Storm Drain Inlet Protection For Construction Sites

(1060)

Wisconsin Department of Natural Resources
Conservation Practice Standard

I. Definition

A temporary barrier installed around a storm drain inlet, drop inlet or curb inlet.

II. Purposes

The purpose of this practice is to reduce sediment from entering storm drains before stabilizing the contributing drainage area.

III. Conditions Where Practice Applies

This practice applies where runoff from construction sites enters conveyance system structures such as drain inlets, drop inlets, and curb inlets. Inlet protection devices are for drainage areas of one acre or less. Runoff from areas larger than one acre should be routed through a properly designed sediment trapping or settling practice upstream of the inlet.

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of storm drain inlet protection. This standard does not contain the text of federal, state, or local laws.

V. Design Criteria

This section establishes the minimum standards for design, installation and performance requirements.

The appropriate type of inlet protection barrier shall be installed once the drain, drop, or curb inlet can receive runoff. The device shall remain in place and be maintained until the disturbed area is stabilized.

A. General Criteria that is applicable to all inlet protection devices.

1. Ponding water to settle sediment is encouraged; however ponding shall not interfere with the flow of traffic, create a safety hazard, or cause property damage. All devices shall have provisions such as weep holes or "emergency spillways" to safely pass water if the device becomes clogged.

2. The contributing drainage area to the inlet protection device shall be one acre or less. In instances were a larger contributing drainage area exists, runoff shall be routed through a properly designed sediment trapping or settling device upstream of inlet.

3. Other than Type D inlet protection devices, no gaps shall be left in the material used that would allow the flow of water to bypass the inlet protection device.

4. All fabrics used as part of an inlet protection device must be selected from the list of approved fabrics certified for inlet protection, Geotextile Fabric, Type FF in the current addition of the WisDOT Product Acceptability List (PAL).

B. Criteria Applicable to Unpaved areas or the Pre-Paving Phase of Construction

1. Inlet Protection Barriers include, but are not limited to, straw bales, sandbags, other material filled bags and socks, and stone weepers. These devices can be used to either settle sediments or divert flows.

   a. Manufactured bags, when used, shall conform to the standards in Table 1.

Table 1	
Minimum Size	14 x 26 inches
Grab Tensile strength of fabric, ASTM D-4632	95 lb. min.
UV stability, ASTM D-4355	70 % min.
Note: To provide sufficient strength, fabric shall be sewn together with double stitching.	

b. Straw Bale installation shall conform to the criteria outlined in the WDNR Conservation Practice Standard (1055) Sediment Bale Barrier (Non-Channel).

c. Stone weeper installation shall conform to the criteria in WDNR Conservation Practice Standard (1063) Sediment Trap.

2. Filter Fabric Barrier Criteria - See Figure 1 Inlet Protection

a. Inlet protection Type A devices shall be utilized around inlets and unpaved areas until permanent stabilization methods have been established. Type A devices shall be utilized on inlets prior to installation of curb and gutter or pavement, and where safety considerations are not compromised on the site.

b. Type B shall be utilized after the casting and grate are in place.

c. Type D shall be utilized in areas where other types of inlet protection are identified as incompatible with roadway and traffic conditions, causing possible safety hazards when ponding occurs at the inlet. Type D shall only be used after castings are in place on top of the inlet boxes.

Type D inlet protection shall conform to the standard drawing as shown in the plans. There shall be a three-inch space between the bag and the sides of the inlet to prevent the inlet sides from blocking the overflow; and shall only be used in inlets deeper than 30 inches from the top of grate to bottom of the inlet. If such clearance is not available, cinch or tie the sides of the bag (with rope or ties) to provide clearance.

C. Criteria Applicable to the Post-Paving / Curbing Phase of Construction

1. Inlet protection Types B, C, and D are applicable to post paving construction. See Figure 1 Inlet Protection.

a. Type B shall be utilized on inlets without curb box.

b. Type C shall be utilized on street inlets with curb heads. A 1½" x 3 ½" (37mm by 87 mm) minimum, piece of wood shall be wrapped and secured in the fabric and placed in front of the curb head as shown in the plans. The wood shall not block the entire opening of the curb box and be secured to the grate with wire or plastic ties.

c. Type D

VI. Considerations

A. When site conditions allow, inlets should be temporarily closed or sealed to prevent entrance of runoff and sediment.

B. The best way to prevent sediment from entering the storm sewer system is to stabilize the disturbed area of the site as quickly as possible, preventing erosion and stopping sediment transport at its source.

C. Storm drain inlet protection consists of several types of inlet filters and traps and should be considered as only one element in an overall erosion control plan. Each type differs in application with selection dependent upon site conditions and inlet type. Not all designs are appropriate in all cases. The user must carefully select a design suitable for the needs and site conditions.

D. Inlet protection is only as effective as the filter or barrier used around the inlet. Effectiveness decreases rapidly if the inlet protection is not properly maintained. In general, inlet protection provides relatively good removal of coarse and medium-sized soil particles from runoff however, most fine silt and clay particles will pass through the filtering mechanisms.

E. Properly maintaining inlet protection can be difficult and often inlets can become clogged. Field experience has shown that inlet protection that causes excessive ponding in an area of high construction activity may become so inconvenient that it is simply removed or bypassed, thus transmitting sediment-laden flows unchecked. In such situations, a structure with an adequate overflow mechanism should be utilized instead of simply removing the inlet protection device.

F. Inlet protection devices can be enhanced by additional excavation to increase the storage capacity around the inlet.

G. Good construction site housekeeping measures, such as keeping the gutters clean, and street sweeping are important.

VII. Plans and Specifications

Plans and specifications for installing inlet protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose:

A. Location of inlet protection and type employed

B. Material spec conforming to standard

C. All plans, standard detail drawings, or specifications shall include schedule for installation, inspection, and maintenance. The responsible party shall be identified.

VIII. Operation and Maintenance

A. Remove inlet protection devices once the contributing drainage area is stabilized with appropriate vegetation or impervious area.

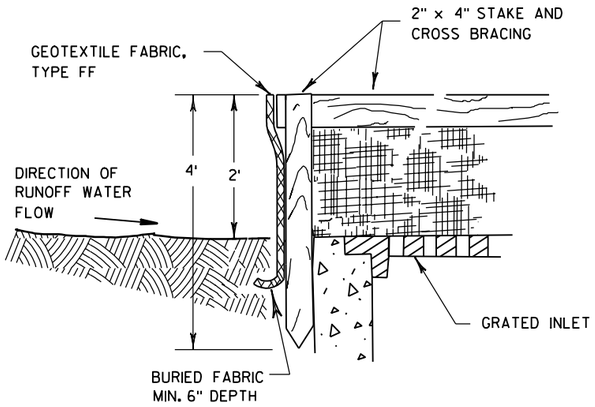
B. Inlet protection shall be at a minimum inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

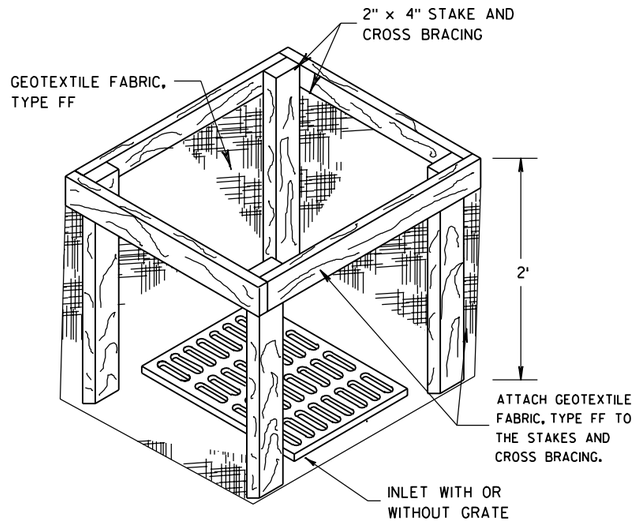
C. Sediment deposits shall be removed and the inlet protection device restored to its original dimensions when the sediment has accumulated between 1/3 to 1/2 the design depth of the device, or when the device is no longer functioning as designed. Removed sediment shall be deposited in a suitable area and stabilized.

D. Due care shall be taken to ensure sediment does not fall into the inlet and impede the intended function of the device. Any material falling into the inlet shall be removed.

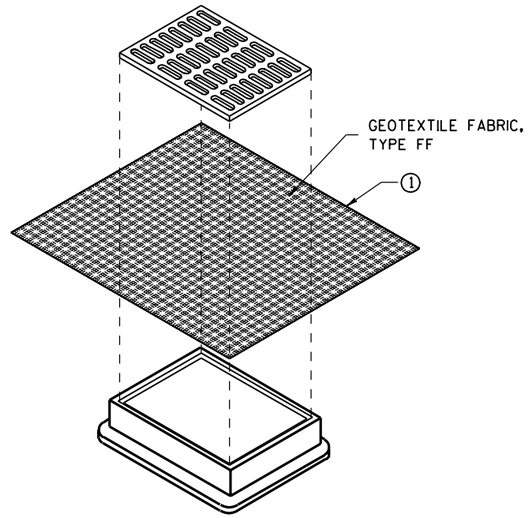
IX. References

WisDOT "Erosion Control Product Acceptability List" is available online at: http://www.dot.wisconsin.gov/business/engrserv/pal.htm Printed copies are no longer distributed.



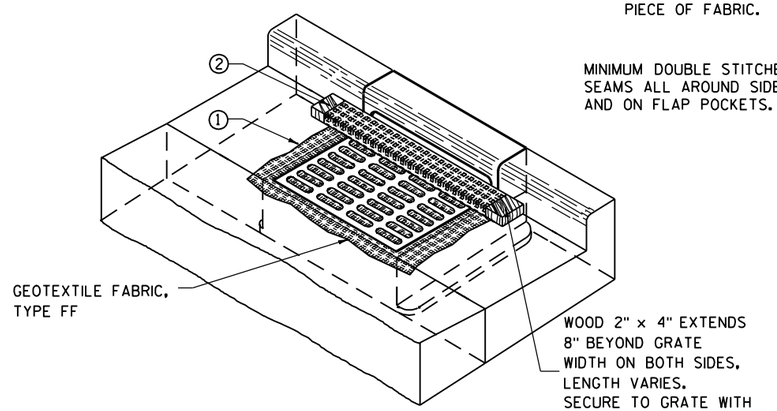


INLET PROTECTION, TYPE A

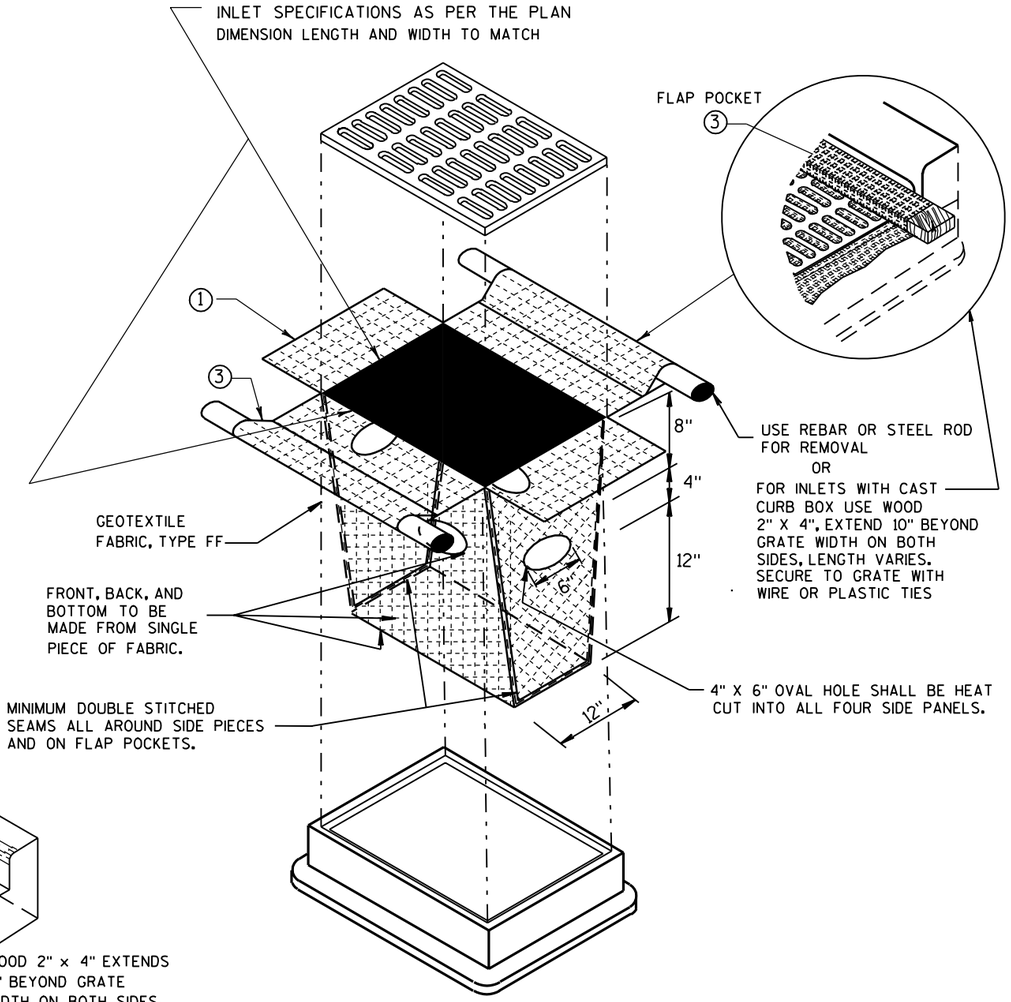


INLET PROTECTION, TYPE B
(WITHOUT CURB BOX)

(CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX)



INLET PROTECTION, TYPE C (WITH CURB BOX)



INLET PROTECTION, TYPE D

(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE ②)

GENERAL NOTES

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

② FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.

③ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

INSTALLATION NOTES

TYPE B & C

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

TYPE D

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 10-2.

INLET PROTECTION
TYPE A, B, C, AND D