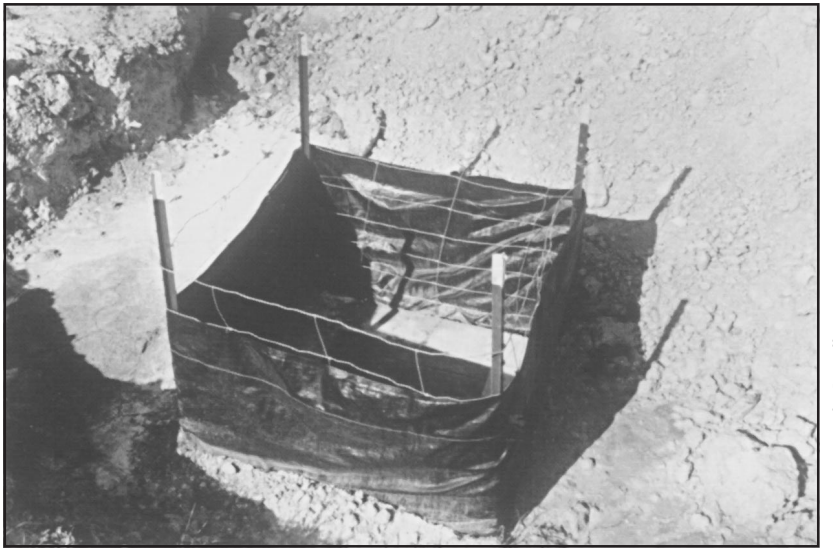
Fabric Drop Inlet Protection

Practice Description

A temporary woven geotextile barrier placed around a drop inlet to prevent sediment from entering the storm drains during construction operations. This practice applies where early use of the storm drain system is necessary.



Filter fabric is only one way of protecting stormwater inlets from siltation early in the grading process.

DEHNR. North Carolina

Recommended Minimum Requirements

Prior to start of construction, fabric drop inlet protection structures should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process.

- **Drainage area:** Less than 1 acre per inlet.
- **Capacity:** 10-year or design storm should enter inlet without bypass flow.
- **Height of fabric:** 1.5 feet maximum, 1 foot minimum; base of fabric should be buried at least 6 inches below the ground surface.

- **Approach:** Less than 1% slope.
- **Sediment Storage:** Generally 35 yard^3/disturbed acre/year for watershed slopes of under 8%; 100 yard^3/disturbed acre/year for slopes over 8%.
- **Support Posts:** Steel fence posts or 2-inch x 4-inch wooden posts. Minimum length of the stakes should be 3 feet; maximum spacing of stakes should be 3 feet.
- **Fabric:** Durable, high-strength synthetic woven fabric.
- **Framing:** Use frame to connect the tops of the posts to stabilize the structure.
- **Stakes:** Close to the drop inlet so that overflow will fall directly into the structure and not onto unprotected soil.
- **Safety:** Provide protection to prevent children from entering the inlet and outlet.

Construction

Space stakes evenly around the perimeter of the inlet a maximum of 3 feet apart, and securely drive them into the ground, approximately 18 inches deep.

To provide needed stability to the installation, frame with 2 x 4-inch wood strips or other suitable materials around the crest of the overflow area at a maximum of 18 inches above the drop inlet crest.

If possible, cut fabric from one continuous roll to eliminate joints.

Place the bottom 12 inches of the fabric in a trench and backfill the trench with crushed stone or compacted soil.

Fasten the fabric securely to the stakes and frame. Joints should be overlapped to the next stake.

Optional: Wire fence may be used to support the fabric. The wire should be 14-gage minimum with maximum mesh spacing of 6 inches. The top

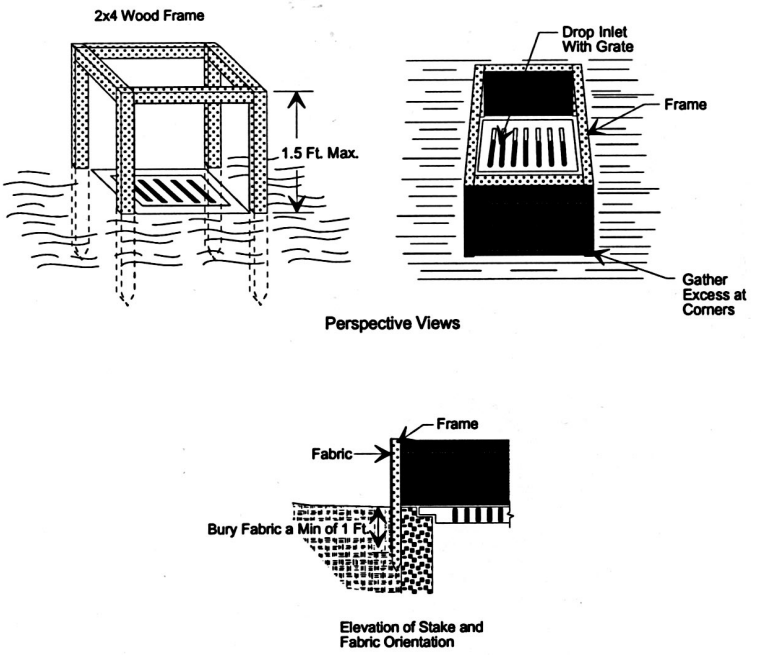


Figure 5.28 Fabric Drop Inlet Protection

of the fence should be level, and the bottom should be buried at least 6 inches below ground surface.

The top of the frame and fabric must be well below the ground elevation downslope from the drop inlet to keep runoff from bypassing the inlet. It may be necessary to build a temporary dike on the downslope side of the structure to prevent bypass flow. Material from within the sediment pool may be used for dike construction.

Optional: Straw bales may be used in lieu of fabric. If this method is selected, install bales as described in *Straw Bale Sediment Trap* section. Straw bales should be set back 12 to 24 inches from inlet.

Stabilization Stabilize all bare areas around the inlet.

Construction Verification Check finished grades and dimensions of fabric drop inlet protection structures.

Troubleshooting

Consult with registered design professional if any of the following occur:

- Variations in topography on site indicate fabric drop inlet protection will not function as intended; changes in plan may be needed.
- Design specifications for posts, fabric or fencing cannot be met; substitution may be required. Unapproved substitutions could result in failure of the structure.

Maintenance

Inspect fabric barrier after each rainfall event and make needed repairs immediately.

Remove sediment from the pool area as necessary to provide adequate storage volume for the next rain. Take care not to damage or undercut the fabric during the sediment removal.

When the contributing drainage area has been adequately stabilized, remove all materials and unstable sediment and dispose of properly. Bring the disturbed area to the grade of the drop inlet; smooth and compact it.

Common Problems

Posts and fabric not supported at top—use frame to support tops of post and fence to support fabric.

Fabric not properly buried at bottom; resulting in undercutting—use proper installation to bury fabric.

Sediment not removed from pool; resulting in inadequate storage volume for the next storm—remove sediment as needed to prevent build-up.

Top of fabric set too high; resulting in flow bypassing the inlet—lower top of fabric.

Fence not close enough to inlet; resulting in erosion and undercutting of inlet—relocate fence adjacent to inlet.

Land slope at drain inlet too steep; resulting in high flow velocity and poor trapping efficiency—flatten slope at inlet.

Excavated Drop Inlet Protection

Practice Description

An excavated area in the approach to a storm drain drop inlet or curb inlet. The purpose is to trap sediment at the approach to the storm drainage system and not permit sediment to flow into the storm drain. This practice applies where early use of the storm drain system is necessary.

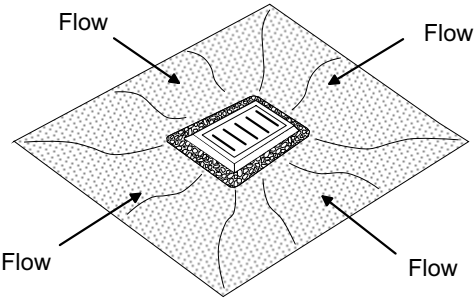


Figure 5.29 Perspective of Excavated Drop Inlet Protection

Recommended Minimum Requirements

Prior to start of construction, excavated drop inlet protection structures should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process.

- **Drainage Area:** Less than 1 acre per inlet.
- **Capacity:** 10-year or design storm should enter inlet without bypass flow.
- **Minimum Depth:** 1 foot, as measured from the top of the drop inlet.
- **Maximum Depth:** 2 feet, as measured from the top of the drop inlet.

- **Side Slopes:** 2:1 or flatter around the excavation.
- **Dewatering:** Place drain holes in drop inlet, covered with wire screen and gravel.
- **Gravel:** Use clean gravel, 1/2 to 3/4 inch in diameter.
- **Sediment Storage:** Keep the minimum volume of excavated material around the drop inlet at approximately 35 yd^3/disturbed acre.
- **Basin Shape:** To fit site conditions, with the longest dimension oriented toward the longest inflow area to provide maximum settling efficiency.
- **Drain:** Install provision for draining the temporary pool to improve trapping efficiency for small storms and to avoid problems from standing water after heavy rains.
- **Safety:** Provide protection to prevent children from entering the inlet or outlet.

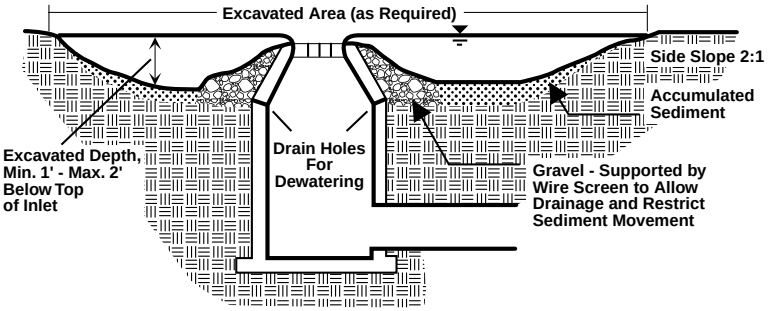


Figure 5.30 Cross section of Excavated Drop Inlet Protection

Construction

Determine exact location of underground utilities.

Clear the area of all debris that might hinder excavation and disposal of spoil.

Excavate the basin to the depth, side slopes and dimensions shown on the plans.

Grade the approach to the inlet uniformly.

Install drain holes in the drop inlet to drain pool slowly. Cover holes with wire screen and place gravel around sides of inlet.

When necessary, spoil may be placed to form a dike on the downstream side of the excavation to prevent bypass flow.

Erosion Control

Stabilize disturbed areas, except the excavated pool bottom, in accordance with vegetation plan.

Construction Verification

Check finished grades and dimensions of excavated drop inlet protection structures.

Troubleshooting

Consult with registered design professional if the following occurs:

- Variations in topography on site indicate excavated drop inlet protection will not function as intended; changes in plan may be needed.

Maintenance

Inspect, clean and properly maintain the excavated basin after every storm until the contributing drainage area has been permanently stabilized.

Remove sediment when the excavated volume is approximately one-half full.

Spread all excavated material evenly over the surrounding land area or stockpile and stabilize it appropriately.

When the contributing drainage area has been permanently stabilized, seal drain holes, fill the basin with stable soil to final grading elevations, compact it properly, and establish vegetation or provide other means of protection.

Common Problems

Sediment producing area too large for basin design or inlet not properly maintained; resulting in sediment entering drain—enlarge basin and maintain inlet.

Gravel over drain holes plugged with sediment; resulting in excessive ponding—remove debris, clear sediment and replace gravel.

Blockage of storm drain from debris entering inlet; resulting in flooding and erosion—install trash rack around inlet.

Block and Gravel Inlet Protection

Practice Description

A sediment control barrier formed around a storm drain inlet by the use of standard concrete block and gravel. The purpose is to help prevent sediment from entering storm drains before the disturbed construction area is revegetated and stabilized. This practice applies where early use of the storm drain system is necessary.

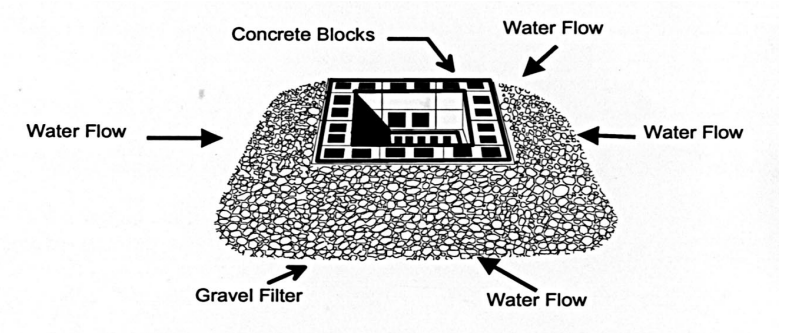


Figure 5.31 Typical Block and Gravel Drop Inlet Protection

Recommended Minimum Requirements

Prior to start of construction, block and gravel inlet protection structures should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process.

- **Drainage Area:** Less than 1 acre
- **Capacity:** 10-year or design storm should enter inlet without bypass flow.
- **Height:** Height of barrier should be between 1 and 2 feet.
- **Side Slopes:** Gravel placed around the concrete block structure should have side slopes of 2:1 or flatter.

- **Dewatering:** Some blocks in bottom row should be placed on their side for drainage.
- **Gravel:** Use clean gravel, 1/2 to 3/4 inch in diameter. Place hardware cloth or comparable wire mesh with 1/2-inch openings over all block openings to hold gravel in place.
- **Safety:** Provide protection to prevent children from entering the pipe inlet.

The top elevation of the structure must be at least 6 inches lower than the ground elevation downslope from the inlet. It is important that all storm flows pass over the structure and into the storm drain and not past the structure. Temporary dikes below the structure may be necessary to prevent bypass flow. Material may be excavated from inside the sediment pool for this purpose.

Construction

Determine exact location of underground utilities.

Clear area of all debris that might hinder excavation and disposal of spoil.

Grade the approach to the inlet uniformly.

Lay one block on its side in the bottom row on each side of the structure to allow pool drainage. The foundation should be excavated at least 2 inches below the crest of the storm drain. Place the bottom row of blocks against the edge of the storm drain for lateral support and to avoid washouts when overflow occurs. If needed, give lateral support to subsequent rows by placing 2 x 4 wood studs through block openings.

Carefully fit hardware cloth or comparable wire mesh with 1/2-inch openings over all block openings to hold gravel.

Place gravel around blocks on a 2:1 slope or flatter, 2 inches below the top of the blocks, and smooth to an even grade.

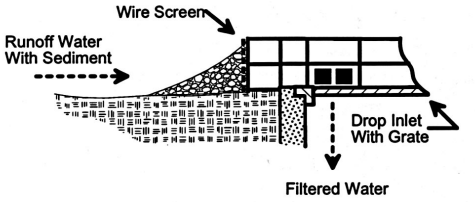


Figure 5.32 Detail of Block and Gravel Drop Inlet

Erosion Control

Stabilize disturbed areas in accordance with the vegetation plan.

Construction Verification

Check finished grades and dimensions of block and gravel drop inlet protection structures.

Troubleshooting

Consult with registered design professional if the following occurs:

- Variations in topography on site indicate block and gravel drop inlet protection will not function as intended; changes in plan may be needed.

Maintenance

Inspect the barrier after each rain and make repairs as needed.

Remove sediment as necessary to provide adequate storage volume for subsequent rains.

When the contributing drainage area has been adequately stabilized, remove all materials and any unstable soil, and salvage or dispose of it properly. Bring the disturbed area to proper grade, then smooth and compact it. Appropriately stabilize all bare areas around the inlet.

Common Problems

Top of structure too high; resulting in bypass flow and erosion—lower height of structure.

Blocks not placed firmly against storm drain inlet; resulting in scour—reset blocks firmly against drain inlet.

Drainage area too large; resulting in poor trap efficiency and/or sediment overload—increase size of temporary sediment pool.

Approach to drain too steep; resulting in high flow velocity and poor trap efficiency—use excavated basin (see *Excavated Drop Inlet Protection*).

Sediment not removed promptly; resulting in sediment entering the storm drain—remove sediment promptly following storms.