

3.9 INLET PROTECTION



Figure 3.14. Inlet protection (Source: Minnesota DOT)

Overview

Description: A manufactured protective device or barrier used to trap sediment at a storm drain surface or curb inlet.

Problem identification: During grading operations, measures are required to prevent sediment from moving from the work area into surface drains in the pavement curb or from area drains into the work area.

Design purpose: To trap sediment carried in stormwater runoff from disturbed areas and to prevent sediment from moving out of the work area.

Associated practices: Small basins should be used extensively around earth surface areas during construction and on a day-to-day basis as construction proceeds near where runoff will take place.

Installation: A number of practices provide storm drain inlet protection. Ideally, the drainage area is limited to one acre or less. Each practice will be reviewed separately below.

1. Curb drop inlet protection: Wire mesh of sufficient strength to support filter fabric with stone shall be placed so it extends 2 ft beyond the inlet in both directions. The 2-inch-sized stone should be placed against the filter fabric to a depth of 10 to 12 in. To ensure that runoff does not bypass the inlet, install temporary dikes directing the flow into the inlet.
2. Excavated drop inlet protection: The side slopes should be no steeper than 2:1. The excavated basin should be 1–2 ft deep. The basin should be shaped with the longest dimension oriented toward the longest inflow in order to result in maximum trap efficiency. The capacity of the basin should be 900 cu ft per acre. Weep holes protected with filter fabric and stone should be provided for draining the temporary pool.

3. Silt fence drop inlet protection: A 3 ft square frame, reinforced with wire mesh and covered with filter fabric on the sides, should be installed around an intake with the bottom edge sealed. The maximum height of the fabric should not exceed 18 in. Steps must be taken at the site and upstream to prevent water or sediment from overtopping the silt fence.
4. Sod drop inlet protection: Place the sod to form a turf mat completely covering the soil surface for a minimum distance of 4 ft on each side of the intake where runoff water will flow. The slope where the sod is placed should not exceed 4:1. During the first four weeks, the sod should be watered twice a week. The ground should be wet to a depth of 4 in. This method should only be applied in urban areas with a drainage area of less than 1/4 acre.
5. Compost filter tubes: Compost filter tubes can be placed around the perimeter of an area intake or in the throat or around the grate of a curb inlet.
6. Raise inlet of structure to provide a natural silt basin.
7. Keep elevation of fill one ft below inlet flow line.
8. Place silt basin approximately 200 ft ahead of entrance pipes in ditch grades 1% to 2%.

Maintenance/inspection: These structures should be inspected after every storm. Any sediment should be removed and disposed of on the site. Any damage should be repaired.

Design life: The life of an earth surface inlet protection is estimated to be three to six months, and that of a curb inlet protection is one year.

Estimated cost: Silt fence costs \$2.80 per linear ft (2004); crushed rock costs \$15.40 per ton (2004).

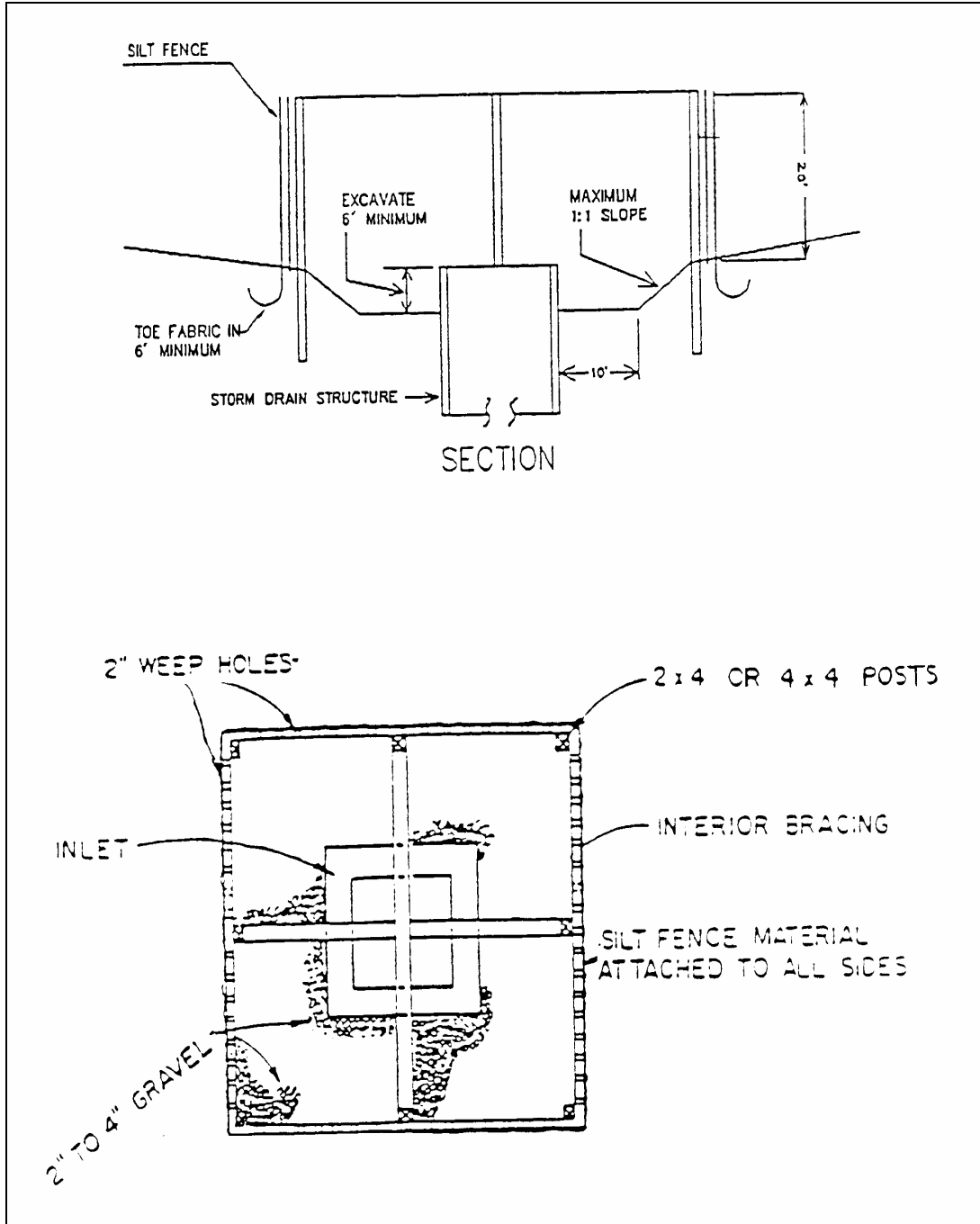


Figure 3.15. Inlet protection diagram (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)



Figure 3.16. Inlet sediment control (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)

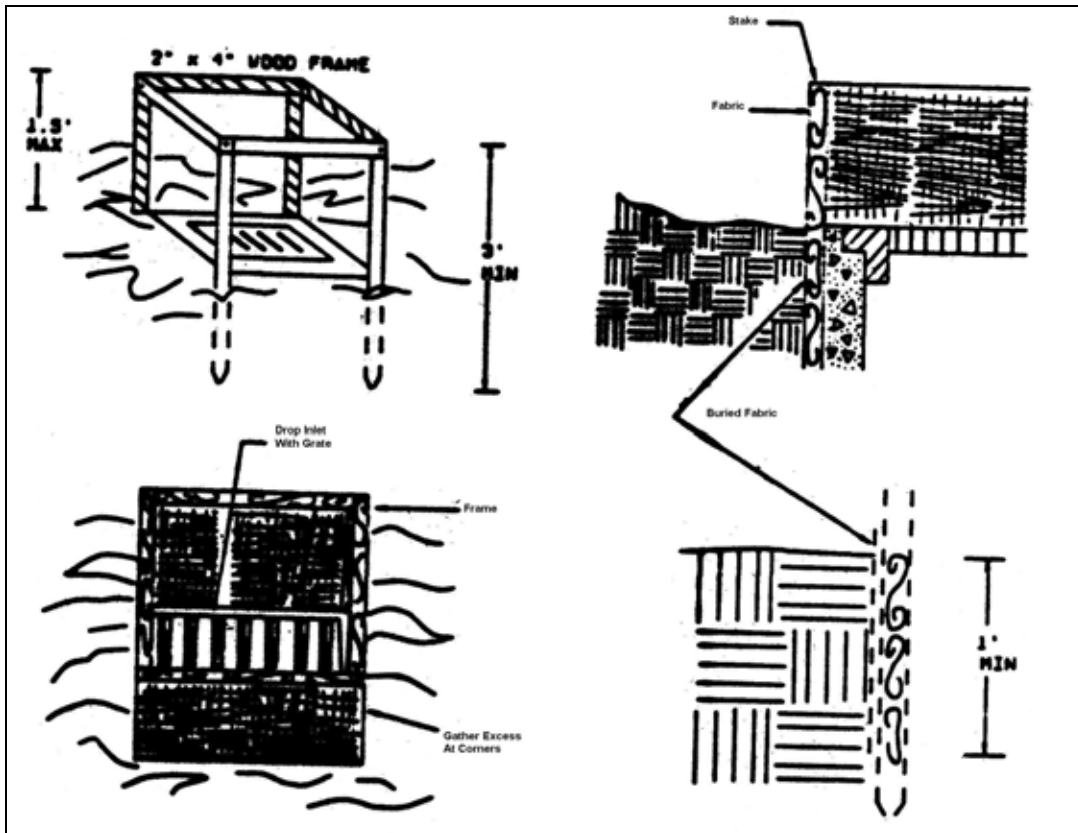


Figure 3.17. Filter fabric drop inlet protection (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)

Construction specifications

1. Filter fabric or 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 at the next stake.
3. Stake materials will be standard 2 by 4 in. wood or an equivalent. Metal stakes may be used with a minimum length of 3 ft.
4. Space stakes evenly around the inlet 3 ft apart and drive them a minimum of 18 in. deep. Spans greater than 3 ft may be bridged with the use of wire mesh behind the filter fabric for support.
5. Fabric shall be embedded a minimum of 1 ft below ground and backfilled. The fabric shall be securely fastened to the stakes and frame.
6. A 2 by 4 in. wood frame shall be constructed around the crest of the fabric for overflow stability.
7. Maximum drainage area = 1 acre.

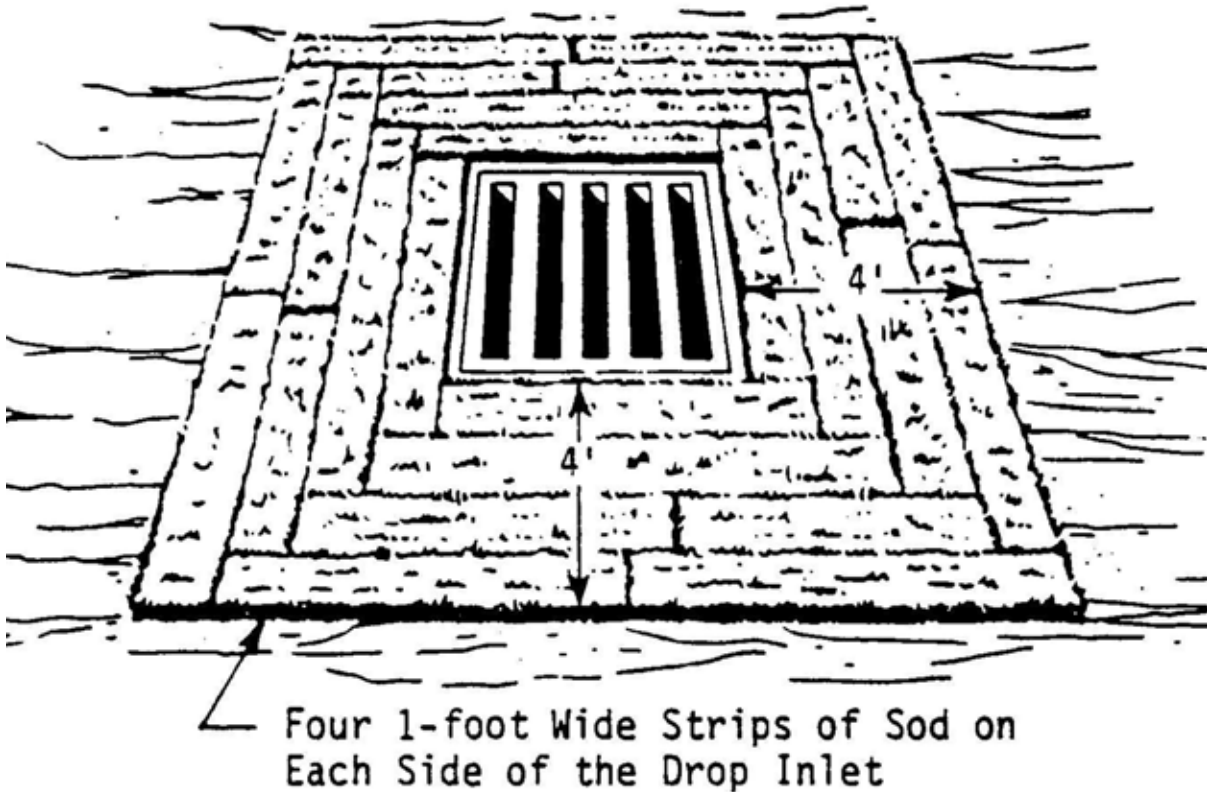


Figure 3.18. Sod drop inlet protection (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)

Construction specifications

1. Bring the area to be sodded to final grade elevation with topsoil. Add fertilizer and lime, and install sod in accordance with the practice on sodding.
2. Lay all sod strips perpendicular to the direction of flow.
3. Maintain a minimum width of 4 ft in all flow directions.
4. Sod strips shall be staggered so adjacent strip ends are not aligned.
5. Maximum Drainage Area = .25 acres

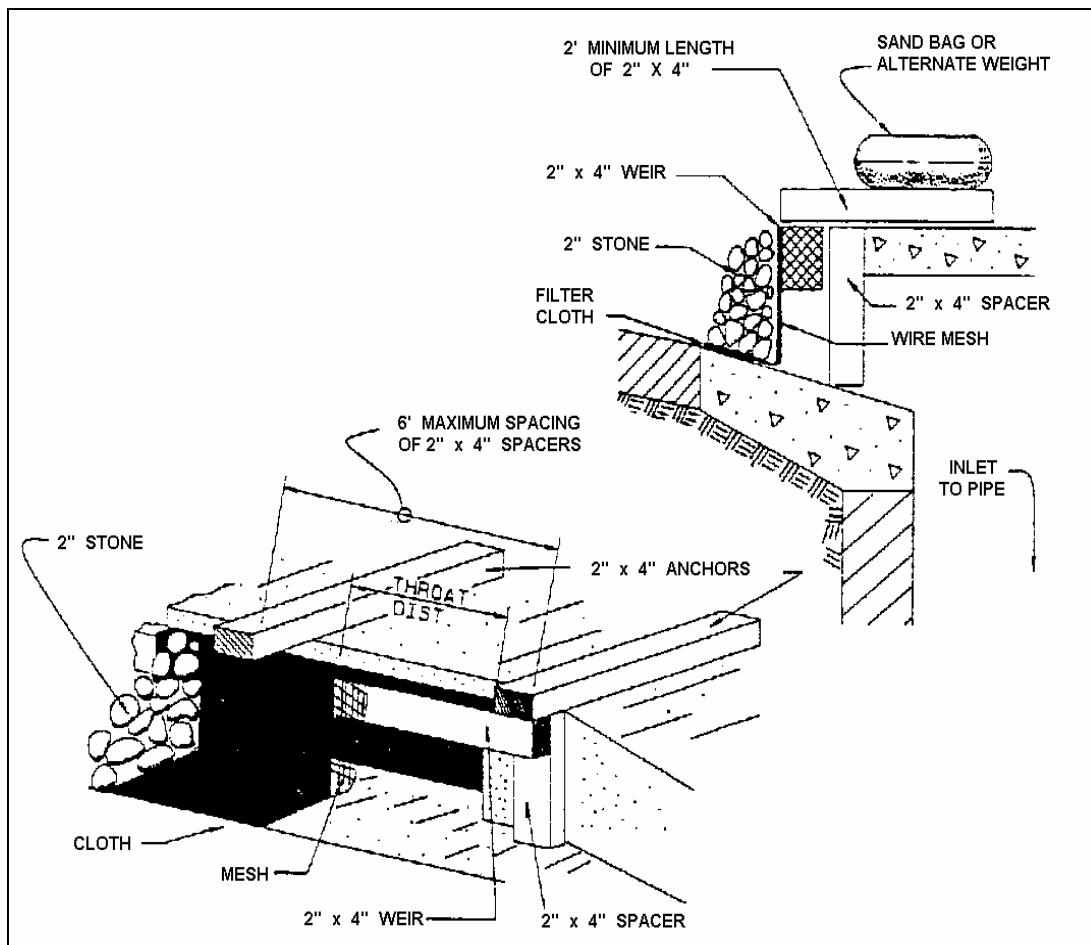


Figure 3.19. Curb gutter inlet protection (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)

Construction specifications

1. Wooden frame shall be construction of 2 by 4 in. construction-grade lumber.
2. Wire mesh across throat shall be a continuous piece with a 30 in. minimum width and a length 4 ft longer than the throat. The mesh shall be shaped and securely nailed to a 2 by 4 in. weir.
3. The weir shall be securely nailed to 2 by 4 in. spacer, 9 in. long, and spaced no more than 6 ft apart.
4. The assembly shall be placed against the inlet and secured by 2 by 4 in. anchors, 2 ft long and extended across the top of the inlet and held in place by sandbags or alternate weights.
5. Maximum drainage area = 1 acre.

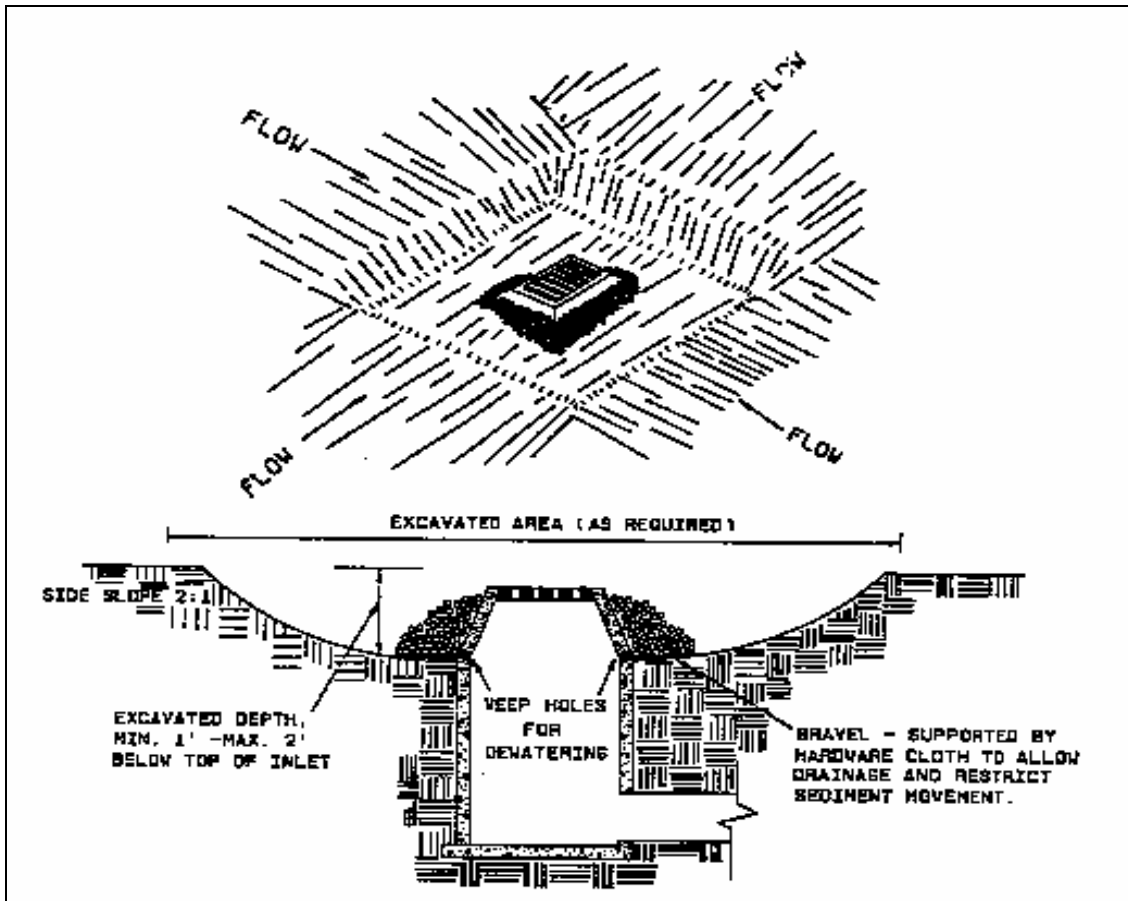


Figure 3.20. Excavated drop inlet protection (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)

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 the contributing drainage area, seal weep holes and fill the basin with stable soil to final grade. Compact it properly and stabilize with permanent seeding.
5. Maximum drainage area = 1 acre.