This field guide is intended to serve as a supplemental document to the 1994 Maryland Standards and Specifications for Soil Erosion Sediment Control and Maryland SHA Standard Specifications for Construction and Materials to be used by MD SHA Staff, Inspection Personnel, and Contractors.
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All Administration projects requiring Erosion and Sediment Control measures will be inspected by an Independent Quality Assurance Inspector to ensure compliance with the approved Erosion and Sediment Control Plan. The Contractor shall obtain all appropriate permits and approvals; demarcate Limits of Disturbances, wetland and wetland buffers, floodplains and tree protection areas as specified in Section 107; and shall proceed according to the approved Erosion and Sediment Control Plan and schedules. Projects will be inspected every 2 weeks at a minimum and be given one of the following ratings:

**A RATING:** The project will receive an 'A' rating from the Quality Assurance Inspector if the score is equal to or greater than 90 on form number OOC61, Erosion and Sediment Control Field Investigation Report.

**B RATING:** The project will receive a 'B' rating from the Quality Assurance Inspector if the score is 80 to 89.9 on form number OOC61, Erosion and Sediment Control Field Investigation Report.
C RATING:  The project will receive a 'C' rating from the Quality Assurance Inspector if the score is 70 to 79.9 on form number OOC61, Erosion and Sediment Control Field Investigation Report. A 'C' Rating indicates that the project is in compliance however, deficiencies are noted and shall be corrected. Conditions for a shut down could arise quickly. Projects that receive a 'C' rating will be re-inspected within 72 hours.

D RATING:  The project will receive a 'D' rating from the Quality Assurance Inspector if the score is 60 to 69.9 on form number OOC61, Erosion and Sediment Control Field Investigation Report. A 'D' Rating indicates that the project is in noncompliance. All earthwork operations will be shut down by the Administration. All work efforts shall focus on correcting erosion and sediment control deficiencies. The project will be reinspected within 72 hours. All required corrective actions shall be completed within the 72 hour period for the project to be upgraded to a 'B' rating. Failure to upgrade the project to a 'B' rating will result in the project being rated an 'F'. Liquidated damages will be imposed for each day the project has a 'D' rating.

F RATING:  The project will receive an 'F' rating from the Quality Assurance Inspector
if the score is less than 60 on form number OOC61, Erosion and Sediment Control Field Investigation Report; or if the Contractor has not obtained all appropriate permits and approvals; demarcated limits of disturbances, wetland and wetland buffers, floodplains, and tree protection areas as specified in Section 107; or is not proceeding according to the approved Erosion and Sediment Control Plan and schedules. An 'F' rating indicates that the project is in noncompliance. The entire project will be shut down by the Administration until the project receives a 'B' rating. All work efforts shall focus on correcting erosion and sediment control deficiencies. Liquidated damages will be imposed for each day the project has a 'F' rating.

**Shutdowns.** When a 'C' rating is given to a project, the Contractor shall have all deficiencies corrected within 72 hours. The project will be reinspected at the end of this period. If it is found that the deficiencies have not been satisfactorily corrected, a 'D' rating will be given and all earthwork operations will be shut down until the project receives a 'B' rating.

When a consecutive 'C' rating is given for other deficiencies and the original
deficiencies were corrected, the Contractor will be alerted that their overall effort is marginal and a shut down of all earthwork operations is imminent if erosion and sediment control efforts do not substantially improve within 72 hours. The project will be reinspected at the end of this period. If it is found that the deficiencies have not been satisfactorily corrected or other deficiencies are identified by the Independent Quality Assurance Inspector that results in a score of less than 80 on form number OOC61 a 'D' rating will be given and all earthwork operations will be shut down until the project receives a 'B' rating.

When a disregard for correcting these deficiencies is evident, an 'F' rating will be given and the entire project will be shut down until the project receives a 'B' rating.

When degradation to a resource could occur, or if the Contractor is unresponsive to direction to take corrective action, the Administration may elect to have these corrective actions taken by another contractor or by Administration maintenance staff. All costs associated with this work will be billed to the original Contractor in addition to liquidated damages.
Incentive Payment / Liquidated Damages.
The Administration has included an incentive payment to the Contractor. When an average score equal to or greater than 85 for the entire rating quarter is given to the project by the Independent Quality Assurance Inspector the quarterly incentive payment will be made to the Contractor within sixty days after the end of the rating quarter. No incentive will be paid for partial quarters or for quarters with less than four inspections. No incentives will be paid for any quarter that liquidated damages are imposed. A rating quarter consists of three months. The first quarter begins with the month the Notice to Proceed is issued for the project. When a project does not receive a 'D' or 'F' rating and the overall average score given to the project by the Independent Quality Assurance Inspector is equal to or greater than 85 the final incentive payment will be made to the Contractor at final project close-out. If a time extension is granted to the contract, additional quarterly incentive payments will be drawn from the final incentive payment.

When a 'D' or 'F' rating is given to the project by the Independent Quality Assurance Inspector for any inspections; the Administration will impose liquidated damages on the Contractor. Payment of the liquidated
damages shall be made within thirty days from imposition of the liquidated damages and shall not be allowed to accrue for consideration at final project close-out.

When the project receives two 'F' ratings the erosion and sediment control certification issued by the Administration shall be revoked from the project superintendent and the Erosion and Sediment Control Manager for a period of not less than six months and until successful completion of the Administration's Erosion and Sediment Control Certification Program. Neither the project superintendent nor the Erosion and Sediment Control Manager shall be allowed to oversee the installation and maintenance of erosion and sediment controls during the period the certification is revoked on any project of the Administration. The Contractor shall provide certified personnel to replace the project superintendent and the Erosion and Sediment Control Manager.
Stream Restriction Periods

Stream closure dates for fish spawning or migration within waterways are as follows:

Use I and IP      March 1 – June 15
Use II           June 1 – September 30 &
                 December 16 – March 14
Use III and IIIP October 1 – April 30
Use IV           March 1 – May 31
SAV              April 15 – October 15

All instream work is prohibited during these periods.
Earth Dike
MDE Detail A-1-6

CROSS SECTION

POSITIVE DRAINAGE SUFFICIENT TO DRAIN

PLAN VIEW

FLOW CHANNEL STABILIZATION
GRADE 0.5% MIN. 10% MAX.

1. Seed and cover with straw mulch.
2. Seed and cover with Soil Stabilization Matting or line with sod.
3. 4" - 7" stone or recycled concrete equivalent pressed into the soil 7" minimum.

DIKE DIKE
A B
a-DIKE HEIGHT 18" 30"
b-DIKE WIDTH 24" 36"
c-FLOW WIDTH 4' 6'
d-FLOW DEPTH 12" 24"
Temporary Swales
MDE Detail A-2-4

Example of A-2

2:1 OR FATTER SLOPES

C MINIMUM DEPTH

D MINIMUM DEPTH

SWALE A SWALE B
C = 1’ MIN. 1’ MIN.
D = 4’ MIN. 6’ MIN.
OUTLET AS REQUIRED

CROSS SECTION

FLOW

0.5% SLOPE MINIMUM

FLOW

FLOW

FLOW

PLAN VIEW

FLOW CHANNEL STABILIZATION
GRADE 0.5% MIN. 10% MAX.

1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4”-7” stone or recycled concrete equivalent pressed into soil in a minimum 7” layer.
Diversion Fence
MDE Detail A-3-5

5’ MAX. CENTER TO CENTER

FLOW

FLOW

3 MIL POLYETHYLENE SHEETING WRAPPED OVER FENCE POST

PERSPECTIVE VIEW

FLOW

6”

36” MIN. FENCE POST LENGTH

LATHING

3 MIL UV RESISTANT (BLACK) POLYETHYLENE SHEETING

4’ MIN.

CROSS SECTION

6”

FENCE POST SECTION MIN. 20” ABOVE GROUND

CARRY SHEETING TO GRADE UNDISTURBED GROUND

DRIVEN A MIN. OF 16”

MAXIMUM DRAINAGE AREA TO OUTLET = 2 ACRES.

JOINING TWO ADJACENT DIVERSION FENCE SECTIONS
Perimeter Dike/Swale

MDE Detail A-3-3

Example of PD/S-2

**STABILIZATION**
PD/S-1 - SEED AND MULCH (DRAINING 1 ACRE)
PD/S-2 - SEED AND COVER WITH SOIL STABILIZATION MATTING OR LINE WITH SOD (DRAINING BETWEEN 1 AND 2 ACRES)

**CONSTRUCTION SPECIFICATIONS**
1. All perimeter dike/swales shall have an uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.
2. The maximum drainage area for this practice is 2 acres.
Pipe Slope Drain
MDE Detail B-5-4

GEOTEXTILE CLASS SE APRON
STANDARD FLARED ENTRANCE SECTION

COMPACTED EARTH DIKE
ANCHORS (USE MANUFACTURERS SPECIFICATIONS FOR TYPE AND SPACING)

DISCHARGE INTO A STABILIZED WATERCOURSE, SEDIMENT TRAPPING DEVICE, OR INTO A STABILIZED AREA AT A NONEROSIVE VELOCITY. REF: ROCK OUTLET PROTECTION

HEIGHT = PIPE DIA.x 2 (MAX 4’)
3% SLOPE OR GREATER
6” GEOTEXTILE CLASS SE KEYED-IN
STANDARD FLARED ENTRANCE SECTION

STABILIZED OUTFALL
4’ MIN. LENGTH AT LESS THAN 1% SLOPE

NOTE: PIPE SIZE DESIGNATION IS: PSD 12=PIPE SLOPE DRAIN WITH A 12” DIA. PIPE.
Riprap Inflow Protection
MDE Detail B-6-2

COMPACTED EMBANKMENT

2:1 SLOPE OR FATTER

TRAP/BASIN BOTTOM

10' MIN.

PERSPECTIVE VIEW

BLEND RIP-RAP INTO EXISTING GROUND

1' MIN. FLOW DEPTH

GEOTEXTILE CLASS 'SE' LINING

19" MIN. DEPTH OF 3" TO 12" RIP-RAP

CROSS SECTION
Gabion Inflow Protection
MDE Detail B-7-2

Perspective View

Profile Along Centerline
Stone Check Dams
MDE Detail B-8-3

Ditch Profile

Clean out elevation 1/2 of the height of the weir crest.
Sediment Traps
Pipe Outlet Sediment Trap - ST I
MDE Detail C-9-7

1/2" wire mesh with geotextile
Class 'E' securely fastened
to perforated riser

4' min. height (fill)

4' max. height (fill)

1' min. dry crest storage

1' min. wet storage

Clean out elevation = 1/2 wet storage depth

Profile
Sediment Traps
Stone Outlet Sediment Trap - ST II
MDE Detail C-9-10

MAXIMUM D.A. = 5 AC

1' MIN. TOP OF EMBANKMENT
1'4" MIN. WEIR LENGTH
11'2" MAX. HEIGHT

EXISTING
GROUND

CLEAN OUT
ELEVATION = \( \frac{1}{2} \)
WET STORAGE
DEPTH

1' THICKNESS \( \frac{3}{4} \)" TO 1'1/2"
STONE OR GEOTEXTILE
CLASS E MAY BE USED
AS A SUBSTITUTE FOR
STONE

4' MIN. WIDTH

DRAIN STORAGE
FLOW

11'2" MIN. WEIR CREST
3' MAX.

SMALL RIP-RAP 4" TO 7"
OUTLET ELEVATION
5' APRON

BOTTOM ELEVATION
EXCAVATE FOR REQUIRED WET
STORAGE

GEOTEXTILE CLASS SE

Sediment Traps
Riprap Outlet Sediment Trap - ST III

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MDE Detail C-9-13

MAXIMUM D.A. = 10 AC.

TOP OF COMPACTED EMBANKMENT MIN. 1' ABOVE TOP OF STONE LINING. MAX. 4' ABOVE EXISTING GROUND

BOTTOM WIDTH OF WEIR (b): MINIMUM DEPTH OF CHANNEL (a)

STONE THICKNESS 19" MIN. 3" - 12" STONE OR SHA CLASS 1.

CROSS SECTION

EXCAVATE FOR WET STORAGE AS REQUIRED

STORAGE HEIGHT LIMIT

CEDTEXTILE CLASS SE SHALL BE EMBEDDED AT LEAST 6" INTO THE EXISTING GROUND AT ENTRANCE TO THE OUTLET CHANNEL

PROFILE

Sediment Traps
Stone/Riprap Outlet Sediment Trap - ST IV

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1. THE PERFORATED DRAW-DOWN DEVICE SHALL BE WRAPPED WITH 1/2" WIRE MESH AND CLASS E GEOTEXTILE FABRIC.
2. PROVIDE SUPPORT TO PREVENT SAGGING & FLOATATION.

Sediment Basin/Trap Baffles
MDE Detail C-10-28
Stone Outlet Structures

MDE Detail E-16-10
MAXIMUM DRAINAGE AREA TO OUTLET = 1/2 ACRE

FLOW

FLOW

2’ MIN. TOP WIDTH

EARTH DIKE

CLEAN OUT ELEVATION 1/2 OF THE HEIGHT OF THE WEIR CREST

L = 6’ MIN. LEVEL CREST

2’ MIN.

6” MIN.

12” MIN.

6” MIN.

2”x10”x12” BAFFLE BOARD

EMBED BAFFLE BOARD 4” MIN. INTO GROUND

PERFORATIONS FOR DRAINAGE = 1” HOLES ON 6” CENTERS

CLASS ‘SE’ GEOTEXTILE INTERFACE BETWEEN STONE AND ALL EARTH SURFACES.

PERSPECTIVE VIEW

CROSS-SECTION
Removable Pumping Station
MDE Detail D-12-5

HOOK AND CHAIN FOR REMOVAL

TOP OF PIPES 12” TO 18” ABOVE WATER SURFACE ELEV.

ANTICIPATED WATER SURFACE ELEV.

STATIONARY PERFORATED 48” PIPE WRAPPED WITH 1/2” WIRE MESH

EXISTING GROUND

WEIGHT AS NECESSARY TO PREVENT FLOTATION OF CENTER PIPE

BOTTOM PLATE FOR EACH PIPE W/ WATERTIGHT CONNECTION

REMovable perforated 15”-36” pipe wrapped first w/1/2” wire mesh, then geotextile fabric class "E"

CLEAN STONE 3/4” - 1 1/2”

3” MIN.

4’ MIN.

8’ MIN.

ELEVATION (CUT AWAY)
**Sump Pit**

**MDE Detail D-13-2**

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**THE TOP OF THE STANDPIPE SHOULD EXTEND AT LEAST 12” TO 18” ABOVE THE TOP OF THE PIT OR ABOVE STANDING WATER.**

**CLEAN WATER DISCHARGE**

**SUCTION LINE TO PUMP**

**3” MINIMUM**

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**EXISTING GROUND LINE**

**STANDPIPE WRAPPED IN 1/2” WIRE MESH, THEN GEOTEXTILE CLASS E**

**12” - 36” DIAMETER PERFORATED CORRUGATED METAL OR PVC PIPE WITH 1/2” X 6” SLITS OR 1” DIA. HOLES**

**WATERTIGHT CAP OF PLATE**

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**SIDE SLOPE (VARIIES)**

**CLEAN AASHTO M-43 No. 4 STONE**

**PLACE 12” BASE OF CLEAN M-43 # 4 STONE BEFORE INSTALLING STANDPIPE.**

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**ELEVATION (CUT AWAY)**
**Portable Sediment Tank**

**MDE Detail D-14-2**

ELEVATION

- **INFLOW**
- **72'' CMP**
- **60'' CMP with 1'' Holes at 6'' on Center**
- **1/2'' STEEL PLATE WELDED TO PIPES WATERTIGHT**
- **5' CMP SECTIONS**
- **2' CLEANOUT DEPTH**
- **OUTFLOW**
- **1/2'' WIRE MESH**
- **GEOTEXTILE CLASS E**

PLAN VIEW

- **INFLOW**
- **72'' CMP**
- **60'' CMP**
- **GEOTEXTILE CLASS E**
- **OUTFLOW**
- **1/2'' WIRE MESH**
- **TANK SIZING = 1 C.F. OF STORAGE FOR EACH GALLON PER MINUTE DISCHARGE CAPACITY**

**CONSTRUCTION SPECIFICATIONS**

1. **TANKS MAY BE CONNECTED IN SERIES.**
2. **TANK SHALL BE PLACED IN AN UNDISTURBED LOCATION, SO TREATED DISCHARGE FROM TANK DOES NOT BECOME SEDIMENT LADEN. IN ADDITION, LOCATION OF TANK SHOULD ALLOW TREATED WATER TO BE CONVEYED SAFELY TO RECEIVING CHANNEL OR WATERWAY AND AWAY FROM WORK AREA.**

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CONSTRUCTION SPECIFICATIONS

1. FILTER BAG SHALL BE PLACED IN AN UNDISTURBED LOCATION, SD TREATED DISCHARGE FROM THE BAG DOES NOT BECOME SEDIMENT LADEN. IN ADDITION, LOCATION OF FILTER BAG SHOULD ALLOW TREATED WATER TO BE CONVEYED SAFELY TO RECEIVING CHANNEL OR WATERWAY AND AWAY FROM WORK AREA.

2. NOZZLE SHOULD BE SEALED TIGHTLY AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNFILTERED WATER FROM ESCAPING.
**Silt Fence**

**MDE Detail E-15-3 or Revised SHA SPI 308.03.28**

**Perspective View**

Post shall consist of the following:

1. 2" x 2" square cut wood
2. 1 1/4" round wood
3. T or U section weighing lots less than 1.00 lb/ft

**Maintenance**

Sediment accumulation reaches 50% of the fabric height when bulges occur or when joining two adjacent posts.

**Section A**

- Fenced post section minimum 20" above ground
- Undisturbed ground

**Section B**

- Staple
- Roll geotextile around posts

**Profile**

- Fence post driven a minimum of 16"
Storm Drain Inlet Protection
MDE Detail E-16-5

Example of Standard Inlet Protection

CONSTRUCTION SPECIFICATIONS
1. IF THE INLET IS NOT IN A SUMP, CONSTRUCT A COMPACTED EARTH DIKE ACROSS THE DITCH LINE DIRECTLY BELOW IT. THE TOP OF THE EARTH DIKE SHOULD BE AT LEAST 6" HIGHER THAN THE TOP OF FRAME.
2. REPLACE THE GEOTEXTILE WHEN IT BECOMES CLOGGED.
Storm Drain Inlet Protection
MDE Detail E-16-6

Example of At Grade Inlet Protection

WRAP INLET GRATE WITH GEOTEXTILE CLASS E

PLAN/CUT AWAY VIEW

INLET GRATE

WIRE TIES

OVERLAP

CROSS SECTION

MAX. DRAINAGE AREA = 1 ACRE
Storm Drain Inlet Protection
MDE Detail E-16-7

Example of Curb Inlet Protection

MAX. DRAINAGE AREA = 1/4 ACRE

2’ MIN. LENGTH OF 2”x4”

2”x4” Spacer

CLEAN 3/4”-1 1/2” STONE

GEOTEXTILE CLASS E

6’ MAX. SPACING OF 2”x4” SPACERS

CROSS SECTION

FLOW
GEOTEXTILE CLASS E

EDGE OF CURTIER PAN

FLOW

1/2”x1/2” WIRE MESH

TEMPORARY EARTH OR ASPHALT DIKE

PERSPECTIVE VIEW
Storm Drain Inlet Protection
MDE Detail E-16-8

Example of Median Inlet Protection

- Sheet Flow
- Inlet Notch
- Geotextile Class F (see silt fence detail for installation)
- 4'-7' Stone Facing (up to weir)
- Concentrated Flow
- Weir (1' min. width)
- 3'-4" - 1'-6" Stone Facing (up to weir)
- Existing Ditch or Cutten
- Undisturbed/Existing Ground
- "Wing"

Plan View

Profile

1'-6"
1'-6"

6"

1' min. depth

6"

4'-7" Stone Facing (up to weir)

3'-4" - 1'-6" Stone Facing (up to weir)

10" min. height

NOTE: Bottom of "Wing" must be 6" higher in elev. than weir to force high flows across weir

Maximum Drainage Area = 1 ac.
Stabilized Construction Entrance
MDE Detail F-17-3

LOCATION - A STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE. VEHICLES LEAVING THE SITE MUST TRAVEL OVER THE ENTIRE LENGTH OF THE STABILIZED CONSTRUCTION ENTRANCE.
Rock Outlet Protection
MDE Detail F-18-8
Rock Outlet Protection I

TRANSITION TO EXISTING CHANNEL

PLAN VIEW

TOP OF CHANNEL
TOP OF RIPRAP

DEPTH Dictated BY CHANNEL SECTION AT END OF APRON

CHANNEL CROSS SECTION WILL TRANSITION FROM A-A TO B-B

BLEND RIPRAP INTO EXISTING GROUND

EXTEND CLASS SE GEOTEXTILE A MIN. OF 6" BEYOND RIPRAP AND KEY INTO EXISTING GROUND

EMBED GEOTEXTILE A MIN. OF 4"

CROSS-SECTION

CROSS-SECTION
Rock Outlet Protection
Rock Outlet Protection II
MDE Detail F-18-9

PLAN VIEW

ELEVATION

CROSS-SECTION

SIDE SLOPES TO VARY FROM 2:1 AT PIPE OUTLET TO THE EXISTING CHANNEL SLOPE AT THE END OF THE APRON

CLASS SE GEOTEXTILE MUST EXTEND AT LEAST 6" FROM EDGE OF RIP-RAP AND BE EMBEDDED AT LEAST 4" AT SIDES OF THE RIP-RAP

MINIMUM DEPTH OF RIP-RAP = MAXIMUM DEPTH OF FLOW. (DOWNSTREAM NORMAL DEPTH OR DISCHARGE DEPTH WHICHEVER IS GREATER)
Rock Outlet Protection

Rock Outlet Protection III
MDE Detail F-18-10

PLAN VIEW

TRANSITION RIPRAP TO EXISTING CHANNEL

TRANSITION RIPRAP TO EXISTING CHANNEL

EXISTING STABILIZED AREA

TOE WALL 3' MINIMUM DEPTH

CLASS SE GEOTEXTILE

1' MIN. WIDTH

PROFILE

ORIGINAL GRADE

TRANSITION RIPRAP TO EXISTING CHANNEL

CLASS SE GEOTEXTILE

CLASS SE GEOTEXTILE SHALL BE EMBEDDED A MIN. OF 4" AND SHALL EXTEND AT LEAST 6" BEYOND THE EDGE OF THE RIP-RAP

CROSS-SECTION

4"

CLASS SE GEOTEXTILE

6"

CROSS-SECTION
Vegetative Stabilization
MDE Detail G-20-1

Purpose: Vegetative stabilization specifications are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas, and improving wildlife habitat and visual resources.

Topsoil and Subsoil

Placing and Spreading Topsoil: Topsoil shall be placed, spread, and maintained over the areas designated to the depth, that after settlement, the completed work shall be in conformance with the thickness, lines, grades, and elevations specified in the Contract Documents. Stones and other foreign material larger than 3 in. shall be removed. Slopes 4:1 to 2:1 shall be tracked operating perpendicular to the slope.

Placing and Spreading, and Compacting Subsoil: Subsoil shall be placed, spread, and compacted in maximum layer of 8 in. to produce a uniform firm layer of subsoil. The
completed work shall be in conformance with the thickness, lines, grades, and elevations specified in the Contract Documents. Stones and other foreign material larger than 4 in. shall be removed. Slopes 4:1 to 2:1 shall be tracked operating perpendicular to the slope.
Temporary Seeding

Temporary seeding shall consist of preparing soil, seeding, fertilizing, mulching and applying wood cellulose fiber binder. Temporary seeding shall be done to areas that will remain undisturbed for 1 month or more. Temporary seeding and temporary wood cellulose mulching shall be done any time of the year.

Soil Preparation: Soil shall be loosened from the grading operation. Compacted soil surfaces shall be loosened before seed is applied.

Application Rates:

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<td>Temporary Seed Mix</td>
<td>2.9</td>
<td>125</td>
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<td>Fertilizer (15-30-15)</td>
<td>10.3</td>
<td>450</td>
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<tr>
<td>Mulch (Straw or Hay)</td>
<td>91.8</td>
<td>4000</td>
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<tr>
<td>Wood Cellulose Fiber (Mulch Binder)</td>
<td>17.2</td>
<td>750</td>
</tr>
</tbody>
</table>
Turf Establishment / Permanent Seeding

Permanent seeding shall consist of soil preparation, seeding, fertilizing, liming as required, mulching, overseeding, and refertilizing.

a. Minimum soil conditions required for permanent vegetative establishment:

1. Soil pH shall be between 6.0 and 7.0.
2. Soluble salts shall be less than 500 ppm.
3. The soil shall contain less than 40% clay but enough fine grained mater (> 30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass or serecia lespedeza is to be planted, then a sandy soil (< 30% silt plus clay) would be acceptable.
4. Soil shall contain 1.5 % minimum organic matter by weight.
5. Soil must contain sufficient pore space to permit adequate root penetration.
6. If these conditions cannot be met by soils on site, adding topsoil is required in accordance with Section 21
Standard and Specification for Topsoil.

b. Areas previously graded in conformance with the drawings shall be maintained in true and even grade, then scarified or otherwise loosened to a depth of 3-5" to permit bonding of the topsoil to the surface area. By tracking the slope, this prevents topsoil from sliding down the slope.

c. Apply soil amendments as per soil test, as included on the plans, or in accordance with the Nutrient Management Plan.

d. Mix soil amendment into the top 3-5" of topsoil by diskng or other suitable means.
Regional Areas

Maryland is divided into regions by counties as follows:

Region 1 — Garrett, Allegany and Washington (West of Clear Spring, MD).

Region 2 — Washington (East of Clear Spring, MD), Frederick, Carroll, Baltimore, Harford, Cecil, Howard, Montgomery, and Baltimore City.

Region 3 — Anne Arundel, Prince Georges, Calvert, Charles, St. Marys, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Worcester and Somerset.
### SEEDING SEASONS AND SEED MIXES

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>SPRING AND FALL MONTH/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4/1 to 6/15 and 8/1 to 10/1</td>
</tr>
<tr>
<td>2</td>
<td>3/1 to 5/15 and 8/1 to 10/20</td>
</tr>
<tr>
<td>3</td>
<td>3/3 to 5/1 and 8/1 to 10/31</td>
</tr>
<tr>
<td>1, 2 and 3</td>
<td>No Additives</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>SUMMER MONTH/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6/16 to 7/31</td>
</tr>
<tr>
<td>2</td>
<td>5/16 to 7/31</td>
</tr>
<tr>
<td>3</td>
<td>5/2 to 7/31</td>
</tr>
<tr>
<td>1, 2 and 3</td>
<td>Plus Additive A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>LATE FALL MONTH/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10/2 to 11/1</td>
</tr>
<tr>
<td>2</td>
<td>10/21 to 11/20</td>
</tr>
<tr>
<td>3</td>
<td>11/1 to 11/30</td>
</tr>
<tr>
<td>1, 2 and 3</td>
<td>Plus Additive B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>ALL SEASONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2 and 3</td>
<td>Plus Additive C for seeding:</td>
</tr>
<tr>
<td></td>
<td>a. Areas 30’ and greater from the edge of the pavement</td>
</tr>
<tr>
<td></td>
<td>b. Slopes 4:1 and steeper</td>
</tr>
<tr>
<td></td>
<td>When seeding areas within 4 miles of a State Airport:</td>
</tr>
<tr>
<td></td>
<td>a. Flatter than 4:1 - No additives</td>
</tr>
<tr>
<td></td>
<td>b. 4:1 and steeper - Special Purpose Seed Mix in lieu of Permanent Seed Mix</td>
</tr>
</tbody>
</table>

Seed Mix contents refer to 920.04.02

### ADDITIVES:

- **A** = Lovegrass or Foxtail Millet
- **B** = Temporary Seed Mix
- **C** = Sercia Lespedeza

45
Incremental Stabilization
MDE Detail G-20-6 & G-20-7

1. Excavation is not to exceed 15’ without stabilization.
2. Excavation should be continuous through the completion of permanent seed and mulch. Any interruptions will necessitate the application of temporary stabilization.

INCREMENTAL STABILIZATION — CUT

Standard Practices: Temporary berm to be placed at the end of each work day until slope is completely stabilized.
- Topsoil/or approved material
- Track slope

FINAL PHASE EMBANKMENT
PHASE 2 EMBANKMENT
PHASE 1 EMBANKMENT
SLOPE SILT FENCE
SEE DETAIL

1. Embankment construction is not to exceed 15’ without stabilization.
2. Placement of fill should be continuous through the completion of permanent seed and mulch. Any interruptions will necessitate the application of temporary stabilization.

INCREMENTAL STABILIZATION — FILL

46
Erosion Control Matting
MDE Detail G-22-2

4" OVERLAP
CROSS-SECTION

4" OVERLAP OF
UPSTREAM MATTING
OVER DOWNSTREAM
MATTING

SEED CHANNEL
PRIOR TO
INSTALLATION
OF MATTING

CHANNEL SHALL
BE GRADED AND
FREE OF DEBRIS

4" OVERLAP OF
MATTING ROLLS
WHERE TWO OR MORE
ROLL WIDTHS ARE
REQUIRED. ATTACH
STAPLES ON 18"
CENTERS

TYPICAL STAPLES
NO. 11 GAUGE WIRE
Straw Bale Dike
MDE Detail E-16-12

**Bedding Detail**

- **Angle first stake toward the previously placed bale**
- **Entrench bales a minimum of 4” into the ground**

**String Binder**

**Bound Bales placed on contour**

**Anchoring Detail**

- **2” x 2” wood stakes driven 12” to 18” into the ground. Stakes are to be driven flush with the top of the bales**

09/16/2005
Super Silt Fence

MDE Detail E-15-7

NOTE:
FENCE POST SPACING SHALL NOT EXCEED 10' CENTER TO CENTER

GROUND SURFACE

REMOVE ANY DEBRIS PREVENTING MIN. DEPTH OF FENCE

2" DIAMETER GALVANIZED OR ALUMINUM POSTS

CHAIN LINK FENCE WITH 1 LAYER OF GEOTEXTILE CLASS F

EMBED FENCE 8" MIN. INTO GROUND

FLOW

PERSPECTIVE VIEW

MAINTENANCE SHALL BE PERFORMED WHEN "BULGES" DEVELOP IN THE SILT FENCE, OR WHEN SILT REACHES 50% OF THE FENCE HEIGHT.

CHAIN LINK FENCING GEOTEXTILE CLASS F

EMBED GEOTEXTILE CLASS F 8" MIN. INTO GROUND & COMPACT BOTH SIDES

FLOW

34" MIN.

EMBED 1ST LAYER OF FILTER CLOTH*

PROFILE

*IF MULTIPLE LAYERS ARE REQUIRED TO ATTAIN 42"
Lined Waterway or Outlet

RIPRAP DITCH DETAIL
NOT TO SCALE
Temporary Access Bridge
MDE Detail H-27-9

CURBS OR FENDERS SHALL BE INSTALLED ALONG THE OUTER EDGES TO PREVENT SOIL MATERIAL FROM FALLING INTO WATERWAY

4" DEPTH STONE AGGREGATE APPROACHES WITH GEOTEXTILE CLASS S

STRINGER

RUN PLANKS (OPTIONAL) TO DISTRIBUTE LOADS

SAFETY CHAIN OR STEEL CABLE

SECURE ANCHOR POINT

DECKING SHALL BE PERPENDICULAR TO STRINGER AND BUTTED TIGHTLY TO PREVENT SOIL MATERIAL FROM FALLING INTO THE WATERWAY
Temporary Access Bridge
-Continued-

Stringers may be logs, sawn timber, prestressed concrete beams, metal beams, or other approved material.

Bridge to be placed above bank elevation and span entire channel.

4" in depth stone aggregate approach with original geotextile class SE streambed.

Bridge support permitted when channel width exceeds 8'. One additional support for each additional 8' of channel width. No bridge support will be permitted for channels less than 8'.

Profile
NOTE: ALL AGGREGATE FILL USED SHALL BE A MIN. 4”-7” STONE. SMALLER STONE MAY BE USED TO FILL THE VOIDS ON THE SURFACE FOR A DRIVING SURFACE.

AGGREGATE FILL

CLASS SE GEOTEXTILE MAX. CULVERT

LENGTH 40’ MIN. 12” AGGREGATE FILL

MIN. 12” DIA. CULVERT

STREAM FLOW

EXTEND PIPE 1’ PAST TOE OF AGGREGATE FILL

PROFILE
CONSTRUCTION SPECIFICATIONS

1. CULVERT SIZE— THE SIZE OF THE CULVERT PIPE SHALL BE THE LARGEST PIPE DIAMETER THAT WILL FIT INTO THE EXISTING CHANNEL WITHOUT MAJOR EXCAVATION OF THE WATERWAY CHANNEL OR WITHOUT MAJOR APPROACH FILLS. IF A CHANNEL WIDTH EXCEEDS 3 FEET, ADDITIONAL PIPES MAY BE USED UNTIL THE CROSS SECTIONAL AREA OF THE PIPES IS GREATER THAN 60 PERCENT OF THE CROSS SECTIONAL AREA OF THE EXISTING CHANNEL. THE MINIMUM SIZE CULVERT THAT MAY BE USED IS A 12" DIA. PIPE. IN ALL CASES, THE PIPE(S) SHALL BE LARGE ENOUGH TO CONVEY NORMAL STREAM FLOWS.

2. STABILIZATION— ALL AREAS DISTURBED DURING CULVERT INSTALLATION AND REMOVAL SHALL BE STABILIZED WITHIN 24 HOURS OF THE DISTURBANCE.

3. AFTER EACH RAIN EVENT CULVERT SHOULD BE INSPECTED FOR BLOCKAGES OR AGGREGATE FILL WASHOUTS.
## Routine / Maintenance Inspection - Troubleshooting

<table>
<thead>
<tr>
<th>Control Measure</th>
<th>Problems</th>
<th>Possible Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetation</td>
<td>Erosion along slopes</td>
<td>Check top-of-slope diversion for positive drainage, install diversion if needed</td>
</tr>
<tr>
<td></td>
<td>Bare soil patches</td>
<td>Fill erosion, regrade eroded slopes, &amp; restabilize</td>
</tr>
<tr>
<td></td>
<td>Sediment at toe-of-slope</td>
<td>Remove sediment, &amp; restabilize</td>
</tr>
<tr>
<td>Dikes</td>
<td>Erosion on backside of dike</td>
<td>Verify positive drainage; repair eroded area, compact, &amp; restabilize</td>
</tr>
<tr>
<td></td>
<td>Loose soil</td>
<td>Compact dike</td>
</tr>
<tr>
<td></td>
<td>Erosion on front face of dike</td>
<td>Verify channel lining, repair erosion, &amp; restabilize</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>--------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Erosion on slope below swale</td>
<td>Verify positive drainage; repair eroded area, compact, &amp; restabilize</td>
</tr>
<tr>
<td>Swales</td>
<td>Water ponding in swale</td>
<td>Verify positive drainage, &amp; regrade swale</td>
</tr>
<tr>
<td></td>
<td>Sediment or debris in channel</td>
<td>Remove material accumulation</td>
</tr>
<tr>
<td></td>
<td>Erosion within swale</td>
<td>Verify channel lining, repair erosion, restabilize &amp; install lining as appropriate; check dams may be necessary</td>
</tr>
<tr>
<td>Pipe Slope Drain</td>
<td>Blocked inlet or outlet</td>
<td>Remove sediment and debris</td>
</tr>
<tr>
<td></td>
<td>Runoff is eroding slope along pipe</td>
<td>Construct a berm at the inflow point</td>
</tr>
<tr>
<td></td>
<td>Runoff is bypassing inlet</td>
<td>Construct an interceptor berm to direct flow</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------------------------------</td>
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<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Pipe Slope Drain (Continued)</td>
<td>Erosion at the outlet</td>
<td>Increase size of riprap apron, use larger riprap; or convey runoff to a more stable outlet</td>
</tr>
<tr>
<td>Grass Waterways</td>
<td>Bare areas</td>
<td>Reseed, add lime &amp; fertilizer; install soil stabilization matting</td>
</tr>
<tr>
<td></td>
<td>Channel capacity reduced</td>
<td>Remove sediment/debris accumulations; or mow high growth</td>
</tr>
<tr>
<td>Riprap Lined Waterways</td>
<td>Scour underneath riprap</td>
<td>Verify proper channel dimensions; regrade, install &amp; key-in geotextile, &amp; place riprap</td>
</tr>
<tr>
<td></td>
<td>Scour along the side of the waterway</td>
<td>Verify proper channel dimensions; and reconstruct waterway</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
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<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Riprap Lined Waterways (Continued)</td>
<td>Riprap dislodged</td>
<td>Replace with larger sized riprap</td>
</tr>
<tr>
<td>Outlet Protection</td>
<td>Scour at outlet</td>
<td>Verify depth, dimensions, &amp; configuration of riprap outlet; reconstruct &amp; enlarge riprap apron &amp; increase size of riprap; outlet should be at 0% slope; extend riprap beyond apron to transition to stream channel.</td>
</tr>
<tr>
<td></td>
<td>Erosion below outlet</td>
<td>Enlarge riprap apron; increase size of riprap; inspect structural integrity of pipe &amp; outlet structure</td>
</tr>
<tr>
<td>Riprap dislodged</td>
<td>Replace with larger sized riprap</td>
<td></td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
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<td>------------------</td>
</tr>
<tr>
<td>Sediment Traps &amp; Basins</td>
<td>Sediment accumulation is half the height of the wet storage elevation</td>
<td>Dewater facility using approved pumping methods &amp; restore facility to elevations and grades shown on the plans, allow material to dry in an approved location.</td>
</tr>
<tr>
<td></td>
<td>Stone outlet structure is full of sediment</td>
<td>Remove clogged stone &amp; replace with new stone</td>
</tr>
<tr>
<td></td>
<td>Basin not dewatering as designed</td>
<td>Inspect riser structure; remove any blockages from orifices; remove clogged stone &amp; replace with new stone</td>
</tr>
<tr>
<td></td>
<td>Embankment misaligned, sliding, or sloughing is occurring</td>
<td>Reconstruct embankment immediately and restabilize. Facility subject to failure</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
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<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sediment Traps &amp; Basins (Continued)</td>
<td>Stone outlet structure erosion</td>
<td>Verify plans for spillway elevations, rock size, &amp; dimensions. Verify design drainage area is not exceeded. Install baffle boards.</td>
</tr>
<tr>
<td></td>
<td>Outlet erosion</td>
<td>Verify depth, dimensions, &amp; configuration of riprap outlet; reconstruct &amp; enlarge riprap apron &amp; increase size of riprap; outlet should be at 0% slope; extend riprap beyond apron to transition to stream channel.</td>
</tr>
<tr>
<td></td>
<td>Riser floating or leaning</td>
<td>Construct riser in concrete footing. Remove and reconstruct riser subgrade and verify joints.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sediment Traps &amp; Basins (Continued)</td>
<td>Excessive discharge to and from facility.</td>
<td>Verify plans for facility dimensions. Verify design drainage area is not exceeded. Enlarge the sediment facility. Temporarily divert a small portion of drainage to another facility that is capable of handling the additional drainage area.</td>
</tr>
<tr>
<td></td>
<td>Wet storage requires regular maintenance</td>
<td>Verify plans for facility dimensions. Stabilize as much of the drainage area as possible. Install interim E&amp;S Controls prior to discharging to the sediment facilities.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
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<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Straw Bale Dike</td>
<td>Bale displacement</td>
<td>Anchor bales with proper stakes. Verify drainage area, slope length, and gradient behind each barrier.</td>
</tr>
<tr>
<td></td>
<td>Undercutting of bales</td>
<td>Entrench bales to proper depth, backfill, and compact the soil.</td>
</tr>
<tr>
<td></td>
<td>Gaps between bales</td>
<td>Restake bales. Drive first stake in each bale at an angel to force it snug against the adjacent bale.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>----------------------</td>
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<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Straw Bale Dike</td>
<td>Baling string broken</td>
<td>Retie bale or replace with new bale.</td>
</tr>
<tr>
<td>(Continued)</td>
<td>Bale disintegrating</td>
<td>Replace with new bale.</td>
</tr>
<tr>
<td></td>
<td>Sediment level near top of bales</td>
<td>Remove sediment when sediment is half the height of the barrier height.</td>
</tr>
<tr>
<td>Silt Fence</td>
<td>Flow undermining Fence</td>
<td>Entrench geotextile 8”, backfill, and compact.</td>
</tr>
<tr>
<td></td>
<td>Sediment exceeds half the height of the fence</td>
<td>Remove sediment when sediment is half the height of the fence.</td>
</tr>
<tr>
<td></td>
<td>Fence leaning or collapsing</td>
<td>Verify post size and geotextile. Verify drainage area, slope length, and gradient behind fence. Correct any substandard condition.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>---------------------------------</td>
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<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Silt Fence (Continued)</td>
<td>Torn fabric</td>
<td>Replace geotextile from post to post and install properly.</td>
</tr>
<tr>
<td></td>
<td>Runoff escaping around end</td>
<td>Extend fence and turn end upslope.</td>
</tr>
<tr>
<td></td>
<td>Sediment exceeds half the height of the structure</td>
<td>Remove sediment when sediment is half the height of the structure.</td>
</tr>
<tr>
<td>Stone Outlet Structure</td>
<td>Stone voids filled with sediment</td>
<td>Remove sediment filled stone and replace with new stone.</td>
</tr>
<tr>
<td></td>
<td>Displaced stone</td>
<td>Verify drainage area, place additional larger stone, and reconstruct structure.</td>
</tr>
<tr>
<td></td>
<td>Flow escaping around the sides of the structure</td>
<td>Extend stone on each side and provide a low area in the center for spillway.</td>
</tr>
<tr>
<td><strong>Control Measure</strong></td>
<td><strong>Problems</strong></td>
<td><strong>Possible Remedies</strong></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Inlet Protection</strong></td>
<td>Inlet protection not dewatering and geotextile or stone voids filled with sediment</td>
<td>Replace geotextile or stone.</td>
</tr>
<tr>
<td></td>
<td>Runoff undermining the inlet protection</td>
<td>Key-in geotextile, backfill, and compact.</td>
</tr>
<tr>
<td></td>
<td>Sediment exceeds half the height of the structure</td>
<td>Remove sediment when sediment is half the height of the structure.</td>
</tr>
<tr>
<td></td>
<td>Inlet protection leaning or collapsing</td>
<td>Verify construction of inlet protection. Verify drainage area. Reconstruct inlet protection.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td><strong>Sump Pit</strong></td>
<td>Discharge from hose is sediment laden</td>
<td>Reconstruct and replace geotextile and stone or install new sump pit.</td>
</tr>
<tr>
<td></td>
<td>Water not entering pipe for pumping</td>
<td>Reconstruct and replace geotextile and stone or install new sump pit.</td>
</tr>
<tr>
<td><strong>Portable Dewatering Tank</strong></td>
<td>Discharge from outlet is sediment laden</td>
<td>Cease pumping and remove sediment from tank, and replace geotextile. If discharge continues, slow pumping rate of flow or use sump pit in conjunction.</td>
</tr>
<tr>
<td></td>
<td>Discharge from outlet is becoming sediment laden once it discharges back onto the ground.</td>
<td>Relocate tank to a stabilized area or place polyethylene sheeting to convey discharge to stabilized area.</td>
</tr>
<tr>
<td>Control Measure</td>
<td>Problems</td>
<td>Possible Remedies</td>
</tr>
<tr>
<td>-----------------</td>
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</tr>
<tr>
<td>Dewatering Sediment Bag</td>
<td>Sediment laden discharge is escaping around the hose insert.</td>
<td>Cease pumping and insert discharge hose further into bag. Retie bag around the discharge hose to create a tight seal. Periodically check this connection.</td>
</tr>
<tr>
<td></td>
<td>Bag is not dewatering efficiently.</td>
<td>Remove and replace bag and dispose of bag in proper location.</td>
</tr>
<tr>
<td></td>
<td>Discharge from outlet is becoming sediment laden once it discharges on the ground.</td>
<td>Relocate tank to a stabilized area or place polyethylene sheeting to convey discharge to stabilized area.</td>
</tr>
</tbody>
</table>