



E. CONCENTRATED FLOW SEDIMENTATION CONTROL (CF-SC)

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The BMPs in this section will address treatment of sediments for situations where concentrated flow is occurring – shallow concentrated or channelized. The channelized flow presents a challenge for sediment control because larger amounts of water have to be slowed down enough to drop their sediment load. These BMPs will accomplish varying levels of sediment control:

- ▶ Check Dams
- ▶ Sediment Traps
- ▶ Storm Drain Inlet Protection

Storm Drain Inlet Protection can capture coarse to medium-sized sediment (i.e. sands). Sediment Traps, depending upon the design, may be able to capture some smaller-sized particles. Manufactured Stormwater Systems, Detention and Wet Ponds, and Infiltration Systems are all very expensive ways to try to trap smaller particle sizes. Again, nothing can take the place of good EROSION CONTROL to prevent sediments from being generated in the first place.

1. CHECK DAMS

Definition and Purpose

A check dam is a berm constructed across a drainage swale or ditch that reduces the velocity of runoff, allowing sediment to settle out behind the dam.

Check dams are very effective in stopping the upstream head-cut movement of gully erosion; see **Section I.C.2. The Erosion Process**. They do not prevent rill erosion in the bottom of a ditch line and should never be considered a primary erosion control BMP. Channel linings are the preferred practice for preventing erosion in concentrated flow channels.

Appropriate Applications

- ▶ As a temporary sediment control structure:
 - Where inslopes, backslopes, and road surfaces have not been fully stabilized.
- ▶ As a permanent sediment control structure:
 - in road ditches that are subject to heavy sediment loads such as roads with heavy winter sand applications.
 - in channels where there are right of way restrictions limiting the installation of sediment traps or other sediment control practices.

Limitations

- ▶ This standard addresses the use of stone for the check dam. Hay bales are not allowed. Other material such as continuous containment berms or other commercial products must be approved by the Resident.
- ▶ Do not install where access for maintenance is impractical.
- ▶ Do not install within stream channels.

Standards and Specifications

- ▶ Refer to Standard Detail Drawing - Stone Check Dam.
- ▶ The crest of the check dam should be shaped such that the center of the check dam is a minimum of 6" lower than the outer edges.
- ▶ Maximum drainage area for the ditch or swale should not exceed 10 acres.
- ▶ Stone shall meet Materials Specification 703.29 - Stone Ditch Protection. Other materials may be used with the approval of the Resident

Application Procedures

- ▶ Make sure the channel bottom where the check dam is to be installed is smooth and free of debris.
- ▶ Stone may be either machine or hand laid.

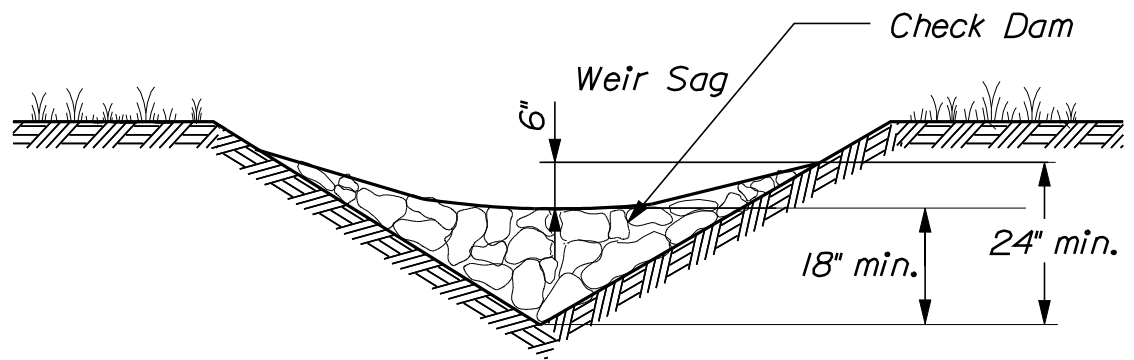
- ▶ Do not remove or dismantle temporary check dams until the ditch vegetation has been fully established.

Maintenance and Inspection

- ▶ Temporary check dams shall be inspected weekly as well as before, during, and after storm events.
 - Make sure the center of the check dam is lower than the sides and is not causing erosion around the outer edges.
 - After construction; temporary check dams should be removed once sufficient vegetation has been established within the channel. If approved by the Resident, the stone aggregate may be dispersed within the channel (stone may need to be pressed into the channel with an excavator bucket, such that there are no obstructions to flow.)
 - Remove sediment when it reaches three quarters the height of the check dam.
- ▶ Permanent check dams should be inspected at least once a year for damage to the structure. Damaged sections should be repaired immediately.
 - Make sure the center of the check dam is lower than the sides and is not causing erosion around the outer edges.
 - Remove sediment when it reaches three quarters the height of the check dam. Frequency of sediment removal will depend on the source. Begin with six month inspections and adjust accordingly.

References

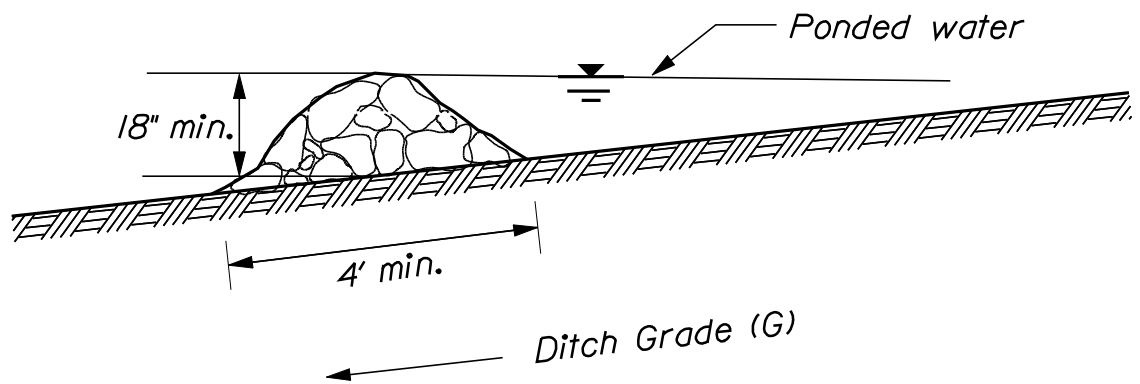
- ▶ Materials Specification 703.29 - Stone Ditch Protection



~ CROSS SECTION ~

NOTE:

Unless specified, stone shall meet requirements of material specification 703.29 stone ditch protection.



~ PROFILE @ DITCH ~

REF: Best Management Practice for Erosion and Sedimentation Control - Check Dam

STONE CHECK DAM
802(10)

2. SEDIMENT TRAPS

Definition and Purpose

Sediment traps are small basins designed to settle out sediments from concentrated stormwater runoff (typically ditch flow). Sediment traps are generally small excavated depressions, but can also be constructed by damming a drainage swale; see **Check Dams**. Sediment traps act to slow the velocity of water thereby decreasing its energy and causing sediment (and attached pollutants) to settle out of suspension. Sediment traps are generally considered to be the primary treatment to remove sand. Additional measures may be necessary to trap lighter silt and clay particles (i.e., detention basins, wet ponds, and filter strips).

Appropriate Applications

- ▶ During construction, as a temporary measure to support other erosion and sedimentation controls until final stabilization has been achieved.
- ▶ As a permanent measure to remove winter sand or other coarse sediments from roadway drainage systems.
- ▶ For treatment of ditch drainage prior to discharge to a water resource.
- ▶ As a pretreatment measure for other BMPs such as Road Ditch Turnouts, Level Spreaders, Filter Strips, etc.

Limitations

- ▶ Proper sizing may be limited by Right of Way restrictions.
- ▶ Contributing drainage area should be less than 5 acres. Larger drainage areas require detailed engineering design.
- ▶ Will not effectively treat silts and clays.
- ▶ Frequent inspection and removal of accumulated sediments is required.
- ▶ Not for use within streams.

Standards and Specifications

- ▶ Refer to Standard Detail Drawing.
- ▶ Sediment traps are best located in flatter areas to get the maximum storage benefit from the terrain.
- ▶ Provide convenient equipment access to enable proper maintenance.
- ▶ The outlet must discharge into a stable, well-vegetated area or into a stable drainage way.
- ▶ Install outlet protection measures to prevent scouring (typically a riprap apron).
- ▶ Sediment trap dimensions should be oriented to maximize the distance that water travels through them. Minimum length to width ratio of the trap is 2:1. Baffles can be constructed within the trap to maximize the travel distance.
- ▶ Minimum depth is 2 feet.

- ▶ Riprapped side-slopes shall not exceed 1 1/2:1; vegetated side-slopes shall not exceed 2:1.
- ▶ Stone shall meet Standard Specification 610 – Stone Fill, Riprap, Stone Blanket, and Stone Ditch Protection.

Application Procedures

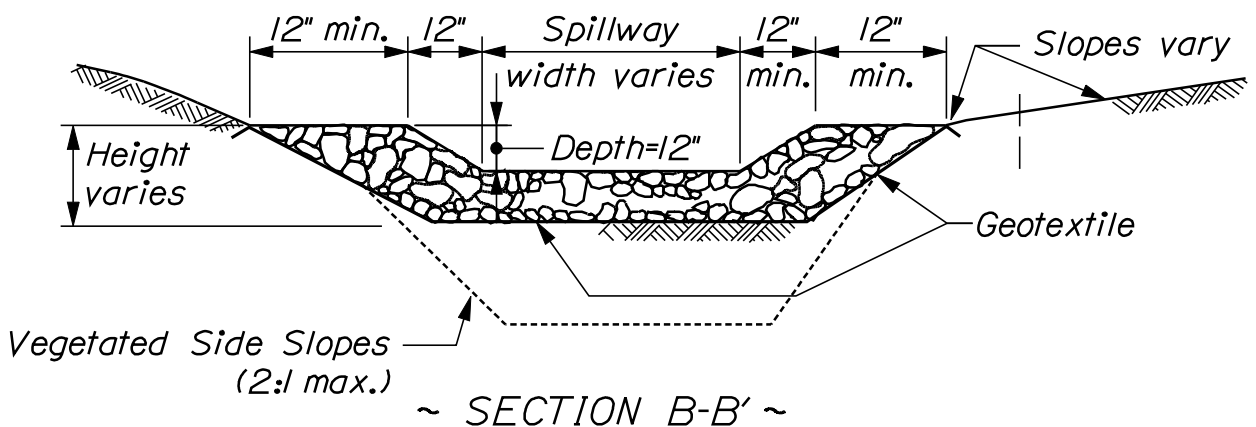
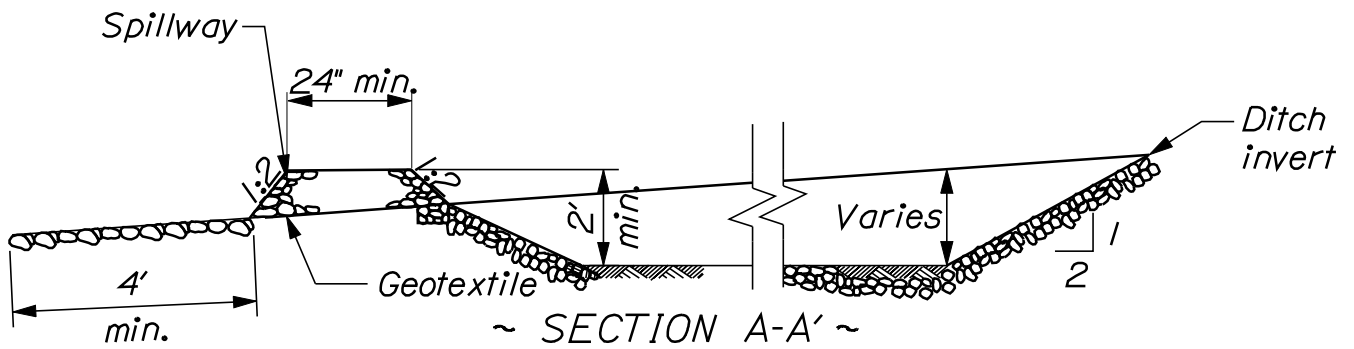
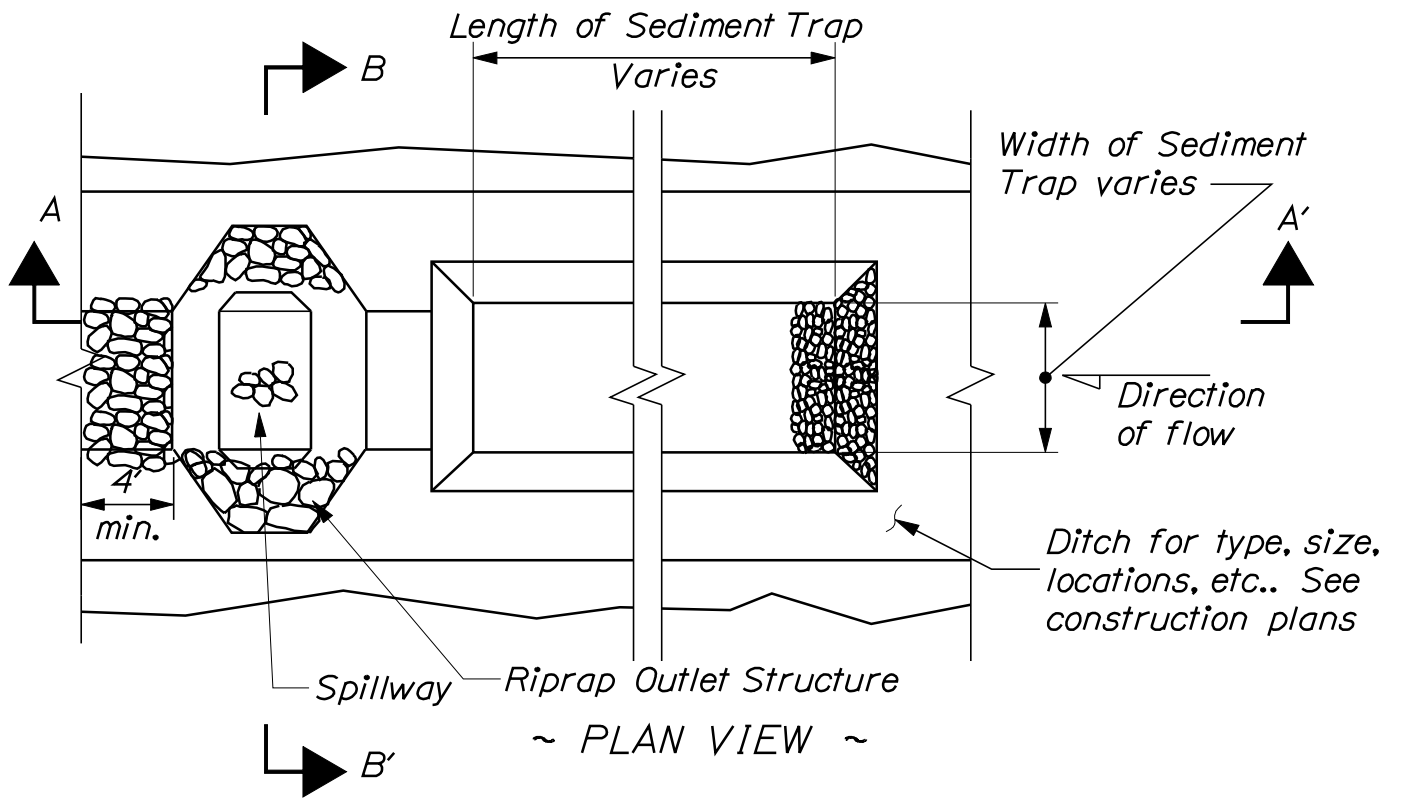
- ▶ Sediment traps should be constructed prior to disturbing soils in the upgradient drainage area.
- ▶ If the trap is created by damming a drainage way, the outlet shall be constructed of Common Borrow (Materials Specification 703.18) adequately compacted to form an embankment. Allow for the depth of stone and provide for a center elevation 12” lower than the sides to prevent scour at the outer edges. Permanent sediment traps shall be lined with non-woven geotextile and riprap to allow easy determination of the original floor of the trap when cleanout is performed.
- ▶ Temporary sediment traps should not be removed until the upgradient area has been completely stabilized. After removal of the trap, apply adequate treatment to stabilize the disturbed area.

Maintenance and Inspection

- ▶ Maintenance responsibilities for permanent sediment traps should be coordinated with and agreed to by Maintenance and Operations Bureau, town or other entity prior to construction. Permanent sediment traps should initially be inspected annually until a routine inspection schedule is determined.
- ▶ Temporary sediment traps require weekly inspection as well as before, during, and after storm events throughout project construction.
- ▶ Inspections should consist of the following:
 - Check for water passing through, under, or around the sediment basin. Necessary repairs should be made as soon as practical.
 - Check outlet area for signs of scouring. Necessary repairs should be made as soon as practical.
 - Inspect amount of sediment accumulation. Remove sediments when trap becomes half full.

References

- ▶ Standard Specification 610 – Stone Fill ,Riprap, Stone Blanket, and Stone Ditch Protection
- ▶ Materials Specification 703.29 - Stone Ditch Protection
- ▶ Materials Specification 703.26 - Plain and Hand Laid Riprap



REF:
Best Management Practice for Erosion and Sedimentation Control -
Sediment Traps

SEDIMENT TRAP 802(13)

3. STORM DRAIN INLET PROTECTION

Definition and Purpose

Storm drain inlet protection is a category of temporary BMPs that provide sedimentation control at inlets to closed storm drainage systems (catch basins) during construction activities. Closed drainage systems often discharge directly into or adjacent to wetlands and/or waterbodies, therefore storm drain inlet protection is often the last opportunity to protect these resources.

There are two basic types of storm drain inlet protection: perimeter protection and in-structure protection.

Perimeter storm drain inlet protection is a semi-permeable barrier placed around the entire perimeter of a storm drain inlet. The barrier slows the concentrated stormwater runoff, thereby decreasing its energy and causing sediment to settle before discharging to the storm drain.

In-structure storm drain inlet protection consists of membranes that are suspended within individual catch basin structures. Membranes typically consist of woven geotextile that filters most sands and gravels, but do not filter silts and clays. Once full of sediment they can be lifted out of the catch basin with earth moving equipment. In-structure storm drain inlet protection devices are typically manufactured devices.

Appropriate Applications

- ▶ Temporary sedimentation control around existing closed drainage inlets receiving runoff from upgradient construction, until stabilization of upgradient areas.
- ▶ Temporary sedimentation control during construction of new closed drainage systems, until surface paving is complete.

Limitations

- ▶ Generally only effective for small drainage areas (1 acre or less).
- ▶ Only use at inlets where ponding will not endanger traffic or flood onto erodible areas.
- ▶ Frequent maintenance is required for all methods of storm drain inlet protection.
- ▶ Without adequate reinforcement, some filters could collapse, potentially blocking the inlet and causing flooding.
- ▶ Storm drain inlet protection may not be suitable for use along long, interconnected road segments with closed drainage because they will pond water on the road.

Standards and Specifications

Perimeter storm drain inlet protection may consist of any of the following four options. Other alternatives are acceptable with the approval of the Resident and/or SWQU staff.

- ▶ Stone Berm
 - Refer to Standard Detail Drawing.

- Continuous berm of clean stone aggregate placed around the entire perimeter of storm drain inlet. MaineDOT Materials Specification 703.24 – Stone for French Drains or other clean gravel as approved by the Resident.
 - Place on pavement or bare ground. Geotextile fabric should be placed over inlet grate and under the stone extending a minimum of 12 inches beyond edge of grate.
 - Berm height should be 12 inches and top of berm should be level all around.
- ▶ Sandbag Berm
- Continuous berm of stone or sand filled sandbags placed around entire perimeter of storm drain inlet.
 - The bags are butted together so that there is no bypass through the bags.
 - Place on pavement or bare ground.
 - Maximum recommended height is 12 inches.
- ▶ Silt Fence
- Refer to Standard Detail Drawing.
 - Consists of standard silt fence with some form of wood frame bracing.
 - The bottom flap of the silt fence must be buried in a trench or covered with a lip of crushed stone to prevent short circuiting.
 - Use silt fence from a continuous roll to avoid joints in the filter; see **Silt Fence (SR-SC)**.
 - Wood frame shall be constructed from 2 x 4 lumber.
 - Minimum fence height is 15 inches, maximum height is 20 inches.
- ▶ Continuous Containment Berm
- Commercial products are available but must be approved by the Resident before use.

In-Structure Storm Drain Inlet Protections

- ▶ MaineDOT does not endorse a particular manufacturer's product.
- ▶ Use of these products must be approved by the Resident.
- ▶ Install according to manufacturer's specifications.

Application Procedures

- ▶ Stone Berm
 - Lay geotextile fabric around inlet if on bare ground (not necessary for paved surfaces).
 - Construct a continuous stone berm around the inlet (over geotextile fabric if on bare ground).
 - Build berm to approximate height of 1 foot and level top of berm so that there is 0% grade all the way around.

- ▶ Sandbag Berm
 - Partially fill bags with stone or sand.
 - Place bags around inlet and butt bags together such that no gaps are evident between bags.
 - If a second layer of bags is added, stagger placement of the bags so that they cover the ends of the bags in the first layer.

- ▶ Silt Fence
 - Drive stakes a minimum of 8 inches into the ground and a maximum of 3 feet apart around the perimeter of the inlet.
 - Build a frame that connects the tops of the stakes together.
 - Excavate a trench approximately 6 inches wide and 6 inches deep around the outside perimeter of the stakes.
 - If using a wire screen backing, attach backing to the stakes.
 - Attach silt fence to the stakes such that 1 foot of fabric extends into the trench.
 - Overlap silt fence at the corner a minimum of 6 inches
 - Backfill and compact trench material over the silt fence fabric.
 - If using crushed stone, place stone along the base of the silt fence.

In-Structure Storm Drain Inlet Protections:

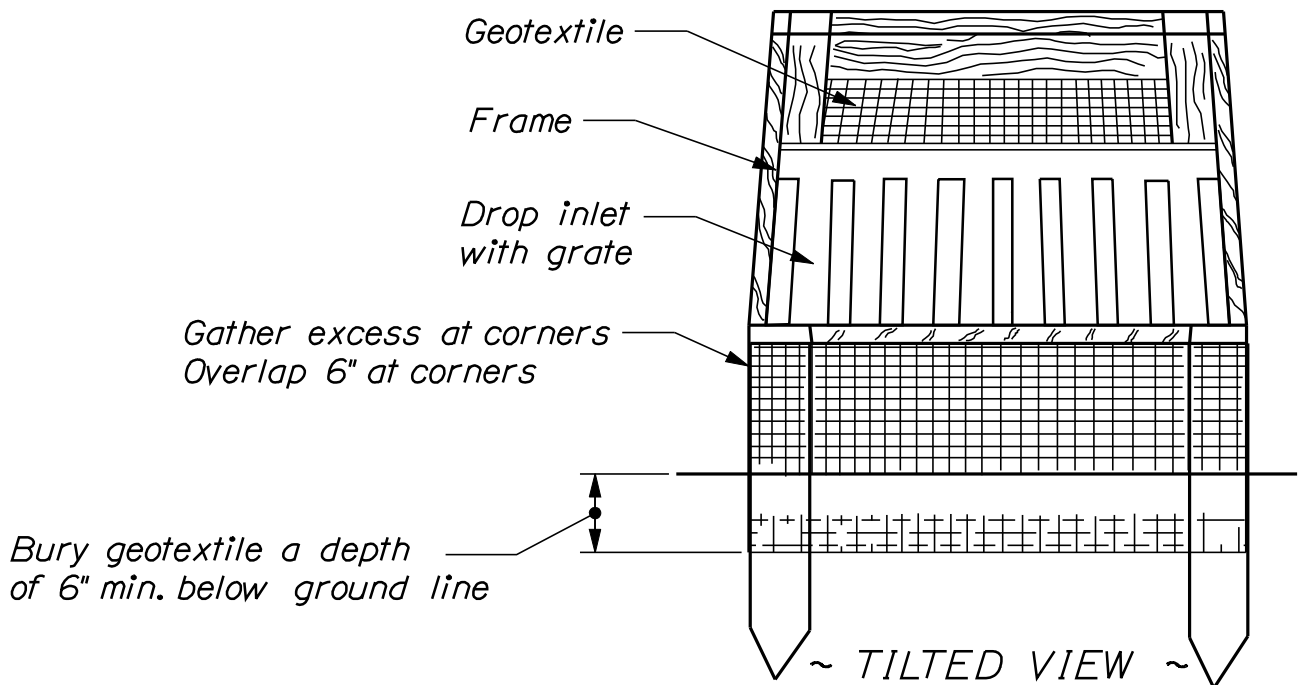
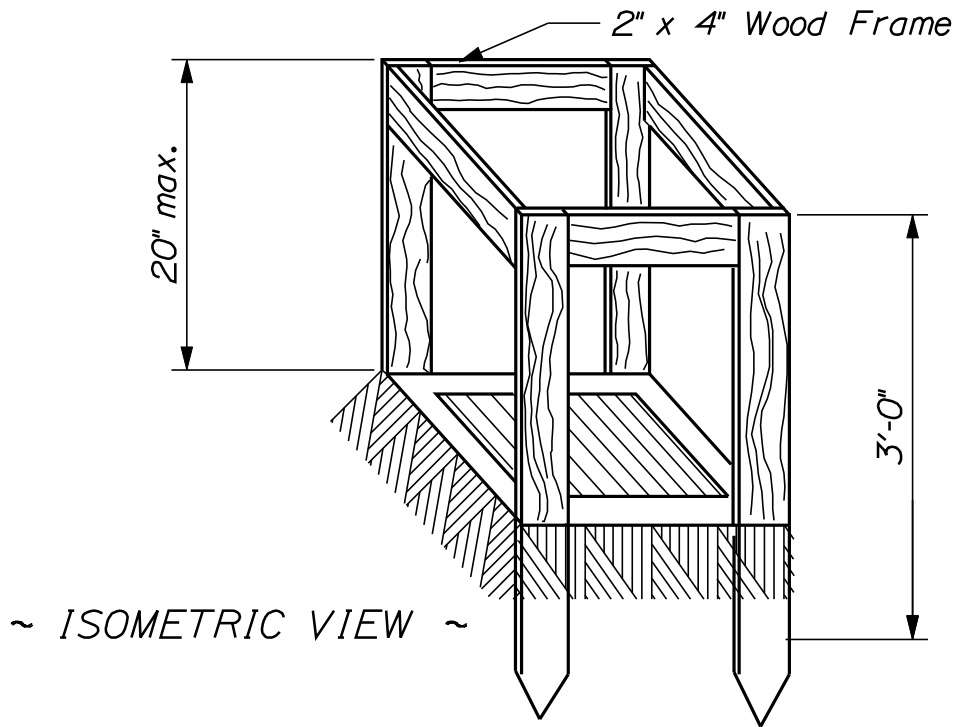
- ▶ Follow the manufacturer's installation guidelines.

Maintenance and Inspections

- ▶ The Contractor should inspect storm drain inlet protection weekly and prior to, during, and after storm events to check for damage and sediment accumulation. Any damage should be repaired immediately and sediment should be removed when it reaches half the height of the barrier. Stone that has become plugged with sediment should be replaced with clean stone. See manufacturer's maintenance guidance for maintaining manufactured storm drain inlet protection.
- ▶ Storm drain inlet protection shall be removed when the contributing drainage area has been properly stabilized. Any disturbance caused by storm drain inlet protection installation and removal will have to be stabilized.
- ▶ All catch basins and associated drainage pipes must be cleaned at the end of construction and after the site has been fully stabilized.

References

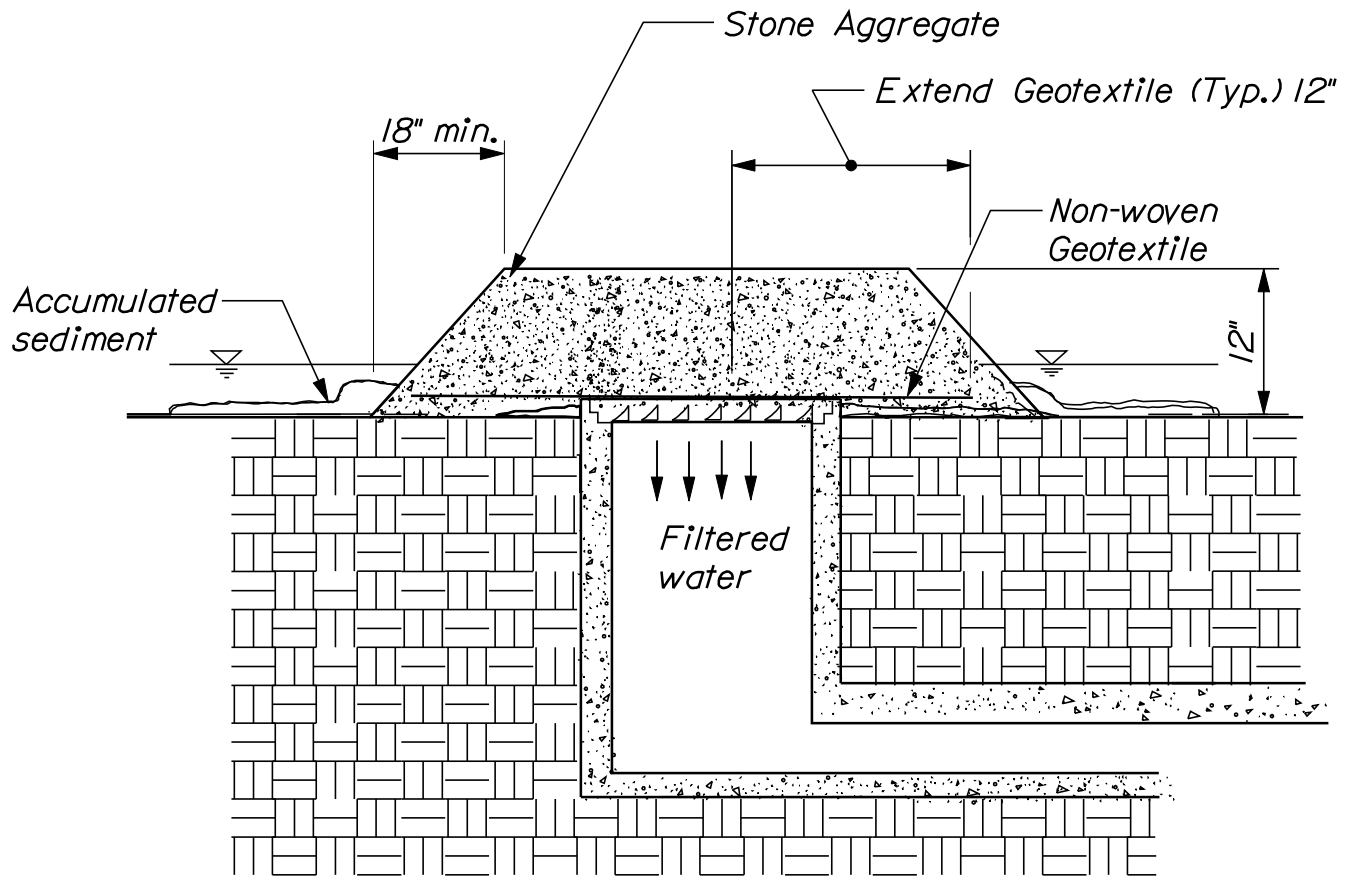
- ▶ Materials Specification 703.24 – Stone for French Drains
- ▶ Standard Specification 620 – Geotextiles



NOTE: Use Silt Fence inlet protection in sump locations only. Sheet flow less than 1 acre Drainage Area not in paved areas or with concentrated flows.

REF: Best Management Practice for Erosion and Sedimentation Control - Storm Drain Inlet Protection

SILT FENCE CB/ INLET GRATE UNIT PROTECTION 802(II)



~ SECTION ~

NOTE: Use stone aggregate and non-woven geotextile inlet protection only in sump locations where heavy concentrated flows are expected. Do not use where ponding around the structure might cause inconvenience or damage. Stone aggregate shall be Stone For French Drain 703.24 or approved by the Resident.

REF: Best Management Practice for Erosion and Sedimentation Control - Storm Drain Inlet Protection

**STONE AGGREGATE & GEOTEXTILE CB/
INLET GRATE UNIT PROTECTION
802(12)**



F. IN-WATER WORK

F. IN-WATER WORK

A large proportion of MaineDOT projects involve culvert and bridge replacement and repair. Working in and adjacent to a water resource increases the risk for a discharge of sediment. Site conditions vary greatly in the type of waterbody and the scope of the construction project. These BMPs provide guidance and some basic standards, but minimizing that risk also requires knowledge of the flow characteristics of the waterbody and seepage characteristics of the soils in the work area, along with good planning, experience, and ingenuity.

When the waterbody is a stream there may be a need for maintaining vehicle traffic on the road during construction and therefore a temporary stream crossing. It is a standard permit requirement that, for streams, flow must be maintained into the downstream channel.

These practices are not stand alone. They are used in combinations, depending on the scope of the project and the water body involved. They include:

- ▶ Floating Turbidity Curtain
- ▶ Temporary Stream Crossing
- ▶ Temporary Stream Diversion
- ▶ Cofferdams
- ▶ Dewatering
- ▶ Temporary Sediment Basins
- ▶ Filter Bags

1. FLOATING TURBIDITY CURTAIN

Definition and Purpose

Floating turbidity curtains (a.k.a. silt curtains, silt boom, sediment curtain) are a temporary in-water sediment barrier consisting of a continuous geotextile fabric curtain suspended from a flotation device on the water surface and held in a vertical position by ballast weight at the bottom.

Appropriate Applications

- ▶ In-water construction activities such as dredging, bank stabilization, in-water fill.
- ▶ Where earth disturbance is adjacent to the waterbody and land based sediment controls can not be installed.
- ▶ Relatively shallow and calm water bodies.

Limitations

- ▶ Not for use where water velocities exceed 1.5 feet per second. Some commercial products are designed for velocities up to 6 feet per second, but use of these products must be approved by the Resident.
- ▶ Not for use in areas experiencing significant wave action.

Standards and Specifications

- ▶ Follow Manufacturer's Guidelines and Specifications.
- ▶ The curtain should fully isolate the construction area.
- ▶ Ballast must consist of a continuous weight (i.e., chain or cable) that is incorporated into the curtain to provide a continuous seal with the bottom of the resource.
- ▶ The curtain shall be suspended in the water column in a vertical plane to the extent possible. This will prevent sediments from accumulating on the curtain, which would cause re-disturbance when the curtain is removed.
- ▶ The curtain should be left in place for at least 24 hours after completion of disturbance activities to allow for settling of sediments.

Application Procedures

- ▶ If available, follow the manufacturer's installation procedures.
- ▶ Shoreline activities should be isolated by wrapping both ends of the curtain onto shore. In-water activities require a fully enclosed perimeter where ends of the curtain overlap. Intermediate anchors shall be installed in accordance with manufacturer's specifications.
- ▶ All anchors must be set in place, buoy marked, and tested before the curtain is deployed.
- ▶ Terminal end anchors (e.g., trees, steel posts, or poured concrete dead-men) should be located on shore and easily accessible.

- ▶ Unfurl the turbidity curtain in accordance with manufacturer's recommendations.
- ▶ The staging area must be cleared of sharp objects, debris, brush or tree roots or anything else that may snag the curtain as it is being moved into the water.
- ▶ Move the unfurled floating turbidity curtain into position.
- ▶ Secure the anchor lines to the top load cable.
- ▶ Release the furling lines to let the curtain reach its working depth.
- ▶ After the completion of work, re-furl the boom, disconnect the anchor lines and remove curtain.

Maintenance and Inspections

- ▶ Check for proper function when sedimentation is occurring. Sediment should be fully contained by the floating turbidity curtain. Signs of leakage or bypass should be assessed and addressed immediately.
- ▶ Inspect the floating turbidity curtain weekly, on windy days, and before, during, and after storm events. Ensure that the connections between curtain sections and the connections to the anchor lines are secure.
- ▶ Keep any debris that might damage the fabric clear from the curtain.
- ▶ If the curtain is damaged while construction is ongoing, it should be repaired in-place in order to maintain its function.
- ▶ After each use, the curtain should be spread out on a flat surface, cleaned thoroughly by brushing with water and detergent, rinsed and allowed to dry.
- ▶ Patch tears and abrasions using special cements and fabric obtainable from the manufacturer.

References

- ▶ Manufacturer's Guidelines and Specifications

2. TEMPORARY STREAM CROSSING

Definition and Purpose

A temporary stream crossing is a temporary structure in or over a stream to provide safe, minimal disturbance access for construction equipment or the traveling public. The structure is either a bridge or a culvert and will be removed upon completion of project construction. The purpose is to prevent damage to the waterway, blocking fish passage, and tracking sediment and other pollutants into the water.

Appropriate Applications

- ▶ On any water body where construction equipment or the traveling public need to travel over the water body during project construction.

Limitations

- ▶ Temporary structures may be subject to permitting requirements and in-water work windows (contact the MaineDOT ENV Office).
- ▶ Installation of a temporary crossing may include in-water work and require installation of cofferdams, temporary stream diversions, and cofferdam sedimentation basins; see each specific BMP.

Standards and Specifications

- ▶ The approach fills shall be placed on a geotextile fabric in order to minimize disturbance of the existing vegetation and facilitate removal.
- ▶ Temporary crossing in use for less than ten days shall be sized for the existing observed stream flow.
- ▶ Temporary crossing in use for more than ten days shall be sized for the following criteria:
 - In use between June 1 and September 15 shall be sized for a minimum 50% of the 2 year storm event.
 - In use prior to June 1 or after September 15 shall be sized for a minimum flow from the 2 year storm event.
 - Intended to remain in place over the winter shall be sized for minimum flow from the 5 year storm event.
 - A temporary bridge shall be sized for minimum flow from the 10 year storm event.
- ▶ Design provisions shall be made for flows exceeding the designed flows without a sediment discharge to the water body, typically a low area in the approach road that is armored from overtopping flows and protecting the temporary structure from failure.
- ▶ If the temporary crossing is a culvert it may be required to provide fish passage. Consult with the MaineDOT Environmental Office for assistance.
- ▶ Clearing adjacent to water bodies shall be the minimum necessary to install the temporary crossing. Wherever possible, roots shall be left in place to regenerate.

- ▶ Water runoff from the approaches shall be diverted away from the temporary crossing and shall not be allowed to run down or along the approach fills.
- ▶ Temporary crossing designs shall be submitted to the Resident or, in the case of Maintenance and Operation projects, the Region Engineer for approval.
- ▶ Refer to Standard Specification 510 - Special Detours.

Application Procedures

- ▶ Install cofferdams and stream diversion as necessary for in-water work. Install other BMPs as needed.
- ▶ Place approach fills on geotextile or mats.
- ▶ Stabilize side slopes of approach fills.
- ▶ Install temporary culvert or bridge in accordance with MaineDOT Bridge Design Guide.
- ▶ Stabilize inlets/outlets of structure.
- ▶ Proceed with the project without delays and remove temporary culvert or bridge and approaches as soon as possible.
- ▶ Stabilize disturbed soils in the area.

Maintenance and Inspections

- ▶ All temporary crossings shall be inspected at least once a week and before, during, and after storm events to ensure that the structure is not damaged, that sediment is not entering the waterbody, and that there are no obstructions to flow or fish passage (if required).
- ▶ Blockage by debris in the channel which could contribute to flooding shall be removed.

References

- ▶ Standard Specification 510 – Special Detours

3. TEMPORARY STREAM DIVERSION

Definition and Purpose

This practice diverts stream flow around an in-water construction site and maintains flow from upstream to downstream. It is typically used with the other BMPs in this section to prevent erosion and sediment discharge to the water resource.

Temporary stream diversions incorporate cofferdams with one of the following means to divert stream flow:

- ▶ Pump diversion
- ▶ Pipe diversion
- ▶ Plastic sheet-lined open channel

Appropriate Applications

- ▶ General
 - In-stream work activities where water flow must be maintained.
- ▶ Pump Diversions
 - Small streams with flow rates that are less than approximately 5 cubic feet per second.
 - Short project duration; typically one-day construction projects.
- ▶ Pipe Diversions
 - Small streams with flow rates that are less than approximately 5 cubic feet per second.
 - Where replacement structure is on a different alignment the existing structure (pipe) may be used.
 - For slip-lined and invert lined projects where the road surface remains undisturbed and traffic flow is retained.
- ▶ Open Channel Diversions
 - Large streams and small rivers where neither pump nor pipe diversions are practical and road is closed to traffic for duration of use.
 - Where diversion will be in place for long periods and higher storm flows are anticipated.

Limitations

- ▶ General
 - In-stream work is subject to permitting requirements and work windows; proper permits must be in place.
 - Temporary stream diversion alternatives are typically designed to pass monthly mean low flows for the duration of their use and not for storm flows. Measures for overtopping and work area flooding must be in place.

- ▶ Pump Diversions
 - Limited capacity.
 - Require continuous monitoring during operation for fueling and inlet and outlet stability.

- ▶ Pipe Diversions
 - Unless the new structure is placed parallel to the existing, and the existing structure is the diversion, it is commonly limited to use for invert lining projects.
 - Can be difficult to establish a seal between pipe diversion and upstream cofferdam, causing excessive leakage into work area.
 - Larger pipe diversion diameters require higher upstream cofferdam height.

- ▶ Open Channel Diversions
 - Requires a wide area at existing stream grade and therefore limited to projects with full road closure.

Standards and Specifications

- ▶ General
 - See Cofferdams BMP for guidance on type and installation of cofferdams.
 - General recommended flow capacities are given in the following table. Site specific conditions may vary.

Conditions	Flows, Q
One Day to One Week with No Rain Forecast	Observed
More than One Week, Summer or Winter	2 X Observed
Multiple Season or Sensitive Site	Bank-full

- Determine flow rates by direct measurement, calculation, or if available, published values. Consult with MaineDOT ENV Hydrology Unit for assistance.

- ▶ Pump Diversions
 - Maintain a downstream flow pumping rate comparable to the base flow for the resource and at a rate that will not overtop the cofferdam for the duration of the project. More than one pump may be necessary.
 - The pump intake and outlet nozzles shall be located such that scour and erosion during pumping will not occur.
 - The following table gives approximate flow capacities for various sized centrifugal pumps. Multiple pump combinations can be used to match design flow.

Pump Diameter (Inches)	Typical Flow Rates*	
	Gallons per Minute	Cubic Feet per Second
2	150	0.33
3	225	0.61
4	325	0.72
6	1250	2.8
8	1700	3.9
12	3000	6.7

**Based on manufacturer's information*

► Pipe Diversions

- The diversion shall be set up with stable inlet and outlet ends before any flow is directed into it. Downstream stabilization is more prone to erosion and may need the addition of an energy dissipater.
- Pipe joints shall be secure and pipe shall be braced to prevent lateral movement during higher flows.
- The following table gives approximate pipe capacities for smooth lined pipe (HDPE or Concrete) for upstream flow depths as a percentage of diversion pipe diameter. Cofferdam height should be a minimum of one half a pipe diameter above the designed flow.

PIPE FLOW RATE Q (CFS)					
Percent Full	Pipe Diameters (inches)				
	12	18	24	30	36
25	0.2	0.6	2.5	3.7	5.6
50	0.7	2.4	3.9	8.6	13.4
75	1.4	3.8	8.3	10.3	16.0
100	2.1	6.2	12.6	21.8	34.2
150	3.6	10.0	20.0	35.0	55.0

► Open Channel Diversions

- The diversion shall be set up with stable inlet and outlet ends before any flow is directed into it. Downstream stabilization is more prone to erosion and may need the addition of an energy dissipator.
- Refer to Standard Detail Drawing. Alternate designs shall be approved by the Resident.
- Channel dimensions should match the dimensions of a typical section of the stream, near the structure.

- Lining materials for the open channel diversion shall consist of a plastic liner with a minimum thickness of 4 mil. It shall be placed in one long continuous piece to the extent possible. If multiple sections are used, the upstream section shall be shingled over the downstream section with an overlap of at least 2 feet.
- Channel liner cross-section shall not have any longitudinal seams. The liner shall be keyed-in or anchored above the flow line along longitudinal edges. Inlet and outlet edges of the liner should also be anchored. Additional anchors may be needed within the trench and at overlaps.

Application Procedures

The variability in project scope and site conditions will determine which type of temporary stream diversion will be used. The sequence of activities is critical to minimizing stream impacts. The layout should be planned considering the following recommendations:

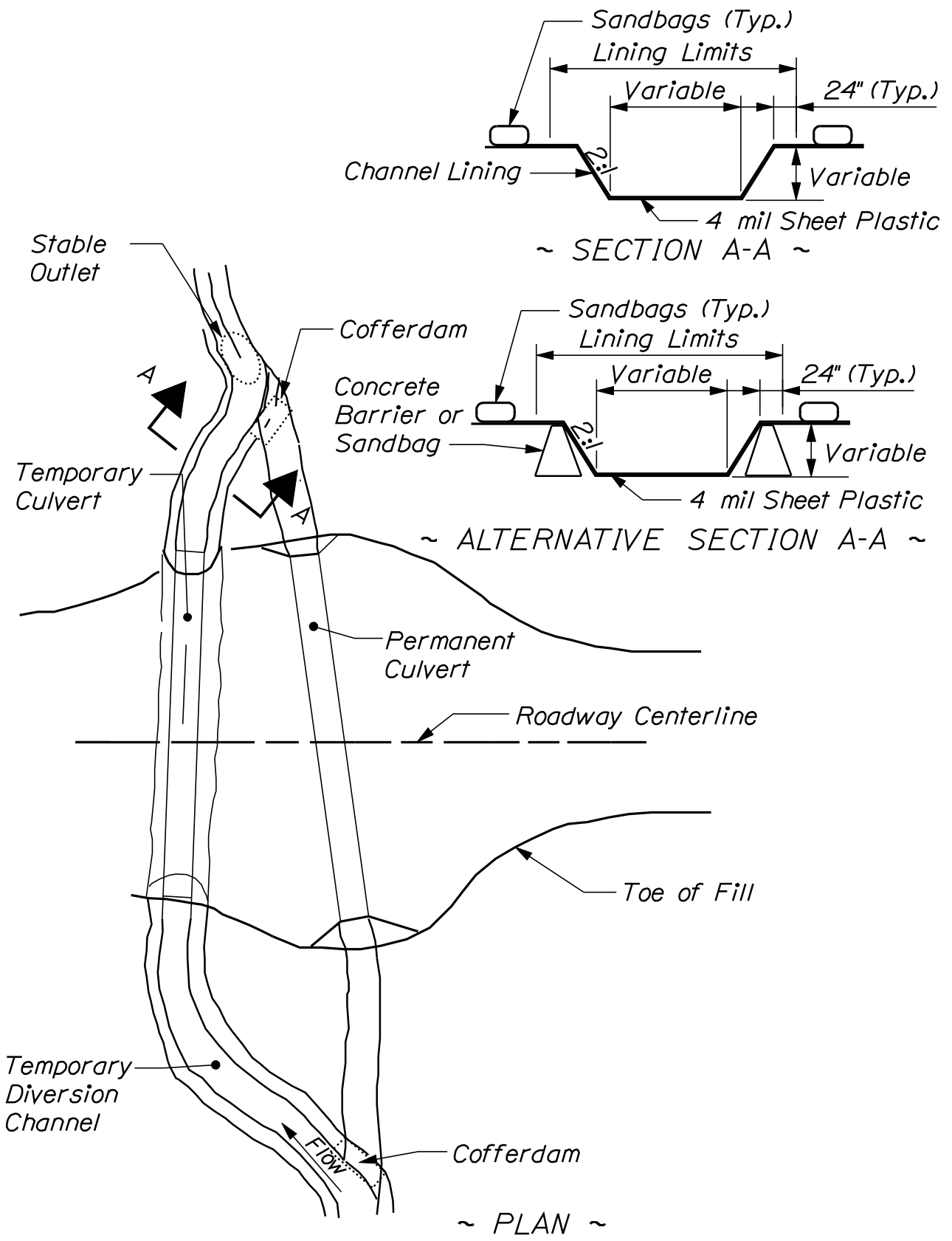
- ▶ Install the temporary diversion in a manner that does not produce a discharge to the resource. This may include installing a separate cofferdam from the main channel cofferdam.
- ▶ Install a stable outlet for the intended flows.
- ▶ Begin diversion, i.e. start pump, breach temporary cofferdam, submerge pipe inlet.
- ▶ Install project cofferdam. This is usually done at the same time as the previous step.
- ▶ Maintain diversion, dewater within cofferdam and complete project; see **Temporary Sediment Basin BMP**.
- ▶ Once project is complete, breach project cofferdam and cease temporary diversion from the upstream end.
- ▶ Remove temporary diversion and stabilize site.

Maintenance and Inspections

The temporary stream diversion is a high maintenance item because of the potential for flooding from upstream runoff, leakage, or structural failure. It shall be monitored routinely during active construction and daily during weekends. Weather reports shall be checked daily and accommodations made in preparation for storm events. Preparations may include obtaining and readying additional pumps, raising the cofferdam height, stabilizing the work area, and removing debris from the diversion pipe. Remove the diversion immediately upon completion of in-water work.

References

- ▶ Manufacturer's Guidelines and Specifications



REF: Best Management Practice for Erosion and Sedimentation Control - Temporary Stream Diversion

TEMPORARY STREAM DIVERSION

802(14)

4. COFFERDAMS

Definition and Purpose

Cofferdams are watertight temporary structures enclosing a part of a waterbody to enable it to be pumped dry for construction purposes. Cofferdams are typically comprised of sandbags, concrete barriers, sheet piles, or manufactured devices. Isolation and dewatering provides a dry working area and is often necessary to prevent adverse environmental impacts from the construction activities.

Appropriate Applications

- ▶ In all water bodies to isolate the work area from the water resource.
- ▶ Provide a dry construction work area.
- ▶ Use with other in-water work BMPs.

Limitations

- ▶ In stream and river systems, high flows can cause overtopping or failure of cofferdams. Cofferdams that will be in place for an extended duration should be designed to accommodate the likelihood of flooding.
- ▶ Cofferdamming a stream channel requires that provisions be made to maintain stream flow around work site; see **Temporary Stream Diversion**.
- ▶ The permeability of the water body substrate needs to be considered when selecting the type of cofferdam to be used.
- ▶ Cofferdams are rarely completely watertight and will require continued maintenance dewatering; see **Dewatering**.

Standards and Specifications

There are three primary design criteria for cofferdams:

- ▶ Minimal seepage through, under, and around the cofferdam to the extent practical.
- ▶ Structural stability and integrity of the cofferdam.
- ▶ Sufficient freeboard to accommodate reasonably expected fluctuations in water levels.

All cofferdams shall conform to applicable standards specified in MaineDOT Standard Specification 511 – Cofferdams.

- ▶ Sandbag Cofferdams
 - Sandbag Material: Sandbag material shall be polypropylene, polyethylene, or polyamide woven fabric, minimum unit weight of four ounces per square yard, mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355. Use of burlap is not acceptable.

- Sandbag Size: Each sand-filled bag shall have a length of 18 inches, width of 12 inches, thickness of 3 inches, and weight of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the Resident for approval prior to use.
 - Grade of Sand: All sandbag material shall be coarse sand, free from deleterious materials.
 - Plastic Sheeting: Plastic sheeting should be utilized to minimize seepage through the cofferdam. Sheeting should be anchored under the base of the cofferdam and wrapped up and over the top of the cofferdam. Where there is a unacceptable level of seepage through the substrate the plastic sheeting should be extended upstream along the bottom of the water body perpendicular to the cofferdam.
 - Height of Dam: Up to 3 feet, measured from the existing streambed to the top of berm. Sandbags will be placed to create a low spot within the top of the berm to direct overtopping flood flow.
- ▶ Concrete Barrier Cofferdams
- Caution: If concrete barriers are used, they must have a firm foundation or additional support against overturning. This analysis is the responsibility of the contractor.
 - Concrete barriers (Jersey barriers) should be machine placed on the channel bottom and coupled together according to manufacturer's specifications.
 - Plastic Sheeting: Plastic sheeting is required for the concrete barrier cofferdam to function. Sheeting should be anchored under the base of the cofferdam and wrapped up and over the top of the cofferdam and extended upstream along the bottom of the water body perpendicular to the cofferdam. The distance that it is extended upstream depends on the permeability of the substrate.
 - Ancillary Sandbags: Ancillary sandbags (meeting specifications in section above) should be used in situations where it is difficult to obtain a good bottom seal and as additional structural support against overturning.
 - Height of Dam: Standard height of concrete barriers is 32 inches measured from the existing streambed to the top of barrier.
- ▶ Other Cofferdam Types
- Other types of cofferdams shall be approved by the project Resident on a case by case basis. Typical alternatives include: Sheet Piles, Large Sandbags, and Proprietary/ Manufactured devices.

Application Procedures

- ▶ Stream flow shall be maintained at a rate similar to natural conditions.
- ▶ Timing of the installation of cofferdams is critical to minimize impacts on fish and other aquatic life. Cofferdams cannot be used across a streambed during times when fish passage is an issue. In-stream work windows are defined by the Environmental Office for most in-water work activities.

- ▶ Because the potential for washout is high, the cofferdam must be carefully monitored, and must not be left unattended for any 24-hour period. Weather reports must be monitored. If a storm event is expected, the site must be stabilized in preparation for it.
- ▶ Turbid water within the cofferdam should be pumped into a temporary sedimentation basin or tank truck, and should not be allowed to discharge directly to any protected natural resource; see **Temporary Sedimentation Basin**.
- ▶ Dual cofferdams (upstream and downstream) are generally necessary in situations that require blocking off the entire stream channel.
- ▶ Refer to **Dewatering** BMP for guidance on dewatering activities.

The sequence of activities is critical to minimizing environmental impacts. In general, the upstream cofferdam is installed first, then the downstream cofferdam. After completion of the work, the sequence is reversed and the downstream cofferdam is removed before the upstream.

Maintenance and Inspections

- ▶ Inspect daily throughout use.
- ▶ Repair and reposition any damaged or displaced cofferdam components.
- ▶ Repair washouts or other damage as needed.
- ▶ Sandbags should be removed by hand to prevent breakage and unnecessary disturbance of the streambed.
- ▶ When using an upstream and downstream dam, remove the downstream dam first.

References

- ▶ Standard Specification 511 - Cofferdams

5. DEWATERING

Definition and Purpose

Dewatering is the removal of water from within a contained work area so that construction work may be accomplished. Dewatering is a component of a suite of in-water work BMPs including: cofferdams, temporary sedimentation basins, and geotextile filter bags.

This practice does not address the dewatering of water contaminated from hazardous wastes or fuel spills. Contact the MaineDOT ENV Hazardous Waste Unit for procedures for investigation, identification, and handling of these contaminants.

Appropriate Applications

- ▶ In-water work within cofferdams.
- ▶ Trenching.
- ▶ Maintenance or repair of stormwater drainage systems.

Limitations

- ▶ The capacity of pumping systems and site specific volumes and flow rates required.

Standards and Specifications

- ▶ Contaminated water shall not be discharged directly to the resource. It shall be treated by the use of a temporary sedimentation control device. This is typically a temporary sedimentation basin, geotextile filter bags, direct discharge to a tank truck, or other methods approved by the Resident.
- ▶ A direct discharge of clean water from within a cofferdam to the resource must be approved by the Surface Water Quality Unit.
- ▶ Minimize the quantity of impacted water that requires treatment by:
 - Minimizing the volume of the containment area to the extent practical
 - Seal the containment area to the extent practical to prevent seepage from water body; see **Cofferdam**.
 - Isolate clean water seepage by constructing sumps whereby clean water can be pumped back into the resource. Clean water sumps consist of a recessed pump intake area backfilled with clean crushed stone to prevent turbidity caused by suction at the pump intake. The pump intake should be buffered on all sides by a minimum of 6” of clean stone. Pump sizing should be based on the seepage rate, as it is preferable to maintain a steady state condition.
 - Where approved, pump clean drawdown water overboard.

- ▶ Pumping Equipment:
 - Multiple pumps may be necessary to pump clean and dirty water separately. Centrifugal pumps are recommended for most applications. Positive displacement pumps are recommended when water is laden with solids.
 - Water Volume – A large pump may be desirable to reduce downtime associated with waiting for a site to dewater. Typically smaller pumps can be used for maintenance dewatering, provided seepage is not excessive.
 - Maintenance Pumping – Cofferdams seepage rates may vary widely from site to site and will dictate the size of pump necessary.
 - Elevation of pump above the water surface and distance of discharge line will greatly affect pumping capacities. Consult with a professional engineer when appropriate.

- ▶ Prevent localized erosion associated with the pump intake and discharge points. It may be necessary to construct a stabilized pad to prevent this type of localized disturbance from occurring. Pads can be constructed from rocks, plywood, geosynthetic fabric, plastic sheeting, etc.

Application Procedures

- ▶ If cofferdams, temporary sedimentation basins, or geotextile filter bags are used refer to the applicable BMP in this section.
- ▶ Initial dewatering is a critical procedure when various assessments should be made:
 - Water Quality – Clean water may be discharged directly back into the resource without being treated. Contaminated water shall be discharged into a temporary sedimentation device.
 - Seepage – Evaluate the degree of cofferdam seepage and determine whether further seepage control (sealing) and/or pump capacity is needed.
 - Clean Water Sumps – Once drawdown is nearly complete, assess the bottom conditions and seepage conditions to determine whether clean water sumps are necessary or practical. Proper function of a clean water sump is based on the quality of water at the discharge. There should be no observable negative impact to the resource.
 - Initial Bottom Preparations – Some turbidity is likely to occur while some of the initial bottom preparations are being installed (i.e., sumps and/or stable extraction pads). Any contaminated water extracted during this time should be discharged to the temporary sedimentation device.
- ▶ Maintain pump operation throughout construction activity.
- ▶ Dewatered area should be reflooded gradually upon completion of in-water work, to prevent sediments from resuspending during cofferdam breaching; see **Cofferdam**.

Maintenance and Inspection

The following items should be inspected and maintained continually during the course of construction operations within a dewatered area.

- ▶ Cofferdam Integrity – Observe any increases in seepage rate. If changes are observed, locate and repair leaks.
- ▶ Water Quality – Observe any clean water discharges to the resource, to ensure that they remain clean. If they are not, redistribute discharges as appropriate and correct any deficiencies.
- ▶ Temporary Sedimentation Devices – Verify proper function of the temporary sedimentation devices. Conduct cleaning and/or installation of additional capacity as necessary.

References

- ▶ Pump manufacturer's specifications

6. TEMPORARY SEDIMENT BASIN

Definition and Purpose

Temporary sediment basins consist of designated impoundment areas that are used to treat contaminated (sediment, high pH) water pumped from a dewatering process. Temporary sediment basins provide water treatment through the following mechanisms:

- ▶ Reduction in velocity of the discharge flow providing adequate time for sediment to settle out.
- ▶ Filtration of coarse sediment through a permeable non-woven geotextile.
- ▶ Sheet flow discharge from the temporary sedimentation basin through a vegetated area removes an additional portion of finer sediments.
- ▶ Potential infiltration into the ground, providing optimal treatment of all finer sediments.

Temporary sediment basins can consist of above ground structures with permeable perimeter berms, natural depressions in the ground, or excavated depressions.

This practice only describes sedimentation basins constructed on ground. Basins constructed on barges or bridge decks for sheet pile cofferdam excavation and dewatering shall be designed by the contractor and approved by the Resident on a case-by-case basis.

Appropriate Applications

- ▶ Work areas that require dewatering of contaminated water.

Limitations

- ▶ Shall not be located within wetlands or immediately adjacent to a water resource without pre-approval by the Surface Water Quality Unit.
- ▶ ROW restrictions may limit ability to use temporary sediment basins (may require temporary landowner agreements).
- ▶ Difficult to determine balance of inflow rates with outflow capacity. Excessive inflow rates may require multiple basins.
- ▶ Geotextile fabric may clog with fine sediments and may require multiple basins.
- ▶ Frozen ground conditions eliminate the potential for infiltration.
- ▶ Difficult to design basin capacity for intended use because of seepage rates into cofferdam, quality of water pumped, and treatment capacity of basin or downstream flow area. Adequate operation requires initial monitoring and may require trial and error adjustments.

Standards and Specifications

- ▶ Location shall be approved by the Resident.
- ▶ Basins shall have a minimum length to width ratio (from inlet to outlet) of 2:1. The longer the better. Flow through the basin can be lengthened by installing baffles.

- ▶ Basins shall be located in an upland area with a maximum ground slope of 2%.
- ▶ Temporary basins should discharge to a stable and well-vegetated area (meadow grass or forested) by sheet flow to provide further treatment. Downstream flow area shall have a maximum ground slope of 5% and a minimum distance from a wetland or waterbody of 25 linear feet. Basins may discharge to an existing drainage swale provided that the discharge has been adequately treated.
- ▶ Above-ground basins shall consist of Non-woven geotextile, meeting Materials Specification 722.03 - Erosion Control Geotextile, draped over a perimeter of haybales or concrete barriers, or enclosed perimeter of silt-fence buttressed by staked haybales.
- ▶ Natural depressions and/or excavated basins shall provide sufficient impounding capacity to handle flow from work area without overtopping. Low points may be blocked off with sandbags, wrapped haybales or similar temporary dams to prevent overtopping.
- ▶ If overtopping will occur, the dewatering process shall cease and measures taken to correct. Options include allowing water to draw down, constructing additional basins, or pumping to a tank truck for off-site disposal.

Application Procedures

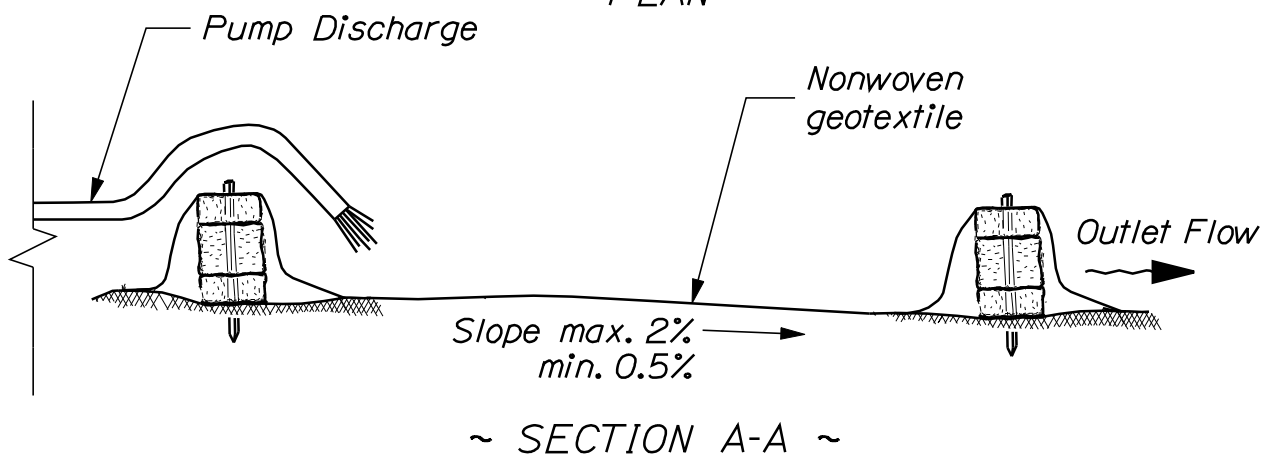
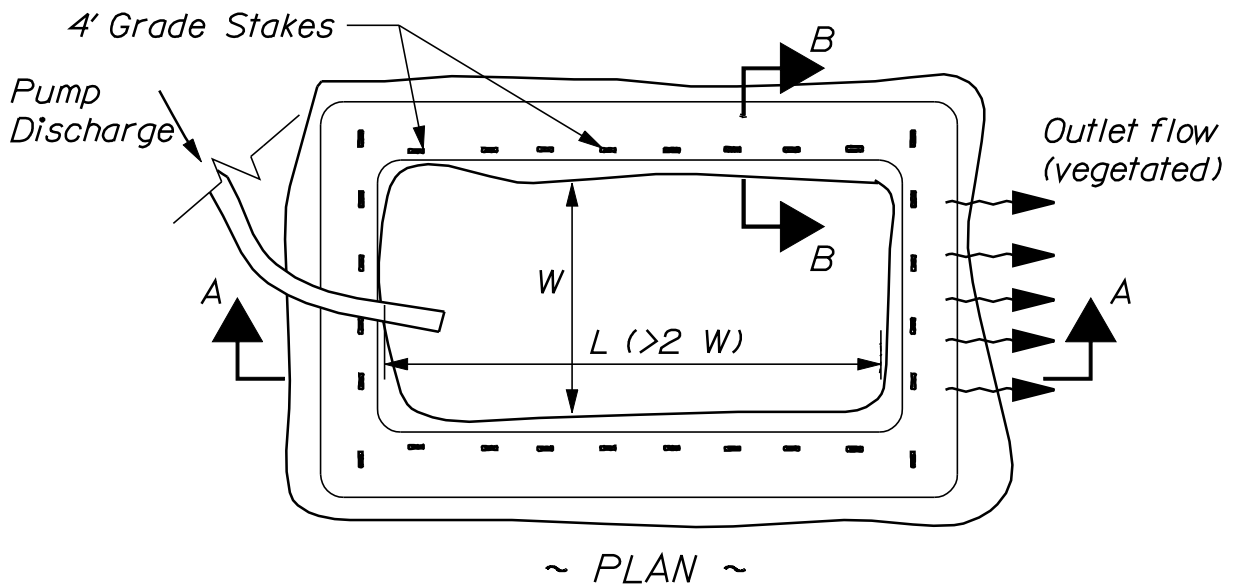
- ▶ For above ground basins using non-woven geotextile, clear area of woody vegetation that may damage fabric.
- ▶ Construct basin.
- ▶ Set up and secure dewatering discharge hoses.
- ▶ Monitor function of basin, including downstream flow.

Maintenance and Inspections

- ▶ Temporary sedimentation basins shall be monitored routinely (hourly) during usage. Frequency depends on the volume and quality of water being treated. Check for leakage, short-circuiting, and overtopping. Repairs should be made immediately.
- ▶ Inspect downstream filter area for concentrated flow and potential erosion of soil and forest duff layer. Inspect location where water discharges to the resource for water quality.
- ▶ If the basin overtops during operation or if downstream filter area is not adequately performing, stop pumping immediately and initiate mitigation from the following options:
 - Establish better cofferdam seals.
 - Reinstall and, if needed, relocate additional basin(s).
 - Clean out sediment (typically conducted when the basin is half full) and dispose of in an approved area or facility.
 - Arrange for pumping to tank truck for off-site disposal.
 - Upon completion of the work, the basin shall be dismantled and the area shall be permanently stabilized with seed and mulch as needed.

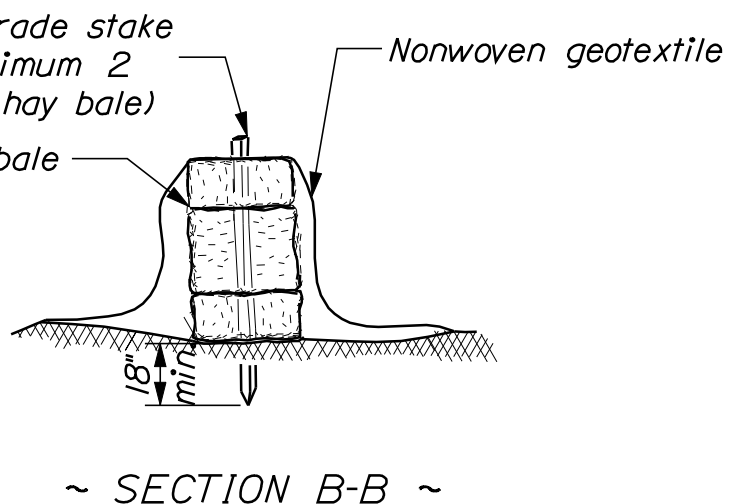
References

- ▶ Materials Specification 722.03 - Erosion Control Geotextile



Notes:

1. Most non-woven geotextile is available in 12.5' and 15' widths. If multiple widths are used, overlap by 1 foot.
2. Design basin according to Best Management Practices for Erosion and Sedimentation Control - Temporary Sediment Basin.



REF:

Best Management Practice for Erosion and Sedimentation Control - Temporary Sediment Basin

TEMPORARY SEDIMENT BASIN 802(15)

7. GEOTEXTILE FILTER BAGS

Definition and Purpose

Geotextile filter bags are manufactured sedimentation devices consisting of a prefabricated sack made from a non-woven geotextile. They are designed to accept a pump discharge hose. Filter bags are used to treat contaminated water (sediment, pH) from a dewatering process. They provide water treatment through the following mechanisms:

- ▶ Reduction in velocity of the discharge flow providing adequate time for sediment to settle out.
- ▶ Filtration of coarse sediment through a permeable non-woven geotextile.
- ▶ Sheet flow discharge from filter bag through a vegetated area removes an additional portion of finer sediments.
- ▶ Potential infiltration into the ground, providing optimal treatment of all finer sediments.

Appropriate Applications

- ▶ Work areas that require dewatering of contaminated water.

Limitations

- ▶ Shall not be located within wetlands or immediately adjacent to a water resource without pre-approval by the Surface Water Quality Unit.
- ▶ ROW restrictions may limit ability to use temporary sedimentation basins (may require temporary landowner agreements).
- ▶ Difficult to determine balance of inflow rates with outflow capacity. Excessive inflow rates may require multiple filter bags or alternative measures.
- ▶ Frozen ground conditions eliminate the potential for infiltration.
- ▶ Filter bags have a finite capacity for sediment removal and may be prone to plugging and failure if these limitations are exceeded.

Standards and Specifications

- ▶ Location shall be approved by the Resident.
- ▶ There are numerous manufacturers of filter bag devices. Filter bags should be used in accordance with manufacturer recommended guidelines.
- ▶ Filter bags shall be located in an upland area with a maximum ground slope of 2%.
- ▶ Filter bags should discharge to a stable and well-vegetated area (meadow grass or forested) by sheet flow to provide further treatment. Downstream flow area shall have a maximum ground slope of 5% and a minimum distance from a wetland or waterbody of 25 linear feet. Filter bags may discharge to an existing drainage swale provided that the discharge has been adequately treated.
- ▶ If flow-through capacity is exceeded, the dewatering process shall cease and measures taken to correct. Options include replacement of filter bag, constructing additional basins, or pumping to a tank truck for off-site disposal.

Application Procedures

- ▶ Site and set-up filter bags prior to initiating in-water work activity.

Maintenance and Inspections

Filter bags shall be inspected routinely (hourly) during usage. Proper inspection and maintenance should consist of the following:

- ▶ Inspect the filter bag for tears and/or other malfunction, if proper filtering is not occurring. Dewatering should be discontinued until leaks can be repaired and/or bag is replaced.
- ▶ Inspect filter bag for signs of plugging. Plugging may be evidenced by a significant reduction in discharge through the geotextile and/or increased rounding of the bag. Plugged filter bags tend to bloat (like a balloon) as they become plugged. Plugged bags may rupture abruptly if not inspected regularly.
- ▶ Inspect discharge from filter bag to ensure that sediment is not discharging to the resource. If sediment discharge is observed, dewatering should be discontinued and corrective measures taken.
- ▶ If the filter bag becomes plugged and loses capacity, stop pumping immediately and initiate mitigation from the following options:
 - Establish better cofferdam seals.
 - Install and, if needed, relocate additional filter bags or Temporary Sedimentation Basins.
 - Arrange for pumping to tank truck for off-site disposal.

Upon completion of the dewatering activity, the filter bag shall be removed from the site and all sediments disposed of in an approved area or facility.

References

- ▶ Manufacturer's Guidelines and Specifications



G. Miscellaneous

G. MISCELLANEOUS

This section includes practices that do not fit well into other sections of this manual although they are of equal importance. These practices include:

- ▶ Dust Control
- ▶ Sweeping and Vacuuming
- ▶ Construction Entrance/Exit
- ▶ Winter Stabilization

1. DUST CONTROL

Definition and Purpose

This BMP is the application of water, or a soil binder, to exposed soils in order to minimize wind erosion.

Appropriate Applications

- ▶ Apply on an open roadbed where wind and traffic result in generation of dust.
- ▶ Use on exposed areas during dry weather conditions.

Limitations

- ▶ Watering is only effective for a short period and may need to be applied several times a day.
- ▶ Excessive watering can produce sediment-laden runoff and a potential off-site discharge.
- ▶ Excessive use of calcium chloride and other salts can cause plant damage and impact water quality.
- ▶ Some of the soil binders require pre-wetting (refer to Manufacturer's Guidelines and Specifications).
- ▶ Soil binders typically have a 24 hour curing time and minimum temperatures for use (refer to Manufacturer's Guidelines and Specifications).
- ▶ Asphalt or oil-based binders are not permitted.

Standards and Specifications

- ▶ If commercial soil binders are used, refer to Manufacturer's Guidelines and Specifications.
- ▶ Of the soil binders, calcium chloride is the most common; magnesium chloride may also be used. Other binders such as lignin sulfonate, guar, or other products may be used with the approval of the Resident.
- ▶ Application rates of water are determined by site specific conditions based on texture of soil and weather conditions.
- ▶ Water and other soil binders shall be applied by means which will ensure an even distribution without causing surface runoff.

Application Procedures

- ▶ Follow Manufacturer's Guidelines and Specifications for application rates and other application requirements.

Maintenance and Inspection

- ▶ Continue to reapply as necessary to prevent dust.

References

- ▶ Manufacturer's Guidelines and Specifications

2. SWEEPING & VACUUMING

Definition and Purpose

Sweeping and vacuuming of paved surfaces removes sediments tracked onto bridges and roads and minimizes the potential of sediment washing into waterbodies and other protected natural resources. Removal of tracked sediments also helps limit the generation of dust.

Appropriate Applications

- ▶ Anywhere sediments have been tracked onto roadways or bridges.

Limitations

- ▶ Sweeping itself can raise dust. Vacuuming is preferred whenever possible.
- ▶ Sweeping and vacuuming may not be completely effective if the sediments are wet or muddy.

Standards and Specifications

- ▶ Refer to Manufacturer's Guidelines and Specifications.

Application Procedures

- ▶ On public roads, use all required safety practices.
- ▶ Sweep from centerline to edge of travel way.
- ▶ Remove accumulated material.
- ▶ Do not sweep into any waterbody, wetland, or concentrated flow channel.

Maintenance and Inspection

- ▶ On construction sites, sweep and/or vacuum daily or as often as necessary to keep surfaces clean from sediment and/or dust. Clean sediments (free of trash or debris) can be re-used onsite as long as they are stabilized. Otherwise, the sweepings must be properly disposed of in accordance with state laws and regulations.

3. CONSTRUCTION ENTRANCE/EXIT

Definition and Purpose

A construction entrance/exit is a rough, stable pad of stone underlain with geotextile fabric, located at any point where traffic will leave construction sites or other off-road construction areas and enter a public right-of-way. As construction vehicles travel over the surface, dirt and mud is removed from the tires minimizing off-site impacts.

Appropriate Applications

- ▶ Used at any construction site facility where tracking of sediments onto paved surfaces is a potential water quality or safety concern.
- ▶ Where dust is a concern during dry weather.

Limitations

- ▶ Stone for the construction entrance/exit may become clogged with sediment and need to be replaced.

Standards and Specifications

- ▶ Refer to Standard Detail Drawing.
- ▶ The construction entrance/exit shall be as wide as the widest vehicle plus 3 feet on each side and a minimum length of 50 feet.
- ▶ Thickness of stone layer should be a minimum of 8 inches. In soft soils, consult with a geotechnical engineer.
- ▶ Stone for the BMP shall be Stone for French Drains or Stone Ditch Protection (MaineDOT Materials Specification 703.24 and 703.29) and must be angular or sub-angular in shape, but without sharp edges that may cut tires.
- ▶ Grade the construction entrance/exit so that it will not provide a conduit for stormwater runoff to leave the yard or facility.

Application Procedures

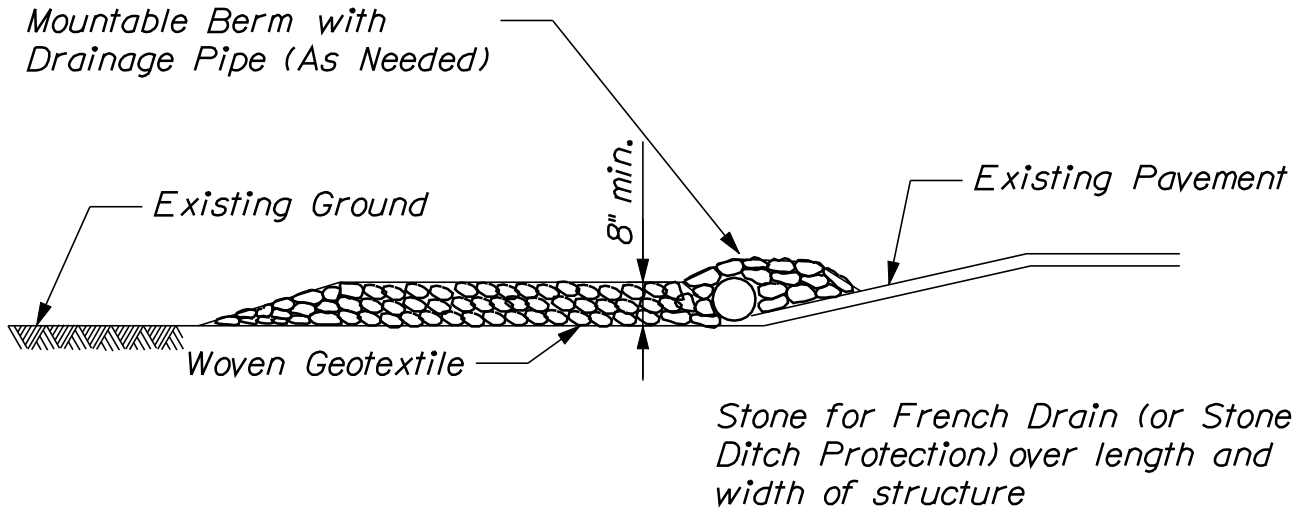
- ▶ Grade the construction entrance/exit and install geotextile. Place stone a minimum of 8 inches thick in a uniform layer.

Maintenance and Inspection

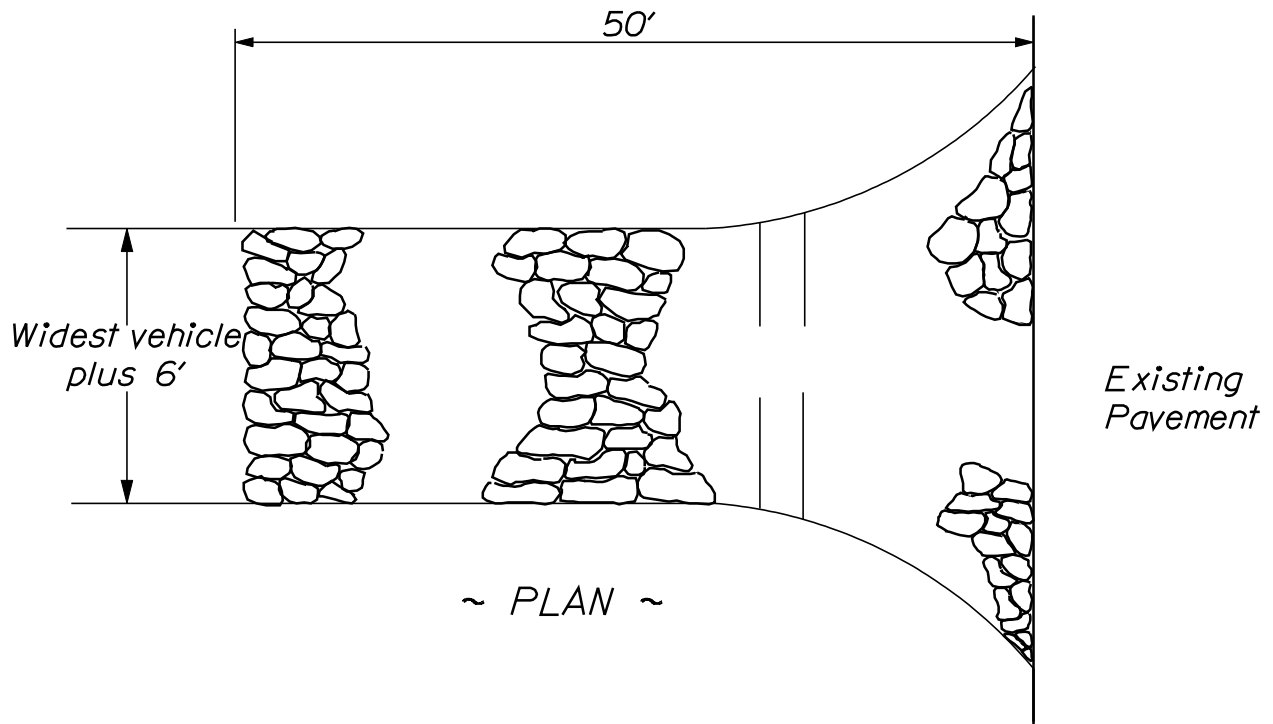
- ▶ The BMP shall be inspected weekly as well as before, during and after each storm event. Stone may need to be added or replaced when the surface becomes clogged with sediment. Any soil that does track onto the public road shall be removed; see **Sweeping and Vacuuming**.

References

- ▶ Standard Specification 610 – Stone Fill, Riprap, Stone Blanket, and Stone Ditch Protection
- ▶ Standard Specification 620 – Geotextiles
- ▶ Materials Specification 703.24 – Stone for French Drains
- ▶ Materials Specification 703.29 – Stone Ditch Protection



~ PROFILE ~



~ PLAN ~

REF: Best Management Practice for Erosion and Sedimentation Control - Stabilized Construction Entrance/Exit

CONSTRUCTION ENTRANCE/EXIT

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4. WINTER STABILIZATION

Definition and Purpose

This BMP includes practices which will provide for stabilization of soils during winter conditions, frozen ground, and spring thaws.

Appropriate Applications

- ▶ Any area of exposed soil that does not have adequate cover to prevent erosion through the winter as determined by the Resident and/or the SWQU staff.
- ▶ It does not include gravel road base or gravel shoulders.
- ▶ It does include areas that were seeded and mulched before November 1st but do not have 90% cover as specified in Standard Specification 618 – Seeding.

Limitations

- ▶ Subject to weather conditions. Successful implementation of erosion control measures cannot be guaranteed when applied over frozen or snow covered ground. Permanent stabilization of disturbed soils prior to November 1st is always preferred.
- ▶ Germination rates for areas seeded after October 15 will be lower than otherwise expected. Reseeding in spring is likely.
- ▶ Cellulose fiber mulch is not acceptable for winter stabilization.

Standards and Specifications

- ▶ Temporary winter stabilization must be used between November 1 and April 1 or outside of that time period if the ground is frozen or snow covered. Temporary winter stabilization involves, at a minimum, covering all disturbed soils and seeded ground that is not “Acceptable Work” with an approved method. If temporary winter stabilization practices are used, spring procedures for permanent stabilization shall also be described in the SEWPCP. Use of these methods for over-winter temporary erosion control will be incidental to the contract and be paid for as part of Pay Item 656.75
- ▶ Mulch (either hay or straw or erosion control mix), stone, or erosion control blanket shall not be applied on top of snow. The snow shall first be removed down to 1 inch or less in depth.
- ▶ Groundwater seeps and/or surface runoff shall be anticipated and given consideration when winter stabilization involves backslopes. The water shall be either diverted into a temporary pipe or carried in a riprap downspout to a stabilized channel.
- ▶ Sheet and rill winter erosion control methods
 - Double application of **hay or straw mulch** at 150 lbs/1000 sf (3 tons/acre) properly anchored; see **Hay and Straw Mulch - SR-EC**.
 - Erosion control mix applied to a thickness of 4 inches; see **Erosion Control Mix - SR-EC**. In the spring, the contractor shall either remove the erosion control mix and apply permanent seed and mulch in accordance with Standard Specification 618 - Seeding, or seed over the erosion control mix with seed mix method 3 or a specialty mix provided by the MaineDOT Landscape Unit.

- ▶ Concentrated flow winter erosion control methods:
 - Permanent stabilization BMPs of stone or **erosion control blanket (SR-EC)**. No other measures required.
- ▶ Winter sedimentation control measures - no additional measures required but existing BMPs shall be in place and clean of accumulated sediment as of November 1st.

Application Procedures

- ▶ Consult appropriate BMP section for each type described above.

Maintenance and Inspections

- ▶ Inspections shall be made after each rainfall, and/or thaw event during the winter. Eroding areas shall be repaired immediately and additional BMPs installed as necessary to prevent future erosion. Sediment shall be removed from behind sediment barriers when half full (snow shall be removed as necessary to check sediment levels).