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SEDIMENT CONTROL

Scope and Discussion

Sediment control is the second component in the site management plan after erosion control. Primary emphasis should be placed on erosion control first which combines runoff control and soil stabilization to minimize soil erosion. Sediment control practices are then integrated into the plan to further reduce the migration of eroded soil both on and off site.

The majority of sediment control practices utilize settling to capture sediment within a storage volume where it can be contained and managed. These practices include sediment basins, sediment traps and dikes, rock dams, water structures, silt fence, turbidity curtains, straw bale dikes, and portable settling tanks. There is also a group of practices that rely on both filtering and settling to capture sediment. These practices include storm drain inlet protection structures, geotextile filter bags, compost tubes, and buffer filter strips. In addition, the use of chemical polymer substances is a process that may, with NYSDEC approval, be used on sites where disturbed clay soils remain in suspension.

It is important that these sediment control practices be designed, constructed and installed in accordance with the criteria contained in these standards. For these practices to effectively remove sediment from turbid water, the volumes, dimensions, and appropriate attributes of these individual practices must be maintained. This includes the calculated relationships of dimensions to respective drainage areas, length to width ratios, and frequency of inspection and maintenance.

Note: Performing activities within or adjacent to wetlands, streams and waterbodies may require permits from the New York State Department of Environmental Conservation (NYSDEC) pursuant to Article 15 (Protection of Waters), Article 24 (Freshwater Wetlands) and Article 25 (Tidal Wetlands) of the Environmental Conservation Law (ECL). Project owners should contact NYSDEC’s Regional Division of Environmental Permits early in the site planning process to discuss the requirements for meeting permit issuance standards. Following the New York State Standards and Specifications for Erosion and Sediment Control may not ensure compliance with the above referenced sections of the ECL.

To assist with the success of these sediment control practices, apply the following concepts for the practice design and location:

1. Keep the clean water clean by diverting runoff from upslope areas away from disturbed areas.
2. Employ natural vegetative buffers or artificial mats to assist in sediment capture in sheet flow areas.
3. Control concentrated flow to minimize additional erosion that could overwhelm a practice.
4. Stabilize all sediment control systems as soon as they are installed so they do not contribute sediment to site runoff.
5. Remove all practices after use and stabilize the regraded areas immediately.

Sediment accumulated in the sediment control practices must be removed when the sediment has filled the designated storage volume for the practice. The material must be disposed of in a manner that stabilizes it on the construction site. These details, as well as the frequency of inspection, sequences of installation and removal, and an inspection checklist shall be included in the Stormwater Pollution Prevention Plan for the site.

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to a sediment basin in liquid, powder, or solid form. Flocculants include polyacrylimide, aluminum sulfate (alum), and polyaluminum chloride.

Polymer flocculation shall only be used for dispersive soil-water mixtures that do not respond to normal settling times when allowed to set in sediment traps and basins, i.e. less than 7 days. Controlled application takes place in a sediment basin or trap with anionic polyelectrolytes in the form of liquid, powder, or solid form, such as polyacrylimide, aluminum sulfate, chitosan lactate, or chitosan acetate. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic...
polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt 2003).

**Chemical treatment shall not be substituted for proper planning, phasing, sequencing, and the design of appropriate erosion and sediment control practices.**

**No polymer application shall take place without written approval from NYSDEC.**

Field tests must be conducted on the proposed site at the design basin locations with the tributary soils to establish polymer dosing rates and verify settling performance.

Treated water discharged from sediment basins with polymer treatment will be tested to determine that any residual polymer meets the standards set by NYSDEC. Polymer flocculation systems require daily inspection.
STANDARD AND SPECIFICATIONS FOR BUFFER FILTER STRIP

Definition & Scope

A temporary/permanent well vegetated grassed area below a disturbed area that can be used to remove sediment from runoff prior to it reaching surface waters or other designated areas of concern, such as parking lots and road pavement.

Condition Where Practice Applies

This practice is effective when the flow is in the form of sheet flow and the vegetative cover is established prior to disturbance. Surface water must be protected from sediment-laden runoff until buffer filter strip vegetation is established, and then the proposed disturbance can be undertaken. This practice is effective when the flow is in the form of sheet flow (maximum of 150 feet).

Design Criteria

1. The vegetation should be a well established perennial grass. Wooded and brushy areas are not acceptable for purposes of sediment removal.

2. The minimum buffer filter strip width for stream protection shall be in accordance with the following table:

<table>
<thead>
<tr>
<th>Land Slope (%)</th>
<th>Minimum Filter Strip Width (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10</td>
<td>50</td>
</tr>
<tr>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>30</td>
<td>85</td>
</tr>
<tr>
<td>40</td>
<td>105</td>
</tr>
<tr>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>60</td>
<td>145</td>
</tr>
<tr>
<td>70</td>
<td>165</td>
</tr>
</tbody>
</table>

3. The minimum buffer filter strip width to protect paved areas during construction is 20 feet.

Maintenance

If at any time the width of the buffer filter strip has been reduced by sediment deposition to half its original width or concentrated flow has developed, suitable additional practices should be installed. The erosion and sediment control plan shall include these details.
Figure 5.1
Buffer Filter Strip
Definition & Scope

A temporary barrier placed at a worksite to prevent water from flooding the work area so that construction can take place without discharging sediment into the water resource.

Condition Where Practice Applies

Temporary coffer dams are used to separate streams, rivers, lakes, and other sources of surface water from adjacent locations where soil disturbances are undertaken to complete construction. These barriers can be constructed of manufactured components such as geotextile/plastic tubes filled with water, portable dams formed by metal framing with a geo-membrane, or conventionally constructed earth and stone dike systems.

Design Criteria

The maximum height for this application is 10 feet. No construction activity shall commence in the area of the cofferdam until it is completed and stabilized.

Water Filled Structures

1. These structures shall be sized and installed according to the manufacturers recommendations.
2. Adequate freeboard must be provided to prevent flotation during high water events and periods of below freezing temperatures.
3. The foundation shall be prepared to provide full bottom contact prior to filling.
4. An interior dewatering system shall be designed within the work area to manage seepage.
5. The ends of the water structures shall be anchored on the stream banks or shorelines at an elevation at least above the top of the structure.

Structural Component Dams

1. These structures shall be sized and installed in accordance with the manufacturers recommendations.
2. The foundation area for the placement of the structural steel framing and the impervious fabric membrane shall be as directed by the manufacturer or by qualified personnel.
3. Dewatering the interior of the coffer dam will be done in a manner that does not disturb the foundation area of the structural frame.
4. A minimum of 2 feet of freeboard shall be provided above the expected high water elevation.

Earthen Coffer Dams

1. The earthen coffer dam shall be constructed of fill material that will preclude the transmission of water through the dam, or contain an impermeable core.
2. The minimum top width shall be 8 feet with 2:1 side slopes, and compacted in 9 inch lifts with a minimum of 4 passes of construction equipment.
3. The outside slope shall be covered with a 1 foot layer of rock riprap over a graded stone bedding or geotextile to prevent erosion of soil material into water. An alternative method is to cover the outside slope with an anchored plastic cover with a minimum thickness of 20 mil.
4. Interior work will be conducted in a manner that will not disturb or undermine the earthen coffer dam or its foundation.

Inspection and Maintenance

1. All cofferdams will be inspected daily to assure proper performance and stability as vibration from construction equipment can cause disturbance of the structures.
2. Particular attention should be given to the foundation support system at perimeter of structural component dams. Any undermined or settled areas shall be restored immediately.
3. Any holes, leaks, or torn areas in the geo-membranes or fabric shall be repaired immediately.

4. Any shifting, movement, or settling of the coffer dam shall be addressed immediately to protect workers in the construction area.

5. Inspect the interior dewatering system and ensure that the system is discharging clean water, or is being pumped to appropriate sediment control facility prior to returning to the water resource.

6. Repair or replace any loss of rock riprap or fill that may occur and assure the top of the coffer dam is level without any low spots due to settling.

7. Upon completion of the construction work, remove all excess material, accumulated sediment and debris from the work area, and remove the cofferdam in accordance with the site stabilization plan.
STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

**Definition & Scope**

A temporary sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

**Condition Where Practice Applies**

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

**Design Criteria**

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12” – 32” except that 8” diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The Maximum Slope Length (in feet) above a compost filter sock shall not exceed the following limits:

<table>
<thead>
<tr>
<th>Dia. (in.)</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>25</th>
<th>33</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>225*</td>
<td>200</td>
<td>100</td>
<td>50</td>
<td>20</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>12</td>
<td>250</td>
<td>225</td>
<td>125</td>
<td>65</td>
<td>50</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>18</td>
<td>275</td>
<td>250</td>
<td>150</td>
<td>70</td>
<td>55</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>24</td>
<td>350</td>
<td>275</td>
<td>200</td>
<td>130</td>
<td>100</td>
<td>60</td>
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<tr>
<td>32</td>
<td>450</td>
<td>325</td>
<td>275</td>
<td>150</td>
<td>120</td>
<td>75</td>
<td>50</td>
</tr>
</tbody>
</table>

* Length in feet

5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note:** All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC’s 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.

6. The compost filter sock fabric material shall meet the
7. Compost filter socks shall be anchored in earth with 2” x 2” wooden stakes driven 12” into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

Table 5.1 - Compost Sock Fabric Minimum Specifications Table

<table>
<thead>
<tr>
<th>Material Type</th>
<th>3 mil HDPE</th>
<th>5 mil HDPE</th>
<th>5 mil HDPE</th>
<th>Multi-Filament Polypropylene (MFPP)</th>
<th>Heavy Duty Multi-Filament Polypropylene (HDMFPP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Characteristics</td>
<td>Photodegradable</td>
<td>Photodegradable</td>
<td>Biodegradable</td>
<td>Photodegradable</td>
<td>Photodegradable</td>
</tr>
<tr>
<td>Sock Diameters</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
</tr>
<tr>
<td></td>
<td>18”</td>
<td>18”</td>
<td>18”</td>
<td>18”</td>
<td>18”</td>
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<tr>
<td></td>
<td>24”</td>
<td>24”</td>
<td>24”</td>
<td>24”</td>
<td>24”</td>
</tr>
<tr>
<td></td>
<td>32”</td>
<td>32”</td>
<td>32”</td>
<td>32”</td>
<td>32”</td>
</tr>
<tr>
<td>Mesh Opening</td>
<td>3/8”</td>
<td>3/8”</td>
<td>3/8”</td>
<td>3/8”</td>
<td>1/8”</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>26 psi</td>
<td>26 psi</td>
<td>44 psi</td>
<td>202 psi</td>
<td></td>
</tr>
<tr>
<td>Ultraviolet Stability % Original Strength (ASTM G-155)</td>
<td>23% at 1000 hr.</td>
<td>23% at 1000 hr.</td>
<td>100% at 1000 hr.</td>
<td>100% at 1000 hr.</td>
<td></td>
</tr>
<tr>
<td>Minimum Functional Longevity</td>
<td>6 months</td>
<td>9 months</td>
<td>6 months</td>
<td>1 year</td>
<td>2 years</td>
</tr>
</tbody>
</table>

Table 5.2 - Compost Standards Table

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic matter content</td>
<td>25% - 100% (dry weight)</td>
</tr>
<tr>
<td>Organic portion</td>
<td>Fibrous and elongated</td>
</tr>
<tr>
<td>pH</td>
<td>6.0 – 8.0</td>
</tr>
<tr>
<td>Moisture content</td>
<td>30% - 60%</td>
</tr>
<tr>
<td>Particle size</td>
<td>100% passing a 1” screen and 10 - 50% passing a 3/8” screen</td>
</tr>
<tr>
<td>Soluble salt concentration</td>
<td>5.0 dS/m (mmhos/cm) maximum</td>
</tr>
</tbody>
</table>
**Figure 5.2**
Compost Filter Sock

![Compost Filter Sock Diagram](image-url)
**STANDARD AND SPECIFICATIONS FOR DEWATERING DEVICE**

**Definition & Scope**

An appurtenance to a sediment trapping structure such as a basin or trap that allows sediment laden water to pond allowing sediment to settle out while removing relatively clean water to a suitable, stable outlet.

**Condition Where Practice Applies**

Dewatering devices are appropriate where the discharge from a trap or basin will be by gravity flow through a riser and pipe outlet system. The skimmer dewatering device is the preferred option. A fixed pipe dewatering device, configured as a perforated vertical riser surrounded by filter fabric and stone material is an alternate option for small structures.

**Design Criteria**

**Skimmer Device**

1. Skimmers must be designed so as to float just beneath the water surface to remove the least sediment laden water effectively.

2. Skimmer shall be constructed with a 4 foot long flexible pipe elbow to allow for vertical movement of the skimmer for its designated range of operation.

3. The designer will provide a table that shows all required dimensions for the skimmer. An example of this table is shown in Figure 5.4 on page 5.12. See design example in Appendix B.

4. The skimmer will be provided with vertical travel guides and a resting stone pad set at the appropriate design elevation.

5. The orifice plate will be at the “T” intersection of the perforated skimmer section with the non-perforated extension arm.

**Riser-Pipe Device**

1. The riser-pipe device is constructed as a fixed rigid structure with a larger diameter pipe as the vertical riser connected to a smaller diameter horizontal pipe barrel.

2. The joint of these two conduits will be anchored by means of a concrete block or welded steel plate to prevent flotation.

3. The riser will be perforated above the bottom of the dewatering zone elevation and wrapped with a geotextile filter fabric to filter out sediment.

4. The filter fabric shall be covered with stone graded as NYSdot #1, #2, or a blend of both, to protect the fabric from deterioration.

5. An orifice plate shall be placed in the riser at the bottom of the dewatering zone elevation to control the dewatering rate.

**Dewatering Drawdown**

As a minimum, sediment traps and basins should have their temporary storage dewatered over a 48 hour period to maximize sediment retention. If the soils disturbed within the drainage area will have 60% - 80% fines the settling time should be increased to 4 days. Soils containing greater than 80% fines will need longer settling times but in no case longer than 7 days to maintain the hydraulic performance of the basin for recurring runoff events.

1. Skimmer orifices may be sized by using the design chart shown in Figure 5.3 on page 5.11.

2. Riser-pipe orifice sizes may be approximated by the following formula:

   \[ A_0 = \frac{A_s \times 2h^{0.5}}{T \times C_d \times 20,428} \]

   Where:
   
   \( A_0 \) = Areas of the dewatering orifice (ft\(^2\))
   
   \( A_s \) = Surface area of the basin/trap (ft\(^2\))
   
   \( h \) = head of water above the orifice (ft)
   
   \( C_d \) = 0.6 (contraction coefficient of an orifice)
   
   \( T \) = Detention time needed to dewater basin (48 hours minimum)
Therefore, the minimum $A_o$ formula for 48 hrs. reduces to:

$$A_o = \frac{Q \times 2h^{0.5}}{588,326}$$

**Material Specifications**

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non-perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

**Maintenance**

1. Dewatering devices shall be inspected weekly and after each runoff event.

2. Filter fabric or media will be replaced as needed.

3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

![Figure 5.3 - Skimmer Orifice Design Chart](image)

* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

**Notes:**

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3” to 5” head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube $\leq 2\ 1/2$“ diameter, use a 2” head. For a 3” diameter tube, use a 2.5” head; 4” tube, use 3.3” head, 5” tube use 4” head, and 6” diameter tube use 5” head.

2. Find the vertical line representing the basin’s dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.
Figure 5.4
Skimmer Dewatering Device

<table>
<thead>
<tr>
<th>Basin No.</th>
<th>Water Surface Elevation (ft.)</th>
<th>Arm Length* (ft.)</th>
<th>Arm Dia. (in.)</th>
<th>Orifice Size** (in.)</th>
<th>Top of Landing Device Elevation (ft.)</th>
<th>Flexible Hose Length (in.)</th>
<th>Flexible Hose Attachment Elevation (ft.)</th>
</tr>
</thead>
</table>

* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)

** Must be equal to or less than arm diameter
**Skimmer Construction Notes**

1. Pipe flotation section shall be solvent welded to ensure an airtight assembly. The contractor is required to conduct a test to check for leaks prior to installation.

2. Skimmer section shall have 12 rows of 1/2” diameter holes, 1 1/4” on center. If additional filtration is necessary, the filtering media shall consist of a Type GD-II geotextile fabric wrapped around the perforated portion of the skimmer and attached with plastic snap ties, bands, etc.

3. Flexible pipe shall be inserted into solid pipe and fastened with 2 #8 wood screws.

4. At a minimum, the structure shall be inspected after each rain and repairs made as needed. If vandalism is a problem, more frequent inspection may be necessary.

5. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

6. The structure shall only be removed when the contributing drainage area has been properly stabilized.

**Materials**

(Note: materials for a 4” diameter arm assembly)

1. Solid Pipe - 4” Schedule 40 PVC
2. Perforated Pipe - 4” Schedule 40 PVC
3. 90º Tee (1 each) - 4” Schedule 40 PVC
4. 90º Elbow (4 each) - 4” Schedule 40 PVC
5. Cap (2 each) - 4” Schedule 40 PVC, solid
6. Flexible pipe - 4” Corrugated Plastic Tubing (non-perforated)
Figure 5.5
Riser Pipe Dewatering Device

(Optional Sediment Basin Dewatering Device - I with 6" Min. Perforated Riser)

Cap end unless equal to or greater than elev. of primary riser crest

Base plate (1/4") size: D+24

Base plate (1/4") size: D+24

Perforations - 6" Spacing Horizontal & Vertical located in concave.

(Optional Sediment Basin Dewatering Device - II)

Pond Embankment

Riser pipe dewatering devices

Adapted from details provided by: USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee.
**Riser Pipe Construction Notes**

1. Standpipe and connector pipe shall be a minimum of 6 inches diameter.

2. Metal pipe may be galvanized steel or aluminum; plastic pipe may be Schedule 40 PVC or HDPP.

3. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

4. The structure shall only be removed when the contributing drainage area has been properly stabilized.

5. All pipe connections shall be watertight. The lower portion of the standpipe, at a point above the barrel connection, shall be fitted with an internal orifice plate sized to release the volume of the basin no sooner than 48 hours.

6. The top 2/3 of the standpipe shall be perforated with 1 inch diameter hole or slit spaced 6 inches vertically and horizontally and placed in the concave portion of the pipe. No holes will be allowed within 6 inches of the horizontal connector pipe.

7. The riser shall be wrapped with a Type GD-II geotextile fabric. The fabric shall extend 6 inches above the highest hole and 6” below the lowest hole. Where ends of fabric come together, they shall be overlapped, folded and stapled to prevent bypass.

8. Straps or connecting bands shall be used to hold the fabric and wire mesh (as needed) in place. They shall be placed at the top and bottom of the cloth.

9. The standpipe shall be anchored with either concrete base or steel plate base to prevent flotation. Concrete bases shall be 12 inches thick with the standpipe embedded nine inches. Steel plate bases will be 1/4 inch minimum thickness attached to the standpipe by a continuous weld around the bottom to form a watertight connection. The plate shall have 2.5 feet of stone, gravel or tampered earth placed on it.

10. The perforated standpipe shall be surrounded by NYSDOT #1 or #2 stone or a blend of both to protect the filter fabric.
STANDARD AND SPECIFICATIONS FOR GEOTEXTILE FILTER BAG

Definition & Scope

A temporary portable device through which sediment laden water is pumped to trap and retain sediment prior to its discharge to drainageways or off-site.

Condition Where Practice Applies

On sites where space is limited such as urban construction or linear projects (e.g. roads and utility work) where rights-of-way are limited and larger de-silting practices are impractical.

Design Criteria

1. Location - The portable filter bag should be located to minimize interference with construction activities and pedestrian traffic. It should also be placed in a location that is vegetated, relatively level, and provides for ease of access by heavy equipment, cleanout, disposal of trapped sediment, and proper release of filtered water.

   The filter bag shall also be placed at least 50 feet from all wetlands, streams or other surface waters.

2. Size - Geotextile filter bag shall be sized in accordance with the manufacturers recommendations based on the pump discharge rate.

Materials and Installation

1. The geotextile material will have the following attributes:

<table>
<thead>
<tr>
<th>Material Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Grab Tensile Strength</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>Minimum Grab Tensile Elongation</td>
<td>50 %</td>
</tr>
<tr>
<td>Minimum Trapezoid Tear Strength</td>
<td>80 lbs.</td>
</tr>
<tr>
<td>Mullen Burst Strength</td>
<td>380 psi</td>
</tr>
<tr>
<td>Minimum Puncture Strength</td>
<td>130 lbs</td>
</tr>
<tr>
<td>Apparent Opening Size</td>
<td>40 - 80 US sieve</td>
</tr>
<tr>
<td>Minimum UV Resistance</td>
<td>70%</td>
</tr>
<tr>
<td>Minimum Flow Thru Rate</td>
<td>70 gpm/sq ft</td>
</tr>
</tbody>
</table>

2. The bag shall be sewn with a double needle machine using high strength thread, double stitched “Joe” type capable of minimum roll strength of 100 lbs/inch (ASTM D4884).

3. The geotextile filter bag shall have an opening large enough to accommodate a 4 inch diameter discharge hose with an attached strap to tie off the bag to the hose to prevent back flow.

4. The geotextile shall be placed on a gravel bed 2 inches thick, a straw mat 4 inches thick, or a vegetated filter strip to allow water to flow out of the bag in all directions.

Maintenance

1. The geotextile filter bag is considered full when remaining bag flow area has been reduced by 75%. At this point, it should be replaced with a new bag.

2. Disposal may be accomplished by removing the bag to an appropriate designated upland area, cut open, remove the geotextile for disposal, and spread sediment contents and seeded and mulched according to the vegetative plan.
STANDARD AND SPECIFICATIONS FOR ROCK DAM

Definition & Scope

A rock embankment located to capture and retain sediment on the construction site and prevent sedimentation in offsite water bodies.

Conditions Where Practice Applies

The rock dam may be used instead of the standard sediment basin with barrel and riser. The rock dam is preferred when it is difficult to construct a stable, earthen embankment and rock materials are readily available. The site should be accessible for periodic sediment removal. This rock dam shall not be located in a perennial stream. The top of the dam will serve as the overflow outlet. The inside of the dam will be faced with smaller stone to reduce the rate of seepage so a sediment pool forms during runoff events.

Design Criteria

Drainage Area: The drainage area for this off stream structure is limited to 50 acres.

Location: The location of the dam should:

- provide a large area to trap sediment
- intercept runoff from disturbed areas
- be accessible to remove sediment
- not interfere with construction activities

Storage Volume: The storage volume behind the dam shall be at least 3,600 cubic feet per acre of drainage area to the dam. This volume is measured one foot below the crest of the dam.

<table>
<thead>
<tr>
<th>Dam Section:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Width</td>
</tr>
</tbody>
</table>
| Side Slopes | 2:1 upstream slope  
|            | 3:1 downstream slope                 |
| Height     | 6’ max to spillway crest             |

Length of Crest: The crest length should be designed to carry the 10 yr. peak runoff with a maximum flow depth of 1 foot and 1 foot of freeboard.

Rock at the abutments should extend at least 2 feet above the spillway and be at least 2 feet thick. These rock abutments should extend at least one foot above the downstream slope to prevent abutment scour. A rock apron at least 1.5 feet thick should extend downstream from the toe of the dam a distance equal to the height of the dam to protect the outlet area from scour.

Rock Fill: The rock fill should be well graded, hard, erosion resistant stone with a minimum d50 size of 9 inches. A “key trench” lined with geotextile filter fabric should be installed in the soil foundation under the rock fill. The filter fabric must extend from the key trench to the downstream edge of the apron and abutments to prevent soil movement and piping under the dam.

The upstream face of the dam should be covered with a fine washed gravel (NYS-DOT #1 or #1A gravel, crushed stone or equal) a minimum 3 feet thick to reduce the drainage rate.

Trapping Efficiency: To obtain maximum trapping efficiency, design for a long detention period. Usually a minimum of eight (8) hours before the basin is completely drained. Maximize the length of travel of sediment laden water from the inlet to the drain for a minimum length to width ratio of 2 to 1 or greater. Achieve a surface area equal to 0.01 acres per cfs (inflow) based on the 10-year storm. See Figure 5.7 on page 5.18 for details.

Maintenance

Check the basin area after each rainfall event. Remove sediment and restore original volume when sediment accumulates to one-half the design volume. Check the structure for erosion, piping, and rock displacement after each significant event and replace immediately.

Remove the structure and any sediment immediately after the construction area has been permanently stabilized. All water should be removed from the basin prior to the removal of the rock dam. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.
Figure 5.7
Rock Dam

CONSTRUCTION SPECIFICATIONS

1. The area under the rock dam shall be cleared and stripped of roots and other objectionable material. The reservoir shall be cleared as needed to facilitate sediment removal.

2. Dimensions shown are minimum. Trench shall be excavated from abutment to abutment on the dam centerline. Filter fabric shall be placed from upstream edge of keytrench to downstream edge of apron. Joints will lap a minimum of 1 ft. with upstream strip on top.

3. Construct the rock embankment to the dimensions shown on the drawing. Rock abutments shall be maintained 2 ft. above the crest.

4. The rock dam shall be constructed prior to clearing the basin area. Stabilize all disturbed areas, except the basin area, with temporary seeding.

5. Fences and warning signs should be placed as appropriate.

Maximum drainage area: 50 acres

Adapted from details provided by: USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee
**Definition & Scope**

A temporary basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

**Conditions Where Practice Applies**

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

**Permanent** (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as permanent structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

**Design Criteria**

**Compliance with Laws and Regulations**

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

**Location - Maximum Drainage Area = 50 acres**

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

**Size and Shape of the Basin**

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

**Surface Area**

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

\[
A = 0.01 \cdot Q_p \quad \text{or} \quad A = 0.015 \times D.A. \quad (\text{whichever is greater})
\]

where,
A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure. The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

C. Dewatering the basin:

1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

2) Alternative Method- A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - http://www.dec.ny.gov/chemical/36730.html, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

D. Anti-vortex device and trash rack:

An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

E. Base:

The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼” minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

For risers greater than ten feet high, computations
shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

\[ 2(N)(P) = 1.15(L_s) \quad N = \frac{0.075(L_s)}{P} \]

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: \( L_s \) = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

\( N \) = number of anti-seep collars.

\( P \) = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.
3. Side slopes shall be 2.5 to 1 or flatter.

**Entrance of Runoff into Basin**

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

**Disposal**

The sediment basin plans shall indicate the method(s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

**Chemical Treatment**

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

**Safety**

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

**Construction Specifications**

**Site Preparation**

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

**Cutoff-Trench**

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be de-watered during the back-filling/compaction operations.

**Embankment**

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one
wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations
   A. Zones total required
   B. Zones total Available
   C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser
TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by __________________________ Date _____________ Checked by ________________ Date _________

Project__________________________________________Basin #__________________________
Location __________________________    Total Area draining to basin (≤50 Ac.) ________________ Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _______ cu. ft., Top of Zone Elev. _______
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _______ cu. ft., Top of Zone Elev. _______
3. Length to width ratio = ______________
4. A. Cleanout at 50% of sediment storage zone volume, Elev. ______________
   B. Distance below top of riser ___________ feet
5. Minimum surface area is larger of  0.01 Q(10) _________or, 0.015 DA = ___________ use ___________ acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff
6. $Q_{p(10)} =$ ____________________________ cfs (Attach runoff computation sheets)

Pipe Spillway ($Q_{ps}$)
7. Min. pipe spillway cap., $Q_{ps} = 0.2 x$ _______ Drainage Area, acres = _______ cfs
   Note: If there is no emergency spillway, then required $Q_{ps} = Q_{p(10)} = _______ cfs.
8. $H$, head = _______ ft. Barrel length = _______ ft
9. Barrel: Diam. _______ inches; $Q_{ps} = (Q) _______ x (cor.fac.) _______ = _______ cfs.
10. Riser: Diam. _______ inches; Length _______ ft.; $h = _______ ft.$ Crest Elev. _____________
11. Trash Rack: Diameter = _______ inches; $H$, height = _______ inches

Emergency Spillway Design
12. Emergency Spillway Flow, $Q_{es} = Q_{p} - Q_{ps} = _______ - _______ = _______ cfs.
13. Width _______ ft.; $H_{p}$ _______ ft. Crest elevation _______ ; Design High Water Elev. _______ 
    Entrance channel slope _____________ % ; Top of Dam Elev. _______ 
    Exit channel slope _____________ %

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:
14. $y =$ _______ ft.; $z =$ _______ :1; pipe slope = _______ %, $L_s =$ _______ ft.
   Use _____ collars, ____ - ____ inches square; projection = _______ ft.

Diaphragms:
# _______ width _______ ft. height _______ ft.

DEWATERING ORIFICE SIZING
(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = _______ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time _______ days (Min. 2 days required)
1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula \( V = (0.4)(A)(d) \), where \( V \) is in cubic feet, \( A \) is the surface area of the basin, in square feet, and \( d \) is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry \( Q_p \) if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of “\( H \)” from field conditions; “\( H \)” is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute \( Q_{es} \) by subtracting actual flow carried by the pipe spillway from the total inflow, \( Q_p \).

13. Use appropriate tables to obtain values of \( H_p \), bottom width, and actual \( Q_{es} \). If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of \( h \), which causes pipe spillway to carry the minimum, required \( Q \). Therefore, the elevation difference between spillways shall be equal to the value of \( h \), or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of \( H_p \). or if there is no emergency spillway, it is the elevation of the riser crest plus \( h \) required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

**To use charts for pipe spillway design:**

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with \( H \) and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge.

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding \( h \) required. This \( h \) must be 1 foot or less.
Figure 5.8
Pipe Spillway Design

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PIPE SPILLWAY DESIGN
Figure 5.9
Sediment Basin
Figure 5.10
Riser Inflow Chart (USDA - NRCS)
Figure 5.11
Pipe Flow Chart; “n” = 0.025 (USDA - NRCS)
Figure 5.12
Pipe Flow Chart; “n” = 0.013 (USDA - NRCS)
Figure 5.13
Concentric Trash Rack and Anti-Vortex Device (USDA - NRCS)
**Figure 5.14**  
Concentric Trash Rack and Anti-Vortex Device Design Table  
(USDA - NRCS)

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Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.
**CONSTRUCTION SPECIFICATIONS**

1. The concrete base shall be poured in such a manner to insure that the concrete fills the bottom of the riser to the invert of the outlet pipe to prevent the riser from breaking away from the base.

2. With aluminum or aluminized pipe, the embedded section must be painted with chromate or equivalent.

3. Riser base may be sized as computed using flotation with a factor of safety of 1.2.

--

Adapted From Details Provided By: USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee.
This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below):

\[ L_S = y (z + 4) \left[ 1 + \frac{\text{pipe slope}}{0.25 \cdot \text{pipe slope}} \right] \]

Where:
- \( L_S \) = length of pipe in the saturated zone (ft.)
- \( y \) = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.
- \( z \) = slope of upstream embankment as a ratio of \( z \) ft. horizontal to one ft. vertical.
- pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:

---

**Figure 5.16**

Anti-Seep Collar Design
Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)
Figure 5.18
Anti-Seep Collar

TYPICAL ANTI SEEP COLLARS
NOT TO SCALE

AT LEAST THE LAST TWO
CORRUPTIONS ON EACH END
MUST BE ANGULAR OR FLANGE.

INSTALL WITH
CORRUPTIONS
VERTICAL

2' MIN.

CONTINUOUS WELD
(FULL CIRCUMFERENCE
BOTH SIDES)

COLLAR WELDED IN PLACE ON
BARREL SECTION

1. PLATES TO BE PRE-CUT
CLAMPED TOGETHER &
PRE-DRILLED & LABELED
TO FACILITATE WATER
TIGHT FIELD ASSEMBLY.

CONTINUOUS WELD (FULL
CIRCUMFERENCE BOTH SIDES)

WELDED FLANGE

STAINLESS STEEL NUT &
BOLT CONNECTION WITH
MASTIK BETWEEN PLATES.

MULTI-PIECE COLLAR FOR
LARGE PIPES

USE MASTIK OR EQUIV.
BETWEEN PLATE & FLANGE

COLLAR FOR FLANGE JOINT PIPE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

ANTI SEEP COLLAR
Figure 5.19
Design Data for Earth Spillways

LEGEND

- $n$ = MANNING’S COEFFICIENT OF ROUGHNESS.
- $H_p$ = DIFFERENCE IN ELEVATION BETWEEN CREST OF EARTH SPILLWAY AT THE CONTROL SECTION AND WATER SURFACE IN RESERVOIR, IN FEET.
- $b$ = BOTTOM WIDTH OF EARTH SPILLWAY AT THE CONTROL SECTION, IN FEET.
- $Q$ = TOTAL DISCHARGE, IN cfs.
- $V$ = VELOCITY, IN FEET PER SECOND, THAT WILL EXIST IN CHANNEL BELOW CONTROL SECTION, AT DESIGN Q, IF CONSTRUCTED TO SLOPE ($S$) THAT IS SHOWN.
- $S$ = FLATTEST SLOPE ($S_e$), IN %, ALLOWABLE FOR CHANNEL BELOW CONTROL SECTION.
- $X$ = MINIMUM SLOPE OF CHANNEL BELOW CONTROL SECTION, IN FEET.
- $Z$ = SIDE SLOPE RATIO.

NOTES:

1) FOR A GIVEN $H_p$, A DECREASE IN THE EXIT SLOPE FROM $S$ AS GIVEN IN THE TABLE DECREASES SPILLWAY DISCHARGE BUT INCREASING THE EXIT SLOPE FROM $S$ DOES NOT INCREASE DISCHARGE. IF AN EXIT SLOPE ($S_e$) STEEPER THAN $S$ IS USED, THEN VELOCITY ($V_e$) IN THE EXIT CHANNEL WILL INCREASE ACCORDING TO THE FOLLOWING RELATIONSHIP:

$$V_e = V(\frac{S}{S_e})^{0.3}$$

2) DATA TO RIGHT OF HEAVY VERTICAL LINES ON DRAWINGS SHOULD BE USED WITH CAUTION, AS THE RESULTING SECTIONS WILL BE EITHER POORLY PROPORTIONED OR HAVE VELOCITIES IN EXCESS OF 6 FT/SEC.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

DESIGN DATA FOR EARTH SPILLWAYS
### Figure 5.20
Design Table for Vegetated Earth Spillways in Erosion Resistant Soils, K=0.1 - 0.35, Side Slopes = 3:1

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Figure 5.21
Design Table for Vegetated Earth Spillways in
Very Erodible Soils, $K = 0.36 - 0.80$, Side Slopes = 3:1
(USDA - NRCS)

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Procedure for Determining or Altering Sediment Basin Shape

As specified in the Standard and Specification, the pool area at the elevation of the crest of the principal spillway shall have a length to width ratio of at least 2.0 to 1. The purpose of this requirement is to minimize the “short circuiting” effect of the sediment laden inflow to the riser and thereby increase the effectiveness of the sediment basin. The purpose of this procedure is to prescribe the parameters, procedures, and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (pool level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width (We) is found by the equation:

\[ We = \frac{A}{L} \]
\[ L:W \text{ ratio} = \frac{L}{We} \]

In the event there is more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate shall meet the length to width ratio criteria.

Three examples are shown on the following page. Note that for the special case in example C the water is allowed to go around both ends of the baffle and the effective length, Le = L1 + L2. Otherwise, the length to width ratio computations are the same as shown above. This special case procedure for computing Le is allowable only when the two flow paths are equal, i.e., when L1 = L2. A baffle detail is also shown in Figure 5.22 on page 5.41.

The required basin shape may be obtained by proper site selection, by excavation, or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles (see Figure 5.22 on following page) shall be placed midway between the inflow point around the end of the baffle to the outflow point. Then:

\[ We = \frac{A}{Le} \]
\[ L:W \text{ ratio} = \frac{Le}{We} \]
Figure 5.22
Sediment Basin Baffle Details (USDA - NRCS)

Examples: Plan Views - not to scale

A.

B.

C.

Baffle Detail

Sheets of 4' x 8' x 1/2" exterior plywood or equivalent.

6''

4''

Riser crest elev.

Posts-min. size 4" square or 5" round. Set at least 3' into the ground.
STANDARD AND SPECIFICATIONS FOR
SEDIMENT DIKE

Definition & Scope

A temporary earth dike with an excavated trench on the upslope toe placed across a slope to capture sediment laden flow from small disturbed drainage areas and allowing sediment to settle out by ponding.

Condition Where Practice Applies

This practice can be used on slopes and in areas where it is difficult to place and maintain silt fence. This practice acts as a smaller sediment trap for linear type applications. This practice will handle sheet and rill erosion for small tributary areas.

Design Criteria

1. The earth dike will be a maximum of 2 feet high with a 2 foot top width and 2:1 side slopes.

2. All earth fill will be placed on a stripped foundation, contain no stumps or woody material, and be compacted with the weight of the excavator bucket.

3. The interior capture trench will be a minimum 1.5 feet deep, 2 feet wide, with 1:1 side slopes and with a near level bottom. In areas where linear slopes exceed 4% the sediment dike system shall be segmented to maintain capture volume and ponding.

4. The system shall be used with a minimum 5 foot vegetated buffer on the down slope toe of the dike or an artificial buffer of erosion control matting.

5. The maximum ponding depth behind the dike shall be 1/2 the height of the constructed dike at its lowest elevation.

6. The ends of the dike system shall terminate with a 90° return of NYS DOT #1A crushed stone to filter any excess flow.

7. The maximum drainage area tributary to this practice shall not exceed 0.5 acres per 100 feet of dike, for slopes less than 10%. For slopes greater than 10%, the drainage area shall be 0.25 acres per 100 feet of dike.

8. The earthen dike shall be seeded and mulched to prevent erosion using an annual rye grass mixture at a rate of 1 lb. per 1,000 square feet.

Maintenance

1. No traffic will be allowed on the dike.

2. Dike system will be inspected weekly and after each runoff event.

3. Sediment in the system will be removed when the interior trench has filled to 75% capacity.

4. Sediment will be disposed of on-site as specified in the Erosion and Sediment Control Plan.

5. Upon stabilization of the tributary drainage area, the trench will be filled, excess dike fill removed, and the area graded and stabilized in accordance with the Erosion and Sediment Control Plan.
CONSTRUCTION NOTES:
1. ALL EARTH FILL WILL BE PLACED ON A STRIPPED FOUNDATION, CONTAIN NO STUMPS OR WOODY MATERIAL, AND BE COMPACTED WITH THE WEIGHT OF THE EXCAVATOR BUCKET.
2. THE SYSTEM SHALL BE USED WITH A MINIMUM 5 FOOT VEGETATED BUFFER ON THE DOWN SLOPE TOE OF THE DIKE OR AN ARTIFICIAL BUFFER OF EROSION CONTROL MATTING.
3. THE ENDS OF THE DIKE SYSTEM SHALL TERMINATE WITH A 90 DEGREE RETURN OF NYS DOT #1A CRUSHED STONE TO FILTER ANY EXCESS FLOW.
4. THE EARTHY DIKE SHALL BE SEED AND MULCHED TO PREVENT EROSION USING AN ANNUAL RYE GRASS MIXTURE AT A RATE OF 1 L.B. PER 1,000 SQUARE FEET.

ADAPTED FROM DETAILS PROVIDED BY: KEN BARBER, BARBER ENGINEERING

SEDIMENT DIKE
Definition & Scope

A sediment tank is a compartmented tank or vessel container to which sediment laden water is pumped to trap and retain the sediment prior to releasing the water to drainage ways, and rights-of-way below the sediment tank site.

Conditions Where Practice Applies

A sediment tank is to be used on sites where excavations are deep, and space is limited, such as urban construction, where direct discharge of sediment laden water to stream and storm drainage systems is to be avoided.

Design Criteria

Location

The sediment tank shall be located for ease of clean-out and disposal of the trapped sediment, and to minimize the interference with construction activities and pedestrian traffic.

Tank Size

The following formula should be used in determining the storage volume of the sediment tank; pump discharge (G.P.M.) x 16 = Cubic Foot Storage.

An example of a typical sediment tank is shown on Figure 5.24 on page 5.45. Other container designs can be used if the storage volume is adequate and approval is obtained from the local approving agency. Commercially manufactured tanks are also available.
Figure 5.24
Portable Sediment Tank

CONSTRUCTION SPECIFICATIONS

1. CLEAN OUT THE SEDIMENT TANK WHEN ONE THIRD (1/3) FILLED WITH SILT.
2. STEEL DRUMS ARE USED AS AN EXAMPLE DUE TO THEIR READY AVAILABILITY. ANY TANKS MAY BE USED, PROVIDING THAT THE VOLUME REQUIREMENTS ARE MET.
3. ALL SEDIMENT COLLECTED IN THE TANK SHALL BE DISPOSED OF IN A SEDIMENT TRAPPING DEVICE OR AS APPROVED BY THE INSPECTOR.
STANDARD AND SPECIFICATIONS FOR
SEDIMENT TRAP

Definition & Scope

A temporary sediment control device formed by excavation and/or embankment to intercept sediment-laden runoff and trap the sediment in order to protect drainageways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainageway, at a storm drain inlet, or other points of collection from a disturbed area for one construction season.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If the drainage area to the proposed trap location exceeds 5 acres, or the trap is in place beyond one construction season, or any of the additional design criteria presented here cannot be met, a full Sediment Basin must be used. See Standard and Specification for Sediment Basin on page 5.19.

Drainage Area

The maximum drainage area for all sediment traps shall be 5 acres.

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. A minimum length to width ratio of 2:1 should be provided. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of traps I-II, and 1/3 the depth for trap III. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All earth embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed.

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.
All traps must be seeded and mulched immediately after construction.

**Trap Details Needed on Erosion and Sediment Control Plans**

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

**Type of Sediment Traps**

There are three (3) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Stone Outlet Sediment Trap
III. Compost Filter Sock Sediment Trap

**I. Pipe Outlet Sediment Trap**

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The preferred method of dewatering the sediment trap is by surface skimmer. See Dewatering Device Standard, page 5.10. If the riser alone is used for dewatering, the top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or
2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment trap is interchangeable in the field with stone outlet provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:
See details for Pipe Outlet Sediment Trap ST-1 in Figure 5.25 and 5.26 on pages 5.49 and 5.50.

Optional sediment trap dewatering devices are shown on Figure 5.29 on Page 5.53.

**Minimum Sizes**

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<th>Barrel Diameter¹ (in.)</th>
<th>Riser Diameter¹ (in.)</th>
<th>Maximum Drainage Area (ac.)</th>
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<td>21</td>
<td>27</td>
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</table>

¹ Barrel diameter may be same size as riser diameter
II. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-II in Figure 5.27 on page 5.51

III. Compost Sock Sediment Trap

A compost sock sediment trap consists of a trap formed by creating an enclosure of geotextile mesh tubes filled with a compost filter media. These traps are used in locations where there is no opportunity to direct runoff into larger traps or well vegetated areas. This could occur at site entrances and access points or in tight areas due to construction boundary limits.

Surface runoff can be directed to the trap with standard conveyance practices. Groundwater or surface ponding in low areas can be pumped into the compost sock sediment trap with appropriate energy dissipation at the pump outlet to prevent scour.

Design criteria for Compost Sock Sediment Trap

1. The maximum drainage area tributary to the trap shall be 5 acres.
2. The minimum settled height above ground shall be 2.0 feet formed by staking 3 compost filter socks in a pyramid as shown in Figure 5.28 on page 5.52.
3. The storage volume provided in the compost sock sediment trap shall be 3,600 cubic feet per tributary drainage acre.
4. If necessary, additional storage area can be created by excavating a sump 1 foot deep beginning at least 5 feet away from the inside sock.
5. All compost filter sock materials, mesh, and compost, will meet the material specifications listed in the Compost Filter Sock standard. No spillway is required.
6. Compost filter sock sediment traps shall be inspected weekly and after every rainfall event. Sediment shall be removed when it reaches one third, 1/3, the height of the trap.
7. The maximum limit of use for a compost sock sediment trap is one (1) year. The existing trap shall be replaced if there is a need for a trap beyond that time limit.
8. Upon completion of the work, the compost sock sediment trap shall be removed. The compost within the socks may be used during cleanup as a vegetative growth medium in accordance with the site stabilization plan.
Figure 5.25
Pipe Outlet Sediment Trap: ST-I

EARTH EMBANKMENT

OUTLET PROTECTION

EXCAVATE IF NECESSARY
FOR STORAGE

■ RISER EMBEDDED 9'' INTO
CONCRETE
OR
1/4'' METAL PLATE WELDED
ALL AROUND.

DESIGN VOLUME IS
________ CUBIC YDS.

ALL SLOPES 2:1
OR FLATTER

4.0'' MIN.

PERFORATED RISER

1/4'' TO 1/2'' HARDWARE
CLOTH WITH FILTER
FABRIC SECURELY
FASTENED.

12''

= DIAMETER
OF RISER = 24''

RIPRAPP
PROTECTION

1.0''

ACCEPTABLE WATER
TIGHT JOINTS

W = RISER

10.0''

WALL ALL
AROUND

EMBANKMENT SECTION THRU RISER

SIZES OF PIPE NEEDED:

BARREL DIAMETER

RISER DIAMETER:

NOTE:
CONSTRUCTION SPECIFICATION SHOULD BE ATTACHED TO
THIS DETAIL TO COMPLETE DESIGN.

MAXIMUM DRAINAGE AREA: 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE OUTLET
SEDIMENT
TRAP ST-I
Figure 5.26
Pipe Outlet Sediment Trap: ST-I - Construction Specifications

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.

2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.

3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.

4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.

5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.

6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.

7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.

9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.

10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.

11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.

12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.

13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLotation. FOR CONCRETE BASE THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR Tamped EARTH ON THE PLATE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE
Figure 5.27
Stone Outlet Sediment Trap: ST-II

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.

2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.

3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.

4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4”-8” ALONG WITH A 1” THICKNESS OF 2” AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.

5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.

6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.

7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.

8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STONE OUTLET SEDIMENT TRAP ST-II
Figure 5.28
Compost Filter Sock Sediment Trap: ST-III

Plan View

Specifications:

1. Compost Sock Sediment Trap shall be sized to provide 3,600 cubic feet of storage capacity for acre tributary to the trap.
2. Minimum base width is equivalent to the height.
3. Sediment accumulation shall not exceed 1/3 the total height of the trap.
4. Socks shall be of larger diameter at the base of the trap and decrease in diameter for successive layers as indicated to the left.
5. Ends of the trap shall be a minimum of 1 foot higher in elevation that the mid-section, which shall be located at the point of discharge.

Staking Detail

* Figures adapted from Filtrexx

Specifications:

1. Sock infill and filter media material shall meet the standards of Table 5.1 on page 5.8. Compost shall meet the compost filter sock standard of Table 5.2 on page 5.8.

2. Compost sock sediment traps shall not exceed three socks in height and shall be stacked in pyramidal form as shown above. Minimum trap height is one 24 inch diameter sock. Additional storage may be provided by means of an excavated sump 12 inches deep extending 1 to 3 feet upslope of the socks along the lower side of the trap.

3. Compost sock sediment traps shall provide 3,600 cubic feet storage capacity with 12 inches of freeboard for each tributary drainage acreage. (See manufacturer for anticipated settlement.)

4. The maximum tributary drainage area is 5.0 acres. Since compost socks are “flow-through,” no spillway is required.

5. Compost sock sediment traps shall be inspected weekly and after each runoff event. Sediment shall be removed when it reaches 1/3 the height of the socks.

6. Photodegradable and biodegradable socks shall not be used for more than 1 year.
Figure 5.29
Optional Sediment Trap Dewatering Devices
for Traps with <5 Acres Drainage Area

Adapted from details provided by: USDA - NRCS,
New York State Department of Transportation,
New York State Department of Environmental Conservation,
New York State Soil & Water Conservation Committee
STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undis- turbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

<table>
<thead>
<tr>
<th>Slope</th>
<th>Steepness</th>
<th>Standard</th>
<th>Reinforced</th>
<th>Super</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2%</td>
<td>&lt; 50:1</td>
<td>300/1500</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2-10%</td>
<td>50:1 to 10:1</td>
<td>125/1000</td>
<td>250/2000</td>
<td>300/2500</td>
</tr>
<tr>
<td>10-20%</td>
<td>10:1 to 5:1</td>
<td>100/750</td>
<td>150/1000</td>
<td>200/1000</td>
</tr>
<tr>
<td>20-33%</td>
<td>5:1 to 3:1</td>
<td>60/500</td>
<td>80/750</td>
<td>100/1000</td>
</tr>
<tr>
<td>33-50%</td>
<td>3:1 to 2:1</td>
<td>40/250</td>
<td>70/350</td>
<td>100/500</td>
</tr>
<tr>
<td>&gt;50%</td>
<td>&gt; 2:1</td>
<td>20/125</td>
<td>30/175</td>
<td>50/250</td>
</tr>
</tbody>
</table>

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.
2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

<table>
<thead>
<tr>
<th>Fabric Properties</th>
<th>Minimum Acceptable Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab Tensile Strength (lbs)</td>
<td>110</td>
<td>ASTM D 4632</td>
</tr>
<tr>
<td>Elongation at Failure (%)</td>
<td>20</td>
<td>ASTM D 4632</td>
</tr>
<tr>
<td>Mullen Burst Strength (PSI)</td>
<td>300</td>
<td>ASTM D 3786</td>
</tr>
<tr>
<td>Puncture Strength (lbs)</td>
<td>60</td>
<td>ASTM D 4833</td>
</tr>
<tr>
<td>Minimum Trapezoidal Tear Strength (lbs)</td>
<td>50</td>
<td>ASTM D 4533</td>
</tr>
<tr>
<td>Flow Through Rate (gal/min/sf)</td>
<td>25</td>
<td>ASTM D 4491</td>
</tr>
<tr>
<td>Equivalent Opening Size</td>
<td>40-80</td>
<td>US Std Sieve ASTM D 4751</td>
</tr>
<tr>
<td>Minimum UV Residual (%)</td>
<td>70</td>
<td>ASTM D 4355</td>
</tr>
</tbody>
</table>

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.
Figure 5.30
Reinforced Silt Fence

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER 'T' OR 'U' TYPE OR HARDWOOD.

2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.

3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.

4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.

5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

REINFORCED SILT FENCE
Definition & Scope

A temporary barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. It is not to be used in place of sediment trapping devices. This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved. This material should be incorporated into the site in a stabilized manner.
unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

**Type III – Stone and Block Drop Inlet Protection**

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet (“doughnut”). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

**Type IV – Paved Surface Inlet Protection**

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

**Type V - Manufactured Insert Inlet Protection**

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.
Figure 5.31
Excavated Drop Inlet Protection

CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE
Figure 5.32
Fabric Drop Inlet Protection

CONSTRUCTION SPECIFICATIONS

1. FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.

2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.

3. STAKE MATERIALS WILL BE STANDARD 2" X 4" WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3 FEET.

4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.

5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.

6. A 2" X 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVERFLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE
Figure 5.33
Stone & Block Drop Inlet Protection

CONSTRUCTION SPECIFICATIONS

1. Lay one block on each side of the structure on its side for dewatering. Foundation shall be 2 inches minimum below rest of inlet and blocks shall be placed against inlet for support.

2. Hardware cloth or 1/2' wire mesh shall be placed over block openings to support stone.

3. Use clean stone or gravel 1/2-3/4 inch in diameter placed 2 inches below top of the block on a 3:1 slope or flatter.

4. For stone structures only, a 1 foot thick layer of the filter stone will be placed against the 3 inch stone as shown on the drawings.

Maximum drainage area 1 acre

Adapted from details provided by USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee

STONE & BLOCK DROP INLET PROTECTION
STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition & Scope

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Condition Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainageway above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed the following limits with the bale placed 10 feet from the toe of the slope:

<table>
<thead>
<tr>
<th>Constructed Slope</th>
<th>Percent Slope</th>
<th>Slope Length (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:1</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>3:1</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>4:1</td>
<td>25</td>
<td>75</td>
</tr>
</tbody>
</table>

Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of dike and the length of slope above the dike shall be less than 100 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5.34 on page 5.64 for details.
Figure 5.34
Straw Bale Dike

CONSTRUCTION SPECIFICATIONS

1. Bales shall be placed at the toe of a slope or on the contour and in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4 inches, and placed so the bindings are horizontal.
3. Bales shall be securely anchored in place by either two stakes or re-bars driven through the bale. The first stake in each bale shall be driven toward the previously laid bale at an angle to force the bales together. Stakes shall be driven flush with the bale.
4. Inspection shall be frequent and repair replacement shall be made promptly as needed.
5. Bales shall be removed when they have served their usefulness so as not to block or impede storm flow or drainage.

ADAPTED FROM DETAILS PROVIDED BY USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE
STANDARD AND SPECIFICATIONS FOR
TURBIDITY CURTAIN

Definition & Scope

A temporary flexible, impenetrable barrier used to trap sediment in water bodies. This curtain is weighted at the bottom to achieve closure while supported at the top through a flotation system and used to prevent the migration of silt from a work site in a water environment into the larger body of water. Top bar float has to support weight of curtain material. Bottom anchor has to be flexible so that it will lie along the contour of the water body bottom.

Condition Where Practice Applies

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces and not in areas of flowing water. Turbidity curtains are not to be used across flowing watercourses.

Design Criteria

The turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not so close as to be disturbed by applicable construction equipment. The height of the curtain shall be 20 percent greater than the depth of the water to allow for water level fluctuations. The area that the turbidity curtain protects shall not contain large culverts or drainage areas that if flows occur behind the curtain would cause a breach or lost contact at the bottom surface.

If water depths at the design alignment are minimal, the toe can be anchored in place by staking.

See Figure 5.35 on page 5.66.

Construction Specifications

The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment. All materials shall be removed so they cannot enter the waterbody. Shallow installations can be made by securing the curtain by staking rather than using a flotation system. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Maintenance

The turbidity curtain shall be inspected daily and repaired or replaced immediately. It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the waterbody. The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.
Figure 5.35
Turbidity Curtain