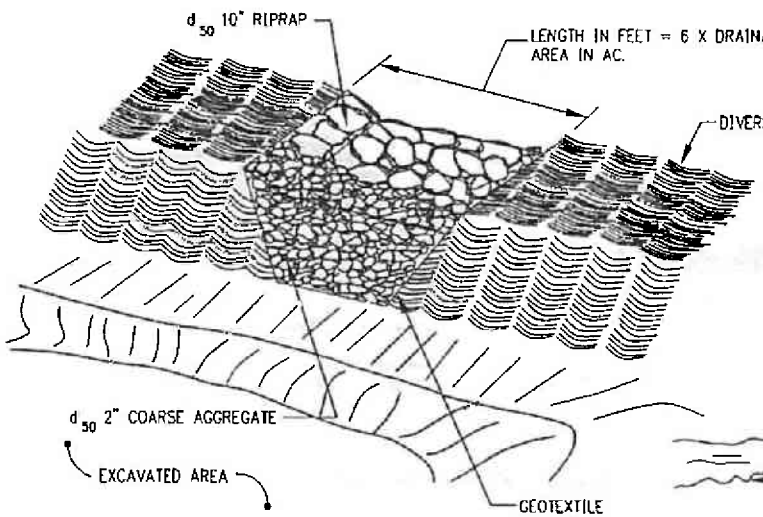
| TEMPORARY SLOPE DRAIN | STANDARD DRAWING NUMBER ESC-32 ADOPTED: |

## TEMPORARY SEDIMENT TRAP

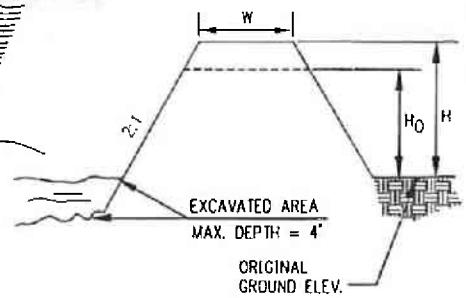



NOTE:
* SEE MINIMUM TOP WIDTH BELOW.

### CROSS SECTION OF OUTLET
NOT TO SCALE




### OUTLET (PERSPECTIVE VIEW)




### MINIMUM TOP WIDTH
NOT TO SCALE

| H | $H_O$ | W |
|---|---|---|
| 1.5 | 0.5 | 2.0 |
| 2.0 | 1.0 | 2.0 |
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| 3.0 | 2.0 | 2.5 |
| 3.5 | 2.5 | 3.0 |
| 4.0 | 3.0 | 3.0 |
| 4.5 | 3.5 | 4.0 |
| 5.0 | 4.0 | 4.5 |

SOURCE: MODIFIED FROM VA. DCR, 1992

## TEMPORARY SEDIMENT TRAP NOTES:

### A) CONSTRUCTION SPECIFICATIONS:

1. THE AREA UNDER THE EMBANKMENT SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ANY VEGETATION AND ROOT MAT.
2. FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHOULD BE COMPACTED IN 6-INCH LAYERS BY TRAVERSING WITH CONSTRUCTION EQUIPMENT.
3. THE EARTHEN EMBANKMENT SHALL BE SEEDED WITH TEMPORARY OR PERMANENT VEGETATION IMMEDIATELY AFTER INSTALLATION.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT TO MINIMIZE EROSION AND WATER POLLUTION.
5. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE UPSLOPE DRAINAGE AREA HAS BEEN STABILIZED.
6. ALL CUT AND FILL SLOPES SHALL BE 2H:1V OR FLATTER EXCEPT FOR EXCAVATED, WET STORAGE AREAS WHICH MAY BE AT A MAXIMUM 1H:1V GRADE.

### B) INSPECTION AND MAINTENANCE:

1. INSPECT THE TEMPORARY SEDIMENT TRAP AFTER EACH STORM EVENT OF 1/2-INCH OR GREATER.
2. REMOVE AND PROPERLY DISPOSE OF SEDIMENT WHEN IT ACCUMULATES TO ONE-HALF THE DESIN VOLUME AS INDICATED BY THE CLEAN-OUT STAKE.
3. PERIODICALLY CHECK THE EMBANKMENT, SPILLWAY, AND OUTLET APRON FOR EROSION DAMAGE, SETTLING SEEPAGE, OR SLUMPING ALONG THE TOE AND REPAIR IMMEDIATELY.
4. REPLACE THE SPILLWAY GRAVEL FACING IF IT BECOMES CLOGGED.
5. INSPECT VEGETATION AND RESEED IF NECESSARY.
6. REPLACE ANY DISPLACED RIPRAP SO THAT NO REPLACEMENT ROCK IS ABOVE THE DESIGN GRADE.
7. REMOVE THE TEMPORARY SEDIMENT TRAP AFTER THE DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, INSPECTED, AND APPROVED. DO SO BY DRAINING ANY WATER, REMOVING THE SEDIMENT TO A DESIGNATED DISPOSAL AREA, AND GRADING THE SITE TO BLEND WITH THE SURROUNDING AREA; THEN STABILIZE.

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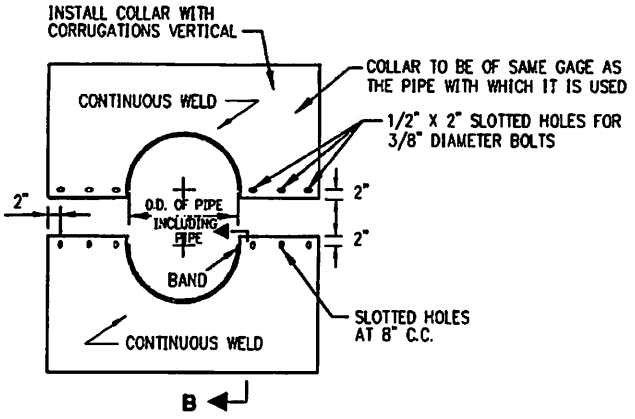
TEMPORARY SEDIMENT TRAP
STANDARD DRAWING NUMBER ESC-33
ADOPTED:

## ANTI-SEEP COLLAR

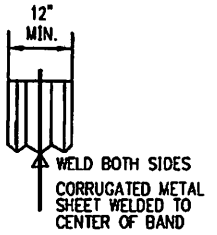



## DETAILS OF CORRUGATED METAL ANTI-SEEP COLLAR

NOT TO SCALE

## NOTES FOR COLLARS:

1. ALL MATERIALS TO BE IN ACCORDANCE WITH CONSTRUCTION MATERIAL SPECIFICATIONS.
2. WHEN SPECIFIED ON THE PLANS, COATING OF COLLARS SHALL BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
3. UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TAGGING TO IDENTIFY MATCHING PAIRS.
4. THE LAP BETWEEN THE TWO HALF SECTIONS AND BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
5. EACH COLLAR SHALL BE FURNISHED WITH TWO 1/2" DIAMETER RODS WITH STANDARD TANK LUGS FOR CONNECTING COLLARS TO PIPE.

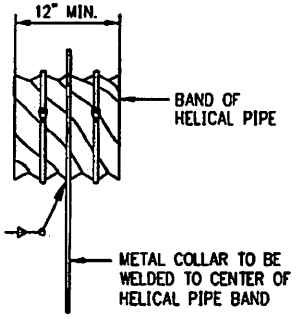



## SECTION B-B

NOT TO SCALE

SIZE AND SPACING OF SLOTTED OPENINGS SHALL BE THE SAME AS SHOWN FOR CM COLLAR

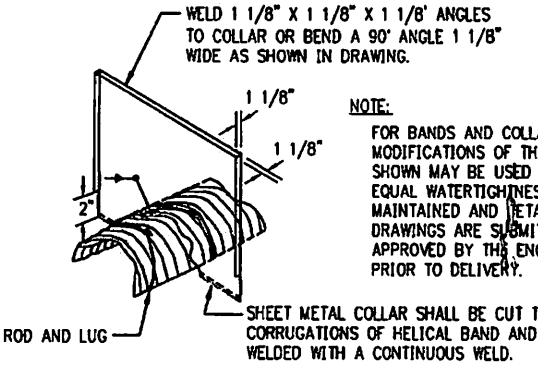
USE RODS AND LUGS TO CLAMP BANDS SECURELY TO PIPE.




## PARTIAL ELEVATION

NOT TO SCALE

## DETAIL OF HELICAL PIPE ANTI-SEEP COLLAR




NOTE:

FOR BANDS AND COLLARS MODIFICATIONS OF THE DETAILS SHOWN MAY BE USED PROVIDING EQUAL WATERTIGHTNESS IS MAINTAINED AND DETAILED DRAWINGS ARE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO DELIVERY.

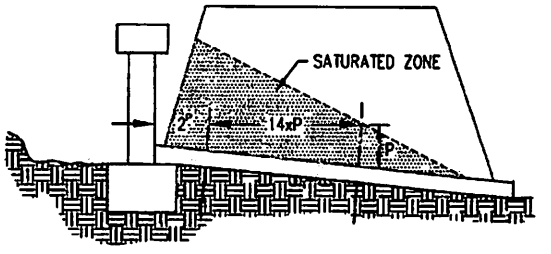
## ISOMETRIC VIEW

NOT TO SCALE

## NOTES:

TWO OTHER TYPES OF ANTI-SEEP COLLARS ARE:

1. CORRUGATED METAL, SIMILAR TO ABOVE EXCEPT SHOP WELDED TO A 4FT. SECTION OF THE PIPE AND CONNECTED TO THE PIPE WITH CONNECTING BANDS.
2. CONCRETE, 6 INCHES THICK FORMED AROUND THE PIPE WITH #3 REBAR SPACED 15" HORIZONTALLY AND VERTICALLY.




## NOTES:

CONNECTIONS BETWEEN THE ANTI-SEEP AND THE BARREL MUST BE WATERTIGHT.

## ANTI-SEEP COLLAR

NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

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| ANTI-SEEP COLLAR | STANDARD DRAWING NUMBER ESC-34<br>ADOPTED: |

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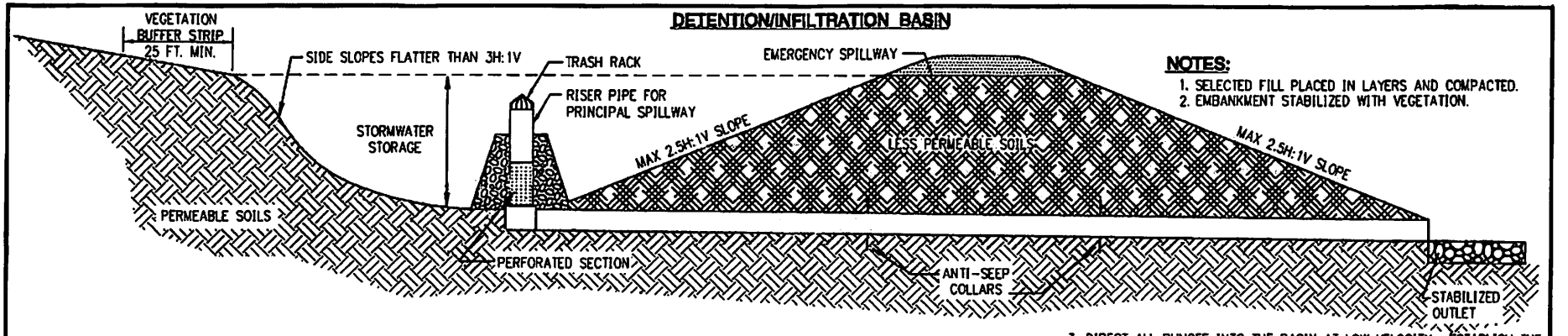
# DETENTION/INFILTRATION BASIN




## NOTES:

1. SELECTED FILL PLACED IN LAYERS AND COMPACTED.
2. EMBANKMENT STABILIZED WITH VEGETATION.

## CONSTRUCTION SPECIFICATIONS:

### A) SITE PREPARATION:

1. LOCATE ALL UNDERGROUND UTILITIES.
2. FOLLOW ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS.
3. CLEAR, GRUB, AND STRIP THE DAM FOUNDATION REMOVING ALL WOODY VEGETATION, ROCKS, AND OTHER OBJECTIONABLE MATERIAL.
4. DISPOSE OF TREES, LIMBS, LOGS, AND OTHER DEBRIS IN DESIGNATED DISPOSAL AREAS.
5. EXCAVATE THE PRINCIPAL SPILLWAY AREA, OUTLET APRON FIRST, STOCKPILING ANY SURFACE SOIL HAVING HIGH AMOUNTS OF ORGANIC MATTER FOR LATER USE.
6. CLEAR THE BASIN AND GRADE TO ALLOW SURFACE DRAINAGE AND TO ENCOURAGE ESTABLISHMENT OF A GOOD COVER OF VEGETATION. USE TRACKED EQUIPMENT TO AVOID COMPACTION.

### B. PRINCIPAL SPILLWAY:

1. SITUATE THE SPILLWAY PIPE AND RISER ON A FIRM, EVEN FOUNDATION. PREPARE THE BEDDING FOR THE PIPE.
2. PLACE AROUND THE BARREL A 4-INCH LAYER OF MOIST, CLAYEY, WORKABLE SOIL, NOT PERVIOUS MATERIAL SUCH AS SAND, GRAVEL, OR SILT; COMPACT WITH HAND TAMPERS TO AT LEAST THE DENSITY OF THE FOUNDATION SOIL. DO NOT RAISE THE PIPE FROM THE FOUNDATION WHEN COMPACTING UNDER THE PIPE HAUNCHES.
3. EMBED THE RISER AT LEAST 12 INCHES INTO CONCRETE TO PROVIDE AN ANTI-FLOATATION BLOCK. THE WEIGHT OF THE CONCRETE SHOULD BALANCE THE BUOYANT FORCE ACTING ON THE RISER.

   BUOYANT FORCE = VOLUME OF RISER X 62.4 LBS/FT$^3$
4. PLACE A TRASH RACK AROUND THE RISER INLET. TRASH RACKS CAN BE CONSTRUCTED BY WELDING #4 REBAR IN A GRID WITH 4- TO 6-INCH OPENINGS
5. CONSTRUCT ANTI-SEEP DEVICES.
6. AT THE PIPE OUTLET, INSTALL A RIPRAP OR CONCRETE APRON AT LEAST 5 FEET WIDE AND 10 FEET LONG TO A STABLE GRADE.
7. OPTIONAL: A SLOTTED OR V-NOTCH WEIR, CONSTRUCTED WITHIN AN OPEN CHANNEL SPILLWAY, CAN BE USED IN PLACE OF A RISER AND CONDUIT AS A PRINCIPAL SPILLWAY.

### C) EMBANKMENT:

1. SCARIFY THE EMBANKMENT FOUNDATION BEFORE PLACING FILL.
2. USE FILL FROM PREDETERMINED BORROW AREAS. IT SHOULD BE CLEAN, STABLE SOIL FREE OF ORGANIC MATERIAL, ROOTS, WOODY VEGETATION, ROCKS, AND OTHER DEBRIS. IT MUST BE WET ENOUGH TO FORM A BALL WITHOUT CRUMBLING, YET NOT SO WET THAT WATER CAN BE SQUEEZED OUT.
3. PLACE THE MOST PERMEABLE SOIL IN THE DOWNSTREAM TOE AND THE LEAST PERMEABLE IN THE CENTER PORTION OF THE DAM.
4. COMPACT THE FILL MATERIAL IN 6- TO 8-INCH, CONTINUOUS LAYERS OVER THE LENGTH OF THE DAM. CONSTRUCTION EQUIPMENT MAY BE ROUTED OVER THE DAM SO THAT EACH LAYER IS TRAVERSED BY AT LEAST ONE WHEEL OF THE EQUIPMENT). TRACKED CONSTRUCTION EQUIPMENT DOES NOT PROVIDE ADEQUATE COMPACTION.
5. PROTECT THE SPILLWAY BARREL WITH 2 FEET OF COMPACTED, HAND-TAMPED FILL BEFORE TRAVERSING OVER THE PIPE WITH EQUIPMENT.
6. CONSTRUCT AND COMPACT THE DAM TO 10% ABOVE THE DESIGN HEIGHT TO ALLOW FOR SETTLING.

### D) EMERGENCY SPILLWAY:

1. CONSTRUCT THE SPILLWAY IN UNDISTURBED SOIL AROUND ONE END OF THE EMBANKMENT AND LOCATE IT SO THAT ALL EXCESS FLOW WILL RETURN TO THE RECEIVING CHANNEL WITHOUT DAMAGING THE EMBANKMENT.
2. STABILIZE THE SPILLWAY WITH VEGETATION AS SOON AS GRADING IS COMPLETE; OR INSTALL PAVING MATERIAL TO FINISHED GRADE IF THE SPILLWAY IS NOT TO BE VEGETATED.

### E) EROSION CONTROL:

1. MINIMIZE THE SIZE OF DISTURBED AREAS. AT THE COMPLETION OF EACH PHASE OF CONSTRUCTION, VEGETATE THE DISTURBED AREAS TO MINIMIZE EROSION.
2. USE TEMPORARY DIVERSIONS TO PREVENT SURFACE WATER FROM RUNNING ONTO DISTURBED AREAS.
3. DIRECT ALL RUNOFF INTO THE BASIN AT LOW VELOCITY. ESTABLISH THE PRINCIPAL SPILLWAY OUTLET ELEVATION TO PREVENT PONDING OF WATER LONGER THAN 72 HOURS.
4. STABILIZE ALL DISTURBED AREAS EXCEPT THE LOWER HALF OF THE SEDIMENT BASIN IMMEDIATELY AFTER CONSTRUCTION.

### F) SAFETY:

BECAUSE DETENTION PONDS THAT IMPOUND WATER ARE HAZARDOUS, THE FOLLOWING PRECAUTIONS SHOULD BE TAKEN:

1. AVOID STEEP SLOPES; SLOPES AROUND THE EXTENDED DETENTION POND SHOULD BE 2.5H:1V OR FLATTER; 3H:1V WHERE MAINTAINED BY TRACTOR OR OTHER EQUIPMENT.
2. FENCE AREA AND POST WARNING SIGNS IF TRESPASSING IS LIKELY.
3. DEWATER THE BASIN BETWEEN STORM EVENTS.

CONSTRUCTION VERIFICATION: CHECK THE FINISHED GRADES AND CONFIGURATION FOR ALL EARTHWORK. CHECK ELEVATIONS AND DIMENSIONS OF ALL PIPES AND STRUCTURES.

### G) INSPECTION AND MAINTENANCE:

1. INSPECT THE BASIN AFTER EACH STORM EVENT OF 1/2 INCH OR GREATER. IF THE BASIN STARTS TO POND WATER FOR EXTENDED PERIODS OF TIME, IT MAY BE CLOGGED AND NEED TO BE CLEANED OUT.
2. REMOVE AND PROPERLY DISPOSE OF ANY SEDIMENT THAT IS COLLECTED AT THE UPSTREAM END OF THE BASIN.
3. PERIODICALLY CHECK THE EMBANKMENT, EMERGENCY SPILLWAY, AND OUTLET FOR EROSION DAMAGE, PIPING, SETTLING, SEEPAGE, OR SLUMPING ALONG THE TOE OR AROUND THE BARRELL REPAIR IMMEDIATELY.
4. REMOVE TRASH AND OTHER DEBRIS FROM THE RISER, EMERGENCY SPILLWAY, AND POOL AREA.
5. CLEAN OR REPLACE THE GRAVEL AROUND THE RISER IF THE SEDIMENT POOL DOES NOT DRAIN PROPERLY.

SOURCE: MODIFIED FROM MDNR, 1998

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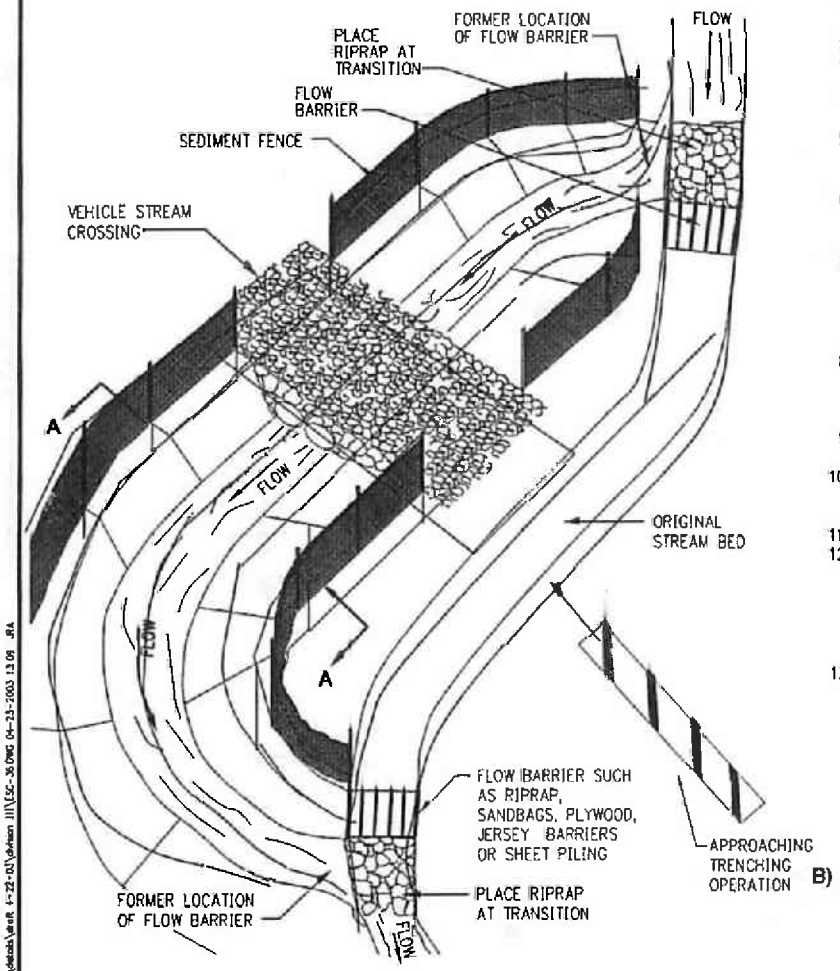
| DETENTION/ INFILTRATION BASIN | STANDARD DRAWING NUMBER ESC-35<br>ADOPTED: |

## DIVERSION CHANNEL CROSSING




**PERSPECTIVE VIEW**

SOURCE: MODIFIED FROM VA. DCR, 1992

## DIVERSION CHANNEL CROSSING NOTES:

### A) GENERAL NOTES:

1. THE DIVERSION CHANNEL CROSSING MUST BE OPERATIONAL BEFORE WORK IS DONE IN THE STREAM. CONSTRUCTION WILL BE PERFORMED IN THE DRY.
2. MINIMUM WIDTH OF BOTTOM SHALL BE 6 FEET OR EQUAL TO BOTTOM WIDTH OF EXISTING STREAMBED, WHICHEVER IS LESS.
3. MAXIMUM STEEPNESS OF SIDE SLOPES SHALL BE 2H:1V. DEPTH AND GRADE MAY BE VARIABLE, DEPENDENT ON SITE CONDITIONS, BUT SHALL BE SUFFICIENT TO ENSURE CONTINUOUS FLOW OF WATER IN THE DIVERSION.
4. CHANNEL MUST BE LINED WITH RIPRAP OR TURF REINFORCEMENT MAT DEPENDING ON THE EXPECTED VELOCITY AND SHEAR STRESS IN THE CHANNEL.
5. STREAM DIVERSIONS MAY BE SEEDED WITH A STANDARD SEED MIX FOR THE TYPES OF SOIL ENCOUNTERED AND THE TIME OF YEAR SEED IS SOWN. AN AVERAGE GROWTH OF TWO INCHES IN HEIGHT SHALL BE ACHIEVED THROUGHOUT THE DIVERSION WITH AN 85% COVER BEFORE WATER IS ALLOWED THROUGH IT.
6. STREAM DIVERSION LINERS SHALL BE SECURED AT THE UPSTREAM AND DOWNSTREAM SIDES WITH NON-ERODIBLE WEIGHTS SUCH AS RIPRAP. THESE WEIGHTS SHALL ALLOW NORMAL FLOW OF THE STREAM. SOIL SHALL NOT BE MIXED WITH STREAM DIVERSION WEIGHTS. WEIGHTS MAY ALSO BE NEEDED ALONG THE DIVERSION'S LENGTH TO SECURE LINER.
7. STREAM DIVERSION LINERS SHOULD BE OVERLAPPED WHEN A SINGLE OR CONTINUOUS LINER IS NOT AVAILABLE OR IS IMPRACTICAL. OVERLAPS SHOULD BE SUCH THAT CONTINUOUS FLOW OF THE STREAM IS MAINTAINED. AN UPSTREAM SECTION SHOULD OVERLAP A DOWNSTREAM SECTION BY A MINIMUM OF 18 INCHES. OVERLAPS ALONG THE CROSS-SECTION SHOULD BE MADE SO THAT A LINER IS PLACED IN THE DIVERSION BOTTOM FIRST AND ADDITIONAL PIECES OF LINER ON THE SLOPES OVERLAP THE BOTTOM PIECE BY A MINIMUM OF 18-INCHES. SEE DETAIL FOR TRM INSTALLATION.
8. STREAM DIVERSION LINERS SHALL BE ENTRENCHED AT THE TOP OF THE SLOPES ALONG WITH A LINE OF SEDIMENT FENCE. SEDIMENT FENCE MAY BE EXCLUDED IF THE DIVERSION LINER IS EXTENDED TO SUCH A POINT THAT SEDIMENTATION OF THE STREAM WILL NOT OCCUR. IF SEDIMENT FENCE IS EXCLUDED, THE DIVERSION LINER MUST BE SECURED. LINERS SHALL EXTEND FROM SLOPE BREAK TO SLOPE BREAK.
9. STAPLES USED IN SECURING SOIL-STABILIZATION BLANKETS AND MATTING OR RIPRAP SHALL BE USED AS NECESSARY TO ANCHOR STREAM DIVERSION LINERS TO THE SIDE SLOPES OF THE DIVERSION. SEE DETAIL ON DRAWING ESC-09 FOR STAPLE PATTERNS.
10. NON-ERODIBLE MATERIALS SUCH AS RIPRAP, JERSEY BARRIERS, SANDBAGS, PLYWOOD, OR SHEET PILING SHALL BE USED AS FLOW BARRIERS TO DIVERT THE STREAM AWAY FROM ITS ORIGINAL CHANNEL AND TO PREVENT OR REDUCE WATER BACKUP INTO THE CONSTRUCTION AREA.
11. THE DOWNSTREAM FLOW BARRIER IS TO BE REMOVED PRIOR TO THE UPSTREAM BARRIER WHEN OPENING A STREAM DIVERSION.
12. STREAMS SHOULD BE REDIVERTED UPON COMPLETION OF THE UTILITY CROSSING FOR WHICH THE DIVERSION WAS BUILT. PRIOR TO REDIVERSION, ANY MATERIALS USED TO PREVENT WATER BACKUP INTO THE DOWNSTREAM END OF THE ORIGINAL STREAMBED SHALL BE REMOVED. THIS MATERIAL SHOULD NOT BE PLACED IN THE DOWNSTREAM END OF THE DIVERSION UNTIL AFTER WATER HAS BEEN REDIVERTED TO THE ORIGINAL WATERWAY. THE STREAM SHOULD THEN BE REDIVERTED BY REMOVING ALL THE MATERIALS DAMMING THE UPSTREAM END OF THE ORIGINAL STREAMBED. THE DIVERSION SHOULD BE SEALED OFF AT THE DOWNSTREAM END AND THEN BACKFILLED. ONCE STARTED, ANY WORK TO RELOCATE THE STREAM SHALL NOT BE DISCONTINUED UNTIL IT IS COMPLETED.
13. STREAM SHOULD BE REDIVERTED ONLY AFTER BACKFILLING AND RESTABILIZATION OF ORIGINAL STREAMBED AND BANKS IS COMPLETED. RESTABILIZATION SHALL CONSIST OF THE INSTALLATION OF UNGROUTED RIPRAP ON ALL DISTURBED STREAMBANK AREAS OR ON THE AREA 6 FEET TO EITHER SIDE OF THE CENTERLINE OF ITS UTILITY TRENCH, WHICHEVER IS GREATER. SLOPES SHALL BE OF 3H:1V OR STEEPER. REFER TO SECTION 2605, RIPRAP FOR INSTALLATION REQUIREMENTS. FOR SLOPES OF 3H:1V OR FLATTER, VEGETATIVE STABILIZATION MAY BE USED, PENDING APPROVAL BY THE PLAN-APPROVING AUTHORITY OR INSPECTION AUTHORITY. STABILIZATION OF STREAMBED AND BANKS AND THE APPROACH AREAS SHOULD OCCUR IMMEDIATELY FOLLOWING THE ATTAINMENT OF FINAL GRADE.

### B) INSPECTION AND MAINTENANCE:

CARE MUST BE TAKEN TO INSPECT ANY STREAM CROSSING AREA AT THE END OF EACH DAY TO ENSURE THE CONSTRUCTION MATERIALS ARE POSITIONED SECURELY. THIS WILL ENSURE THAT THE WORK AREA STAYS DRY AND THAT NO CONSTRUCTION MATERIALS FLOAT DOWNSTREAM.

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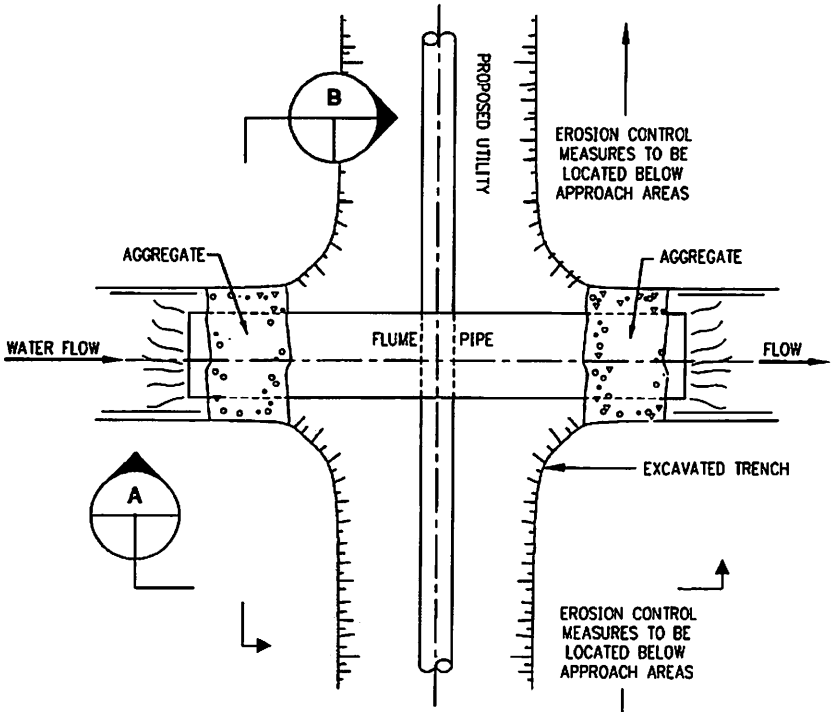
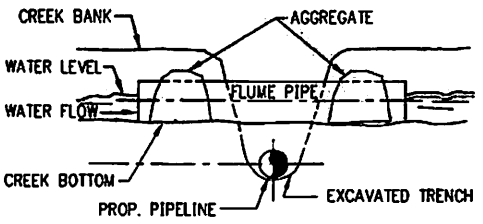
| DIVERSION CHANNEL CROSSING | STANDARD DRAWING NUMBER ESC-36 ADOPTED: |

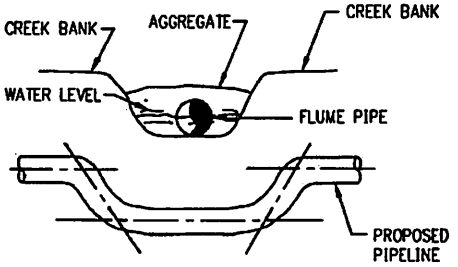
## FLUME PIPE CROSSING




**PLAN VIEW**




**SECTION A-A**




**SECTION B-B**

SOURCE: MODIFIED FROM VA. DCR, 1992

## FLUME PIPE CROSSING NOTES:

### A) GENERAL NOTES:

1. THE FLUME PIPE CROSSING MUST BE MADE OPERATIONAL PRIOR TO THE START OF CONSTRUCTION IN THE STREAM.
2. CULVERTS, STONE, AND GEOTEXTILE MUST MEET THE PHYSICAL CONSTRAINTS FOR VEHICULAR TRAFFIC.
3. A LARGE FLUME PIPE OF AN ADEQUATE SIZE TO SUPPORT NORMAL CHANNEL FLOW SHALL THEN BE INSTALLED IN THE STREAM BED ACROSS THE PROPOSED TRENCH CENTERLINE. COARSE AGGREGATE, MINIMUM SIZE 2", OR RIPRAP SHALL BE PLACED CLOSE TO EACH END OF THE FLUME PIPE TO FORCE THE WATER TO FLOW THROUGH THE FLUME PIPE.
4. THE WATER CAN THEN BE PUMPED FROM WITHIN THE DAMMED-OFF AREA INTO AN APPROVED DEWATERING STRUCTURE. SEE DETAILS ESC-42 THROUGH ESC-44. THE TRENCH CAN THEN BE DUG UNDER THE FLUME PIPE. THE PIPE SECTIONS WILL THEN BE INSTALLED TO THE PROPER DEPTH UNDER THE FLUME PIPE. AFTER PIPE SECTIONS ARE INSTALLED, THE DITCH WILL BE BACKFILLED AND RESTABILIZED.
5. RESTABILIZATION SHALL CONSIST OF THE INSTALLATION OF UNGROUTED RIPRAP ON ALL DISTURBED STREAMBANK AREAS, OR ON THE AREA 6 FEET EITHER SIDE OF THE CENTERLINE OF THE UTILITY TRENCH, WHICHEVER IS GREATER. SLOPES SHALL BE 3H:1V OR STEEPER. REFER TO SECTION 2605, RIPRAP FOR INSTALLATION REQUIREMENTS. FOR SLOPES OF 3H:1V OR FLATTER, VEGETATIVE STABILIZATION MAY BE USED, PENDING APPROVAL BY THE PLAN-APPROVING AUTHORITY OR INSPECTION AUTHORITY. STABILIZATION OF THE STREAMBED AND BANKS AND THE APPROACH AREAS SHOULD OCCUR IMMEDIATELY FOLLOWING THE ATTAINMENT OF FINAL GRADE.
6. AFTER COMPLETION OF BACKFILLING, RESTORATION OF THE BANKS, AND LEVELING OF STREAM BED, THE FLUME PIPE CAN BE REMOVED. THE GRAVEL CAN BE REMOVED OR SPREAD IN THE STREAM BED DEPENDING ON PERMIT REQUIREMENTS. SEDIMENT CONTROL IN APPROACH AREAS SHALL NOT BE REMOVED UNTIL ALL CONSTRUCTION IS COMPLETED IN THE CROSSING AREA. ALL GROUND CONTOURS SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.

### B) INSPECTION AND MAINTENANCE:

CARE MUST BE TAKEN TO INSPECT ANY STREAM CROSSING AREA AT THE END OF EACH DAY TO ENSURE THAT CONSTRUCTION MATERIALS ARE POSITIONED SECURELY SO THAT THE WORK AREA STAYS DRY AND THAT CONSTRUCTION MATERIALS FLOAT DOWNSTREAM.

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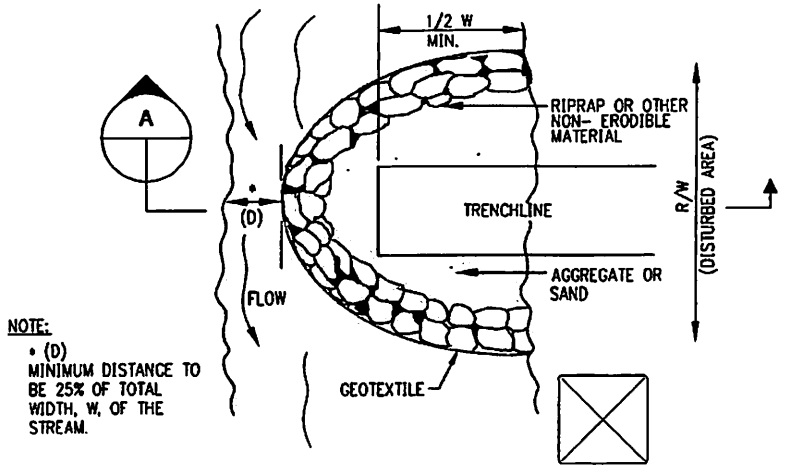
| FLUME PIPE CROSSING | STANDARD DRAWING NUMBER ESC-37<br>ADOPTED: |

J:\KCMAPWA\37707\CIVIL\details\dwgs 4-23-03\design 11\ESC-37.DWG 04-23-2003 13:21 JBA

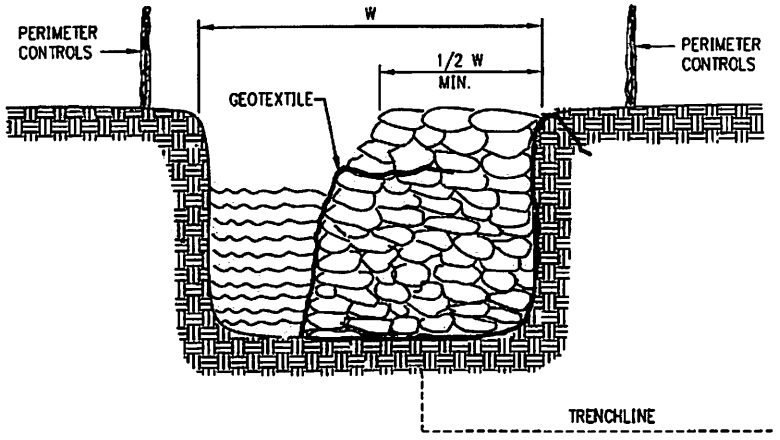
## COFFERDAM CROSSING

### EXISTING STREAM WIDTH (W)




NOTE:
• (D)
MINIMUM DISTANCE TO BE 25% OF TOTAL WIDTH, W, OF THE STREAM.

**PLAN**




**SECTION A-A**

## COFFERDAM CROSSING NOTES:

### A) GENERAL NOTES:

1. TO BE USED WHEN STREAM DIVERSION IS NOT PRACTICAL AND STREAM IS 10 FEET OR WIDER TO MAKE COFFERDAM INSTALLATION PRACTICAL.
2. CONSTRUCTION IS TO BE PERFORMED DURING LOW FLOW PERIODS.
3. CROSSING SHALL BE ACCOMPLISHED IN A MANNER THAT WILL NOT PROHIBIT THE FLOW OF THE STREAM.
4. AS WITH ALL UTILITY LINE CROSSINGS, APPROACH AREAS MUST BE CONTROLLED WITH PERIMETER MEASURES SUCH AS SEDIMENT FENCE.
5. REMOVE LARGE ROCKS, WOODY VEGETATION, OR OTHER MATERIAL FROM THE STREAMBED AND BANKS THAT MAY GET IN THE WAY OF PLACING THE RIPRAP, SANDBAGS, SHEET METAL, OR WOOD PLANKS OR INSTALLING THE UTILITY PIPE OR LINE.
6. FORM A COFFERDAM BY PLACING THE RIPRAP IN A SEMICIRCLE ALONG THE SIDE OF THE STREAM IN WHICH THE UTILITY INSTALLATION WILL BEGIN. IT MUST BE SURROUNDED AND UNDERLAIN WITH GEOTEXTILE. THE HEIGHT OF AND AREA WITHIN THE DAM WILL DEPEND UPON THE SIZE OF THE WORK AREA AND THE AMOUNT OF STREAM FLOW. STACK MATERIALS AS HIGH AS NECESSARY TO KEEP WATER FROM OVERTOPPING THE DAM AND FLOODING THE WORK AREA. WHEN THE STREAM FLOW IS SUCCESSFULLY DIVERTED BY THE COFFERDAM, DEWATER THE WORK AREA AND STABILIZE IT WITH AGGREGATE OR SAND. DISCHARGE THE WATER INTO A SEDIMENT TRAPPING DEVICE. DEWATERING DEVICES ARE LOCATED ON DETAILS ESC-41 THROUGH ESC-43.
7. INSTALL THE UTILITY PIPE OR LINE IN HALF THE STREAMBED. REMOVE THE RIPRAP OR OTHER MATERIALS AND BEGIN PLACING THEM ON THE OTHER SIDE OF THE STREAM.
8. RESTABILIZATION SHALL CONSIST OF THE INSTALLATION OF UNGROUTED RIPRAP ON ALL DISTURBED STREAMBANK AREAS OR ON THE AREA 6 FEET TO BOTH SIDES OF THE CENTERLINE OF ITS UTILITY TRENCH, WHICHEVER IS GREATER. SLOPES SHALL BE 3H:1V OR STEEPER. REFER TO THE RIPRAP SECTION FOR INSTALLATION REQUIREMENTS. FOR SLOPES OF 3H:1V OR FLATTER, VEGETATIVE STABILIZATION MAY BE USED, PENDING APPROVAL BY PLAN-APPROVING AUTHORITY OR INSPECTION AUTHORITY. STABILIZATION OF STREAMBED AND BANKS AND APPROACH AREAS SHOULD OCCUR IMMEDIATELY FOLLOWING THE ATTAINMENT OF FINAL GRADE.

### B) INSPECTION AND MAINTENANCE:

CARE MUST BE TAKEN TO INSPECT ANY STREAM CROSSING AREA AT THE END OF EACH DAY TO MAKE SURE THAT THE CONSTRUCTION MATERILAS ARE POSITIONED SECURELY. THIS WILL ENSURE THAT THE WORK AREA STAYS DRY AND THAT NO CONSTRUCTION MATERILAS FLOAT DOWNSTREAM.

SOURCE: MODIFIED FROM VA. DCR, 1992

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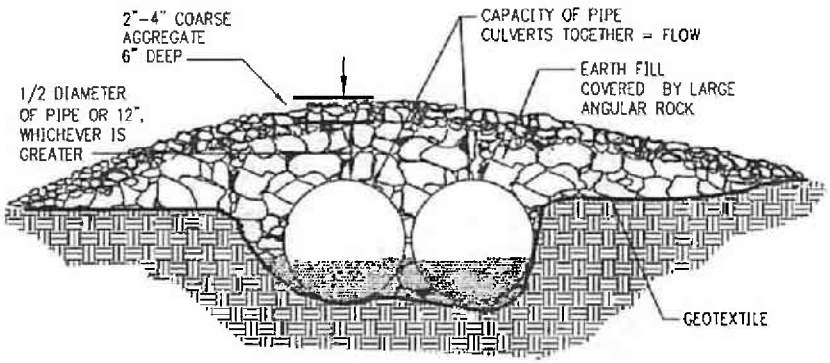
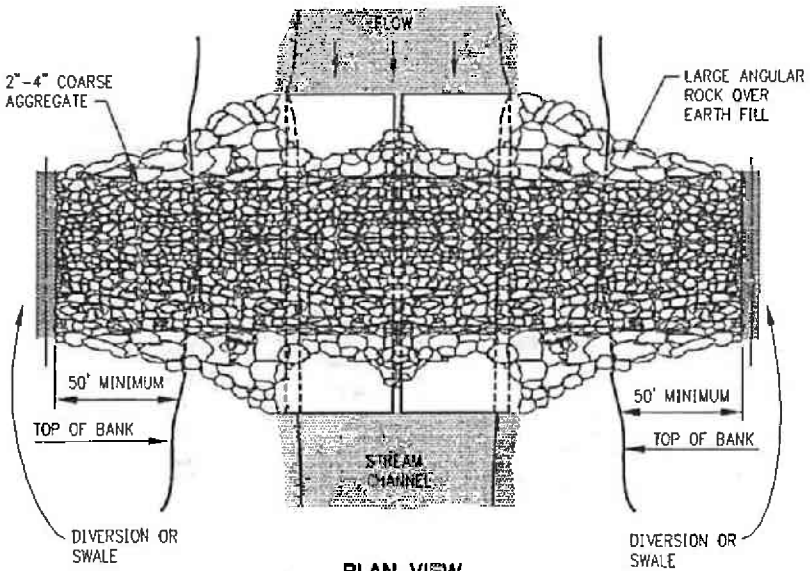
| COFFERDAM CROSSING | STANDARD DRAWING NUMBER ESC-38<br>ADOPTED: |

## TEMPORARY CULVERT CROSSING




**ELEVATION**
NOT TO SCALE




**PLAN VIEW**
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## TEMPORARY CULVERT CROSSING NOTE:

### A) GENERAL NOTES:

1. CLEARING AND EXCAVATION OF THE STREAM BED AND BANKS SHALL BE KEPT TO A MINIMUM.
2. THE INVERT ELEVATION OF THE CULVERT SHALL BE INSTALLED ON THE NATURAL STREAMBED GRADE TO MINIMIZE INTERFERENCE WITH FISH MIGRATION.
3. GEOTEXTILE SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACEMENT OF THE PIPE CULVERT AND AGGREGATE. THE GEOTEXTILE SHALL COVER THE STREAMBED AND EXTEND A MINIMUM OF 6 INCHES AND A MAXIMUM OF 1 FOOT BEYOND THE END OF THE CULVERT AND BEDDING MATERIAL. FILTER CLOTH REDUCES SETTLEMENT AND IMPROVES CROSSING STABILITY.
4. THE CULVERT SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE UPSTREAM AND DOWNSTREAM TOE OF THE AGGREGATE PLACED AROUND THE CULVERT. IN NO CASE SHALL THE CULVERT EXCEED 40 FEET IN LENGTH.
5. THE CULVERT SHALL BE COVERED WITH A MINIMUM OF 1 FOOT OF AGGREGATE. IF MULTIPLE CULVERTS ARE USED, THEY SHALL BE SEPARATED BY AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL.
6. WHEN THE CROSSING HAS SERVED ITS PURPOSE, ALL STRUCTURES INCLUDING CULVERTS, BEDDING, AND GEOTEXTILE MATERIALS SHALL BE REMOVED. REMOVAL OF THE STRUCTURE AND CLEAN-UP OF THE AREA SHALL BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE CHANNEL.
7. UPON REMOVAL OF THE STRUCTURE, THE STREAM SHALL IMMEDIATELY BE SHAPED TO ITS ORIGINAL CROSS-SECTION AND PROPERLY STABILIZED.

### B) INSPECTION AND MAINTENANCE:

CARE MUST BE TAKEN TO INSPECT ANY STREAM CROSSING AREA AT THE END OF EACH DAY TO MAKE SURE THAT THE CONSTRUCTION MATERIALS ARE POSITIONED SECURELY. THIS WILL ENSURE THAT THE WORK AREA STAYS DRY AND THAT NO CONSTRUCTION MATERIALS FLOAT DOWNSTREAM.

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| TEMPORARY CULVERT CROSSING | STANDARD DRAWING NUMBER ESC-39<br>ADOPTED: |

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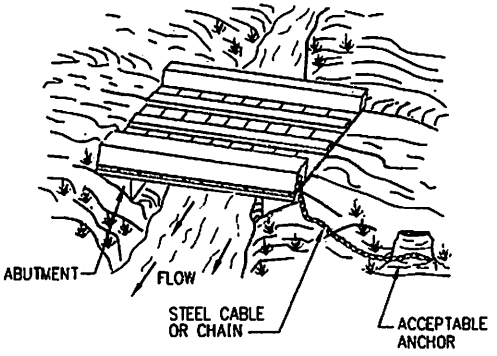
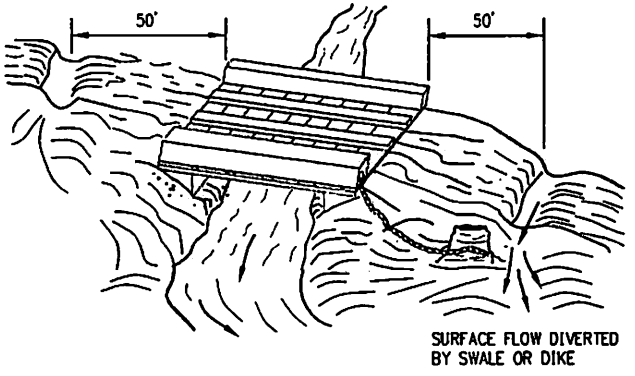
## TEMPORARY BRIDGE CROSSING




**ISOMETRIC VIEW**




**ISOMETRIC VIEW**
NOT TO SCALE

## TEMPORARY BRIDGE CROSSING NOTES:

### A) GENERAL NOTES:

1. CLEARING AND EXCAVATION OF THE STREAM BED AND BANKS SHALL BE KEPT TO A MINIMUM.
2. THE TEMPORARY BRIDGE STRUCTURE SHALL BE CONSTRUCTED AT OR ABOVE BANK ELEVATION TO PREVENT THE ENTRAPMENT OF FLOATING MATERIALS AND DEBRIS.
3. ABUTMENTS SHALL BE PLACED PARALLEL TO AND ON STABLE BANKS.
4. BRIDGES SHALL BE CONSTRUCTED TO SPAN THE ENTIRE CHANNEL. IF THE CHANNEL WIDTH EXCEEDS 8 FEET, AS MEASURED FROM TOP-OF-BANK, A FOOTING, PIER, OR BRIDGE SUPPORT MAY BE CONSTRUCTED WITHIN THE WATERWAY. ONE ADDITIONAL FOOTING, PIER, OR BRIDGE SUPPORT WILL BE PERMITTED FOR EACH ADDITIONAL 8-FOOT WIDTH OF THE CHANNEL. NO FOOTING, PIER, OR BRIDGE SUPPORT, HOWEVER, WILL BE PERMITTED WITHIN THE CHANNEL FOR WATERWAYS WHICH ARE LESS THAN 8 FEET WIDE.
5. STRINGERS SHALL EITHER BE LOGS, SAWN TIMBER, PRESTRESSED CONCRETE BEAMS, METAL BEAMS, OR OTHER APPROVED MATERIALS.
6. DECKING MATERIALS SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOAD. ALL DECKING MEMBERS SHALL BE PLACED PERPENDICULAR TO THE STRINGERS, BUTTED TIGHTLY, AND SECURELY FASTENED TO THE STRINGERS. DECKING MATERIALS MUST BE BUTTED TIGHTLY TO PREVENT ANY SOIL MATERIAL TRACKED ONTO THE BRIDGE FROM FALLING INTO THE WATERWAY BELOW.
7. RUN PLANKING SHALL BE SECURELY FASTENED TO THE LENGTH OF THE SPAN. ONE RUN PLANK SHALL BE PROVIDED FOR EACH TRACK OF THE EQUIPMENT WHEELS. ALTHOUGH RUN PLANKS ARE OPTIONAL, THEY MAY BE NECESSARY TO PROPERLY DISTRIBUTE LOADS.
8. CURBS OR FENDERS MAY BE INSTALLED ALONG THE OUTER SIDES OF THE DECK AND ARE AN OPTION WHICH WILL PROVIDE ADDITIONAL SAFETY.
9. BRIDGES SHALL BE SECURELY ANCHORED AT ONLY ONE END USING STEEL CABLE OR CHAIN. ANCHORING AT ONLY ONE END WILL PREVENT CHANNEL OBSTRUCTION IN THE EVENT THAT FLOODWATERS FLOAT THE BRIDGE. ACCEPTABLE ANCHORS ARE LARGE TREES, LARGE BOULDERS, OR DRIVEN STEEL ANCHORS. ANCHORING SHALL BE SUFFICIENT TO PREVENT THE BRIDGE FROM FLOATING DOWNSTREAM AND POSSIBLY CAUSING AN OBSTRUCTION TO THE FLOW.
10. ALL AREAS DISTURBED DURING INSTALLATION SHALL BE STABILIZED WITHIN 7 CALENDAR DAYS OF THAT DISTURBANCE. WHEN THE TEMPORARY BRIDGE IS NO LONGER NEEDED, ALL STRUCTURES INCLUDING ABUTMENTS AND OTHER BRIDGING MATERIALS SHOULD BE REMOVED IMMEDIATELY.
11. FINAL CLEAN-UP SHALL CONSIST OF REMOVAL OF THE TEMPORARY BRIDGE FROM THE WATERWAY, PROTECTION OF BANKS FROM EROSION, AND REMOVAL OF ALL CONSTRUCTION MATERIALS. ALL REMOVED MATERIALS SHALL BE STORED OUTSIDE THE FLOOD PLAIN OF THE STREAM. REMOVAL OF THE BRIDGE AND CLEAN-UP OF THE AREA SHALL BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE CHANNEL.

### B) INSPECTION AND MAINTENANCE:

CARE MUST BE TAKEN TO INSPECT ANY STREAM CROSSING AREA AT THE END OF EACH DAY TO MAKE SURE THAT THE CONSTRUCTION MATERIALS ARE POSITIONED SECURELY. THIS WILL ENSURE THAT THE WORK AREA STAYS DRY AND THAT NO CONSTRUCTION MATERIALS FLOAT DOWNSTREAM.

SOURCE: MODIFIED FROM VA. DCR, 1992

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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| TEMPORARY BRIDGE CROSSING | STANDARD DRAWING NUMBER ESC-40<br>ADOPTED: |

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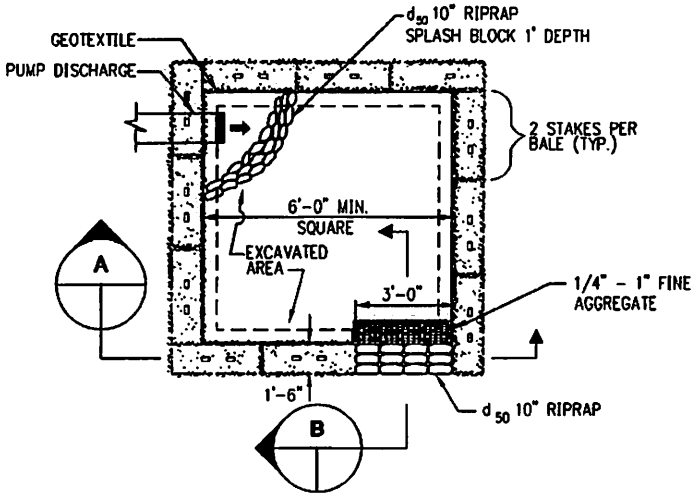
## STRAW BALE/SEDIMENT FENCE PIT




**PLAN VIEW**
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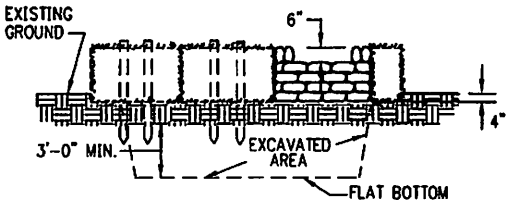


**CROSS SECTION A-A**
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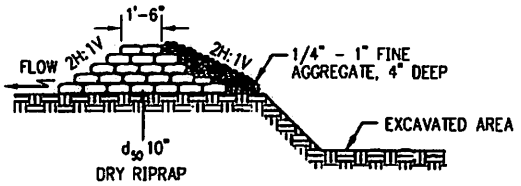


**CROSS SECTION B-B**
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

## STRAW BALE/SEDIMENT FENCE PIT NOTES:

### A) GENERAL NOTES:

1. PIT SHALL CONSIST OF STRAW BALES, SEDIMENT FENCE, A STONE OUTLET THAT IS A COMBINATION OF RIPRAP AND AGGREGATE, AND A WET STORAGE PIT.
2. THE STRUCTURE MUST HAVE A CAPACITY WHICH IS DICTATED BY THE FOLLOWING FORMULA:

   PUMP DISCHARGE (GPM) X 16 = CUBIC FEET OF STORAGE REQUIRED

3. IN CALCULATING THE CAPACITY, INCLUDE THE VOLUME AVAILABLE FROM THE FLOOR OF THE EXCAVATION TO THE CREST OF THE STONE WEIR.
4. THE EXCAVATED AREA SHOULD BE A MINIMUM OF 3 FEET BELOW THE BASE OF THE STRAW BALES OR SEDIMENT FENCE.
5. THE PERIMETER MUST BE INSTALLED AS PER THE GUIDELINES FOUND IN SECTOIN #, STRAW BALE BARRIER AND IN SECTION #, SEDIMENT FENCE.
6. ONCE THE WATER LEVEL NEARS THE CREST OF THE STONE WEIR, THE PUMP MUST BE SHUT OFF WHILE THE STRUCTURE DRAINS DOWN TO THE WET STORAGE ELEVATION.
7. THE WET STORAGE PIT MAY BE DEWATERED ONLY AFTER A MINIMUM OF 6 HOURS OF SEDIMENT SETTLING TIME. THIS EFFLUENT SHOULD BE PUMPED ACROSS A WELL-VEGETATED AREA OR THROUGH A SEDIMENT FENCE PRIOR TO ENTERING A WATERCOURSE.
8. ONCE THE WET STORAGE AREA BECOMES FILLED TO HALF OF THE EXCAVATED DEPTH, ACCUMULATED SEDIMENT SHALL BE REMOVED AND PROPERLY DISPOSED OF.
9. ONCE THE DEVICE HAS BEEN REMOVED, GROUND CONTOURS WILL BE RETURNED TO ORIGINAL CONDITION.

### B) INSPECTION AND MAINTENANCE:

1. THE DEWATERING DEVICES MUST BE INSPECTED FREQUENTLY AND REPAIRED OR REPLACED ONCE THE SEDIMENT BUILD-UP PREVENTS THE STRUCTURE FROM FUNCTIONING AS DESIGNED.
2. THE ACCUMULATED SEDIMENT WHICH IS REMOVED FROM A DEWATERING DEVICE MUST BE SPREAD ON SITE AND STABILIZED OR DISPOSED OF AT AN APPROVED DISPOSAL SITE AS PER APPROVED PLAN.

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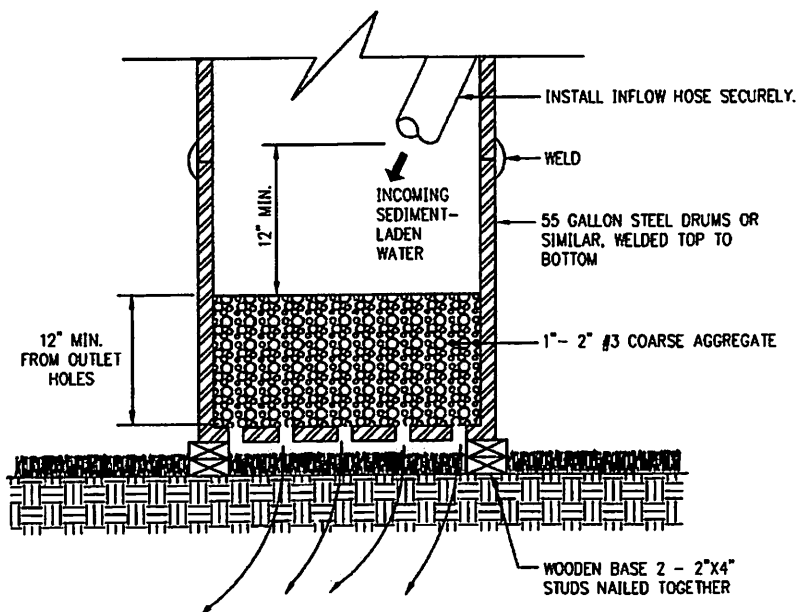
| STRAW BALE/ SEDIMENT FENCE PIT | STANDARD DRAWING NUMBER ESC-41<br>ADOPTED: |

## DEWATER BOX




**ELEVATION VIEW**
NOT TO SCALE

## DEWATER BOX NOTES:

### A) GENERAL NOTES:

1. THE BOX SELECTED SHOULD BE MADE OF STEEL, STURDY WOOD, OR OTHER MATERIALS SUITABLE TO HANDLE THE PRESSURE REQUIREMENTS IMPOSED BY THE VOLUME OF WATER. FIFTY-FIVE GALLON DRUMS WELDED TOP TO BOTTOM ARE NORMALLY READILY AVAILABLE AND IN MOST CASES WILL SUFFICE.
2. BOTTOM OF THE BOX SHALL BE MADE POROUS BY DRILLING HOLES.
3. COARSE AGGREGATE SHALL BE PLACED OVER THE HOLES AT A MINIMUM DEPTH OF 12 INCHES. METAL HARDWARE CLOTH MAY BE REQUIRED BETWEEN THE AGGREGATE AND THE HOLES IF HOLES ARE DRILLED LARGER THAN THE MAJORITY OF THE STONE.
4. AS A RESULT OF THE FAST RATE OF FLOW THROUGH THE AGGREGATE, THE EFFLUENT MUST BE DIRECTED OVER A WELL-VEGETATED STRIP AT LEAST 50 FEET LONG AFTER LEAVING THE BASE OF THE FILTER BOX.
5. THE BOX SHALL BE SIZED AS FOLLOWS:

   PUMP DISCHARGE (GPM) X 16 = CUBIC FEET OF STORAGE REQUIRED

6. ONCE THE WATER LEVEL NEARS THE TOP OF THE BOX, THE PUMP MUST BE SHUT OFF WHILE THE BOX DRAINS AND ADDITIONAL CAPACITY IS MADE AVAILABLE.
7. THE BOX SHALL BE DESIGNED TO ALLOW FOR EMERGENCY FLOW OVER THE TOP.

   NOTE: USING A DEWATER BOX ONLY ALLOWS FOR MINIMAL SETTLING TIME FOR SEDIMENT PARTICLES; THEREFORE, IT SHOULD ONLY BE USED WHEN SITE CONDITIONS RESTRICT THE USE OF THE OTHER METHODS.

### B) INSPECTION AND MAINTENANCE:

1. THE DEWATERING DEVICES MUST BE INSPECTED FREQUENTLY AND REPAIRED OR REPLACED ONCE THE SEDIMENT BUILD-UP PREVENTS THE STRUCTURE FROM FUNCTIONING AS DESIGNED.
2. CLEAN-OUT OF THE BOX IS REQUIRED ONCE ONE THIRD OF THE ORIGINAL CAPACITY IS DEPLETED DUE TO SEDIMENT ACCUMULATION. THE TANK SHALL BE CLEARLY MARKED SHOWING THE CLEAN-OUT POINT.
3. THE ACCUMULATED SEDIMENT WHICH IS REMOVED FROM A DEWATERING DEVICE MUST BE SPREAD ON SITE AND STABILIZED OR DISPOSED OF AT AN APPROVED DISPOSAL SITE AS PER APPROVED PLAN.

SOURCE: MODIFIED FROM VA. DCR, 1992

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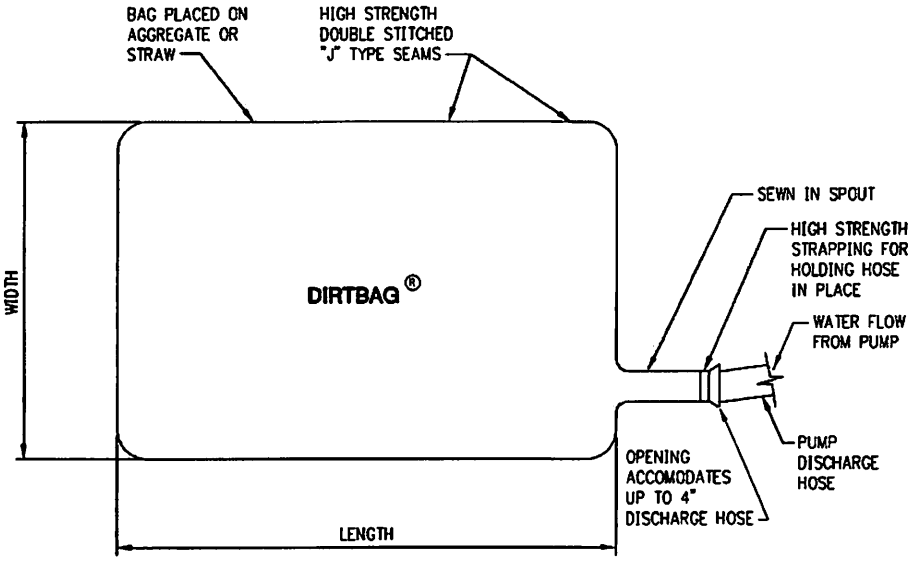
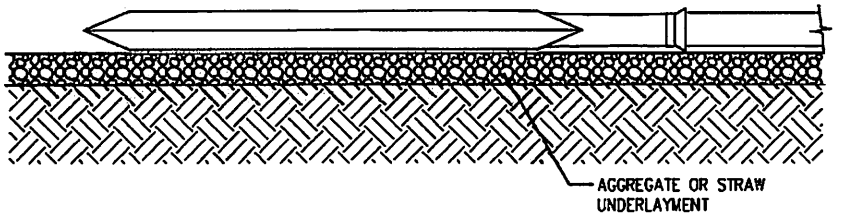
|---|---|
| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| DEWATER BOX | STANDARD DRAWING NUMBER: ESC-42<br>ADOPTED: |

## DIRT BAG®




**TOP VIEW**




**SIDE VIEW**

## DIRTBAG® NOTES:

### A) GENERAL NOTES:

1. THE DIRTBAG® WILL HAVE AN OPENING LARGE ENOUGH TO ACCOMMODATE A 4" DISCHARGE HOSE WITH ATTACHED STRAP TO PREVENT THE PUMPED WATER FROM ESCAPING THE DIRTBAG® WITHOUT BEING TREATED.
2. INSTALL THE DIRTBAG® ON A SLOPE. IT SHOULD BE PLACED SO THE INCOMING WATER FLOWS THROUGH THE DIRTBAG®. DO NOT ALLOW WATER TO FLOW OUT OF THE OPENING WITHOUT BEING TREATED THROUGH THE FABRIC. TO INCREASE THE EFFICIENCY OF THE FILTRATION, THE BAG SHOULD BE PLACED ON AN AGGREGATE BED TO ALLOW WATER TO FLOW THROUGH ALL SURFACES OF THE BAG.
3. DISPOSAL MAY BE ACCOMPLISHED AS DIRECTED BY THE ENGINEER. IF THE SITE ALLOWS, THE DIRTBAG® MAY BE CUT OPEN AND SEEDED, REMOVING THE VISIBLE FABRIC. THE DIRTBAG® IS STRONG ENOUGH TO BE LIFTED IF IT MUST BE HAULED AWAY.

### B) INSPECTION AND MAINTENANCE:

THE DIRTBAG® SHOULD BE CONSIDERED FULL WHEN IT IS IMPRACTICAL FOR THE BAG TO TREAT SEDIMENT LADEN RUNOFF AT A REASONABLE RATE, AND SHOULD BE REPLACED WITH A NEW DIRTBAG®.

SOURCE: ACF ENVIRONMENTAL, INC.

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| APWA | KANSAS CITY METROPOLITAN CHAPTER |
| DIRTBAG® | STANDARD DRAWING NUMBER ESC-43<br>ADOPTED: |

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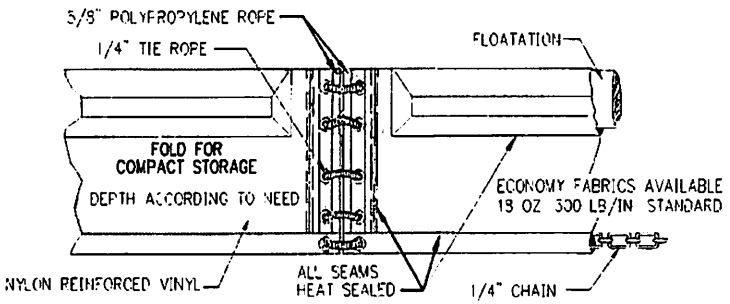
## TURBIDITY CURTAIN




**TYPE I**
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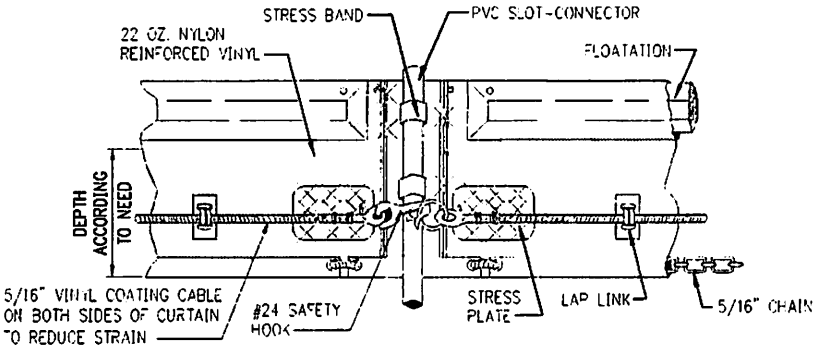
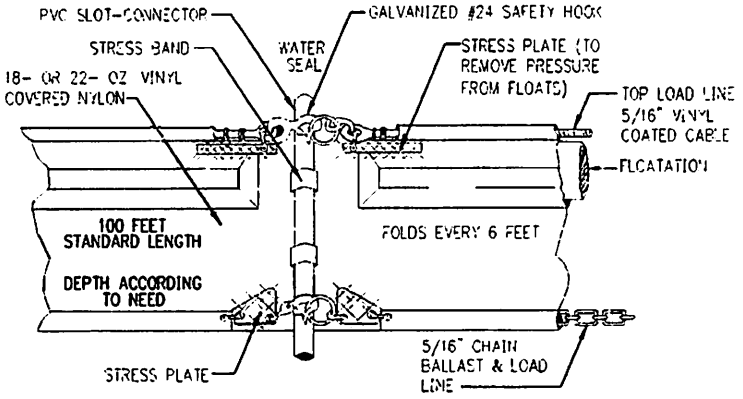



**TYPE III**
NOT TO SCALE




**TYPE II**
NOT TO SCALE

## TURBIDITY CURTAIN NOTES:

### A) GENERAL NOTES:

1. TYPE I IS DESIGNED FOR USE IN SMALL LAKES AND PONDS WITH LITTLE OR NO WIND CURRENT AND LIGHT TURBIDITY.
2. TYPE II IS DESIGNED FOR USE ON RIVERS AND STREAMS, LARGE OPEN LAKES, BAYS, AND BEACHES WITH MODERATE CURRENTS AND WIND EXPOSURE.
3. TYPE III IS SIMILAR TO TYPE II ONLY WITH ADDITIONAL STRESS PLATES OR SPECIAL FABRIC TO HELP RELIEVE STRESSES CAUSED BY STRONG CURRENTS.

### B) INSPECTION AND MAINTENANCE:

1. THE PRIMARY CARE THE BARRIER REQUIRES WHILE IN USE CONSISTS OF KEEPING THE ANCHOR LINES SECURE AND PROPERLY POSITIONED TO ALLOW THE BARRIER TO FUNCTION AS EFFICIENTLY AS POSSIBLE.
2. SHOULD REPAIRS TO THE GEOTEXTILE FABRIC BECOME NECESSARY, THERE ARE NORMALLY REPAIR KITS AVAILABLE FROM MANUFACTURERS; MANUFACTURER'S INSTRUCTIONS MUST BE FOLLOWED TO ENSURE THE ADEQUACY OF THE REPAIR.
3. WHEN THE CURTAIN IS NO LONGER REQUIRED AS DETERMINED BY THE INSPECTOR, THE CURTAIN AND RELATED COMPONENTS SHALL BE REMOVED SO AS TO MINIMIZE TURBIDITY. REMAINING SEDIMENT SHALL BE SUFFICIENTLY SETTLED BEFORE REMOVING THE CURTAIN. SEDIMENT MAY BE REMOVED AND THE ORIGINAL DEPTH OR PLAN ELEVATION RESTORED. ANY SPOILS MUST BE TAKEN TO UPLAND AREA AND STABILIZED.

SOURCE: MODIFIED FROM VA. DCR, 1992

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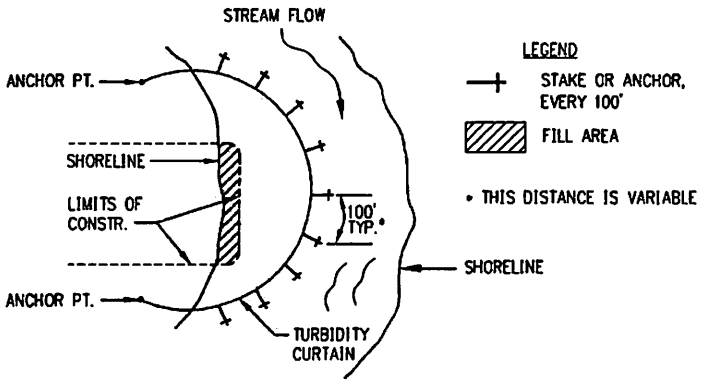
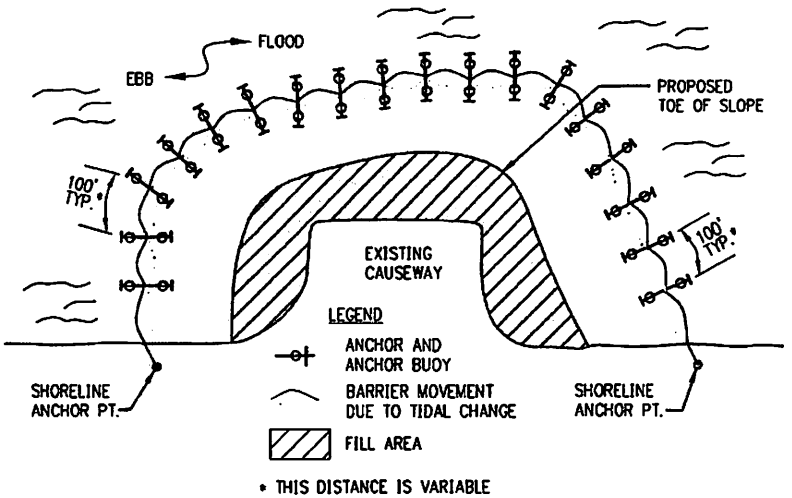
## TURBIDITY CURTAIN TYPICAL LAYOUTS




**STREAMS, PONDS AND LAKES (PROTECTED AND NON-TIDAL)**

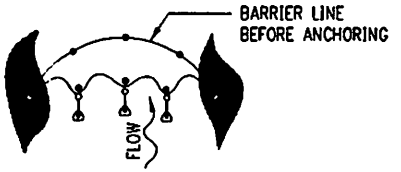
NOT TO SCALE



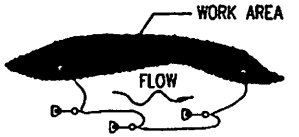

**TIDAL WATERS AND/OR HEAVY WIND AND WAVE ACTION**

NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992 AND ©AER-FLO CANVAS PRODUCTS, INC., 1998




**ACROSS CURRENT**




**PARALLEL TO CURRENT**

## TURBIDITY CURTAIN INSTALLATIONS NOTES:

### A) INSTALLATION IN CURRENTS:

1. THE CURRENT ADDS FORCES TO THE BARRIER WHICH MUST BE RESISTED BY THE LOAD LINES AND ANCHORING SYSTEM. TYPE II AND TYPE III BARRIERS ARE EQUIPED WITH TOP LOAD CABLES. THESE CABLES ARE USED TO TRANSMIT THE LOADS ON THE BARRIER TO THE ANCHOR POINTS AT THE TERMINAL ENDS AND TO ANY ANCHORS SPACED ALONG THE BARRIER LENGTH.
2. ADDITIONAL ANCHORS ARE GENERALLY REQUIRED AT THE JOINTS BETWEEN BARRIER SECTIONS AND SOMETIMES AT LOCATIONS ALONG THE BOTTOM BETWEEN JOINTS. WHEN THE CURRENT IS IN EXCESS OF 5 FEET PER SECOND, THE ENTIRE INSTALLATION SHOULD BE DESIGNED BY A QUALIFIED ENGINEER. A PLAN OF THE BARRIER PERIMETER SHOULD BE MADE KEEPING IN MIND THE DIRECTION AND VELOCITY OF THE CURRENT. LOADS ON THE BARRIER AND THE ANCHORING SYSTEM MUST BE DETERMINED. THE ANCHOR LOCATIONS SHOULD BE MARKED WITH BUOYS CONFORMING TO THE LOCATION PLAN BEFORE THE BARRIER IS DEPLOYED, AND THE ANCHORS, WHEN SET IN PLACE, SHOULD BE TESTED TO ENSURE THEIR HOLDING CAPACITY IS SUFFICIENT FOR THE LOADS EXPECTED.

### B) FLOATING BARRIERS INSTALLATION IN CALM WATERS:

THIS BARRIER IS DEPLOYED AROUND THE CONSTRUCTION SITE WITHOUT ANY SPECIAL ANCHORAGE. IT MAY BE DESIRABLE TO PLACE STAKES AT POINTS ALONG THE PERIMETER TO HOLD THE BARRIER IN POSITION. THE ENDS SHOULD BE ANCHORED WELL UP ON THE SHORE. A STRONG STEEL OR WOOD POST IS GENERALLY ADEQUAET FOR THIS PURPOSE. THE LOWER EDGE OF THE CURTAIN SHOULD BE ABOVE THE BOTTOM AT THE LOWEST WATER LEVEL EXPECTED.

### C) ACROSS CURRENT:

1. IF INTERMEDIATE ANCHOR POINTS ARE REQUIRED, THEY SHOULD BE IN PLACE WITH BUOYS MARKING THEIR LOCATION BEFORE DEPLOYING THE BARRIER.
2. SET THE TERMINAL END ANCHOR POINTS WELL UP ON SHORE. TIE OFF ONE END OF THE BARRIER TO THE UPSTREAM ANCHOR POINT. STRETCH THE FURLED BARRIER OUT ALONG THE BANK IF POSSIBLE OR ALONG THE SHORELINE AS CLOSE TO THE BANK AS POSSIBLE. WITH A BOAT TAKE THE FREE END OF THE BARRIER TO THE OPPOSITE SHORE AND SECURE IT. FROM THE UPSTREAM SIDE OF THE BARRIER USE THE BOAT TO BRING THE BARRIER CONNECTION POINTS BACK TO THE MATCHING INTERMEDIATE ANCHOR POINTS. AFTER ALL ANCHOR POINTS ARE CONNECTED, UNFURL THE BARRIER.

### D) PARALLEL TO CURRENT:

1. IF INTERMEDIATE ANCHOR POINTS ARE REQUIRED, THEY SHOULD BE IN PLACE WITH BUOYS MARKING THEIR LOCATION BEFORE DEPLOYING THE BARRIER.
2. SET THE UPSTREAM AND DOWNSTREAM ANCHOR POINTS. TIE OFF ONE END OF THE BARRIER TO THE UPSTREAM ANCHOR POINT. ALLOW THE FURLED BARRIER TO DRIFT DOWNSTREAM. CONNECT THE INTERMEDIATE ANCHORS TO THE MATCHING BARRIER POINTS AS THE CURTAIN IS DEPLOYED. TIE OFF THE DOWNSTREAM END OF THE BARRIER. RETURN TO THE INTERMEDIATE ANCHOR POINTS AND MAKE ANY NECESSARY ADJUSTMENTS IN THE LINES. AFTER ALL ANCHOR POINTS ARE CONNECTED, UNFURL THE BARRIER.

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