Bowling Green, Kentucky
Stormwater Best Management Practices (BMPs)
Sediment Management Practices (SMPs)

SMP-11

Activity: Temporary Inlet Protection (TIP)

PLANNING CONSIDERATIONS:

Design Life:
1 yr

Acreage Needed:
Minimal

Estimated Unit Cost:
Low

Monthly Maintenance:
60% of installation

TIP

Target Pollutants

Significant ♦ Partial ◈ Low or Unknown ◇

Sediment ♦ Heavy Metals ◇ Nutrients ◇ Oxygen Demanding Substances ◇ Toxic Materials ◇
Oil& Grease ◇ Bacteria & Viruses ◇ Floatable Materials ◈ Construction Waste ◇

Description

This practice allows sediment to settle prior to entering into a stormwater catch basin or inlet. The detainment of sediment-laden runoff through filtering devices allows a cleaner runoff to be discharged into the environment.

Suitable Applications

- Protection of storm drain inlets or catch basins from sedimentation upstream of the inlet.
- Areas where ponds are not encroached into access road or highway traffic.
- Disturbed tributary areas have not yet been permanently stabilized.
- Areas where drainage is 1 acre or less.
- Areas with drainage more than 1 acre must be accompanied by a downstream sediment trap or basin.

Approach

Sediment control can be maintained using one of the following practices:

- Filter Fabric Fences
- Block and Gravel Filter
- Gravel and Wire Mesh Filter
- Excavated Inlet Sediment Traps

Installation Procedures

Sediment filters are used as storm inlet protectors.

- **Filter Fabric Fences** are desired for basins less than one acre with less than a 5% slope. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a max. of 3 feet apart with an ending depth of at least 8 in. into the ground. Stakes should be 3 feet long. Excavate trench 8 inches wide and 12 inches deep around the outside perimeter of the stakes. Staple fabric to the stakes so that 32 in of the fabric extend out and can be formed into the trench (use heavy-duty wire staples at least 1 in. in length). Backfill trench with a ¾ in or less washed gravel all the way around.

Installation Procedures (cont'd)

- **Block and Gravel Filter** is desired for flows greater than 0.5 cfs. Hardware cloth should be dropped ½ in over drop inlet so that wire extends a minimum of 1 ft on each side. Concrete blocks should be placed lengthwise on their sides in a single row around the perimeter of the inlet with ends abut adjacently. Height can be 4, 8 or 12 in. wide by stacking combinations of concrete. Rows should be no greater than 24 inches high. Wire mesh should be over the outside vertical face of the concrete blocks to prevent stone from washing through blocks. Pile wash stone against the wire mesh to the top of the blocks. Use ¾ to 3 in. gravel.
- **Gravel and Wire Mesh Filter** is used on curb or drop inlets where construction equipment may drive over the inlet. Place over drop inlet so that wire extends on both sides at a minimum of 1 ft. Use hardware cloth or wire mesh with ½ in. opening. Place ¾ to 3 in. gravel over the filter fabric/wire mesh. Depth should be 12 inches over the entire inlet opening. Excavate drop inlet sediment trap, minimum storage capacity calculated at the rate of 67 cubic yards per acre (yd^3/ac) of tributary area should be sized.
- **Sand Bag Barriers** are used to create a small sediment trap upstream of inlets on sloped, paved streets. Bags should be made of geotextile material and filled with ¾ in. rock or ¼ in. pea gravel. Leave room upstream for settlement and ponding. Place several layers of bags and pack them tightly together leaving a gap of one bag on the top row to serve as a spillway.
- **Excavated Drop Inlet Sediment Traps** are excavated areas around inlets to trap sediment.
- Gates and inlets should be a sealed to prevent seepage of sediment-laden water.
- Excavate sediment sumps 1 to 2 feet with 2:1 (H:V) side slopes around the inlet.
- Provide areas around the inlet for water to pond without flooding structures and property.

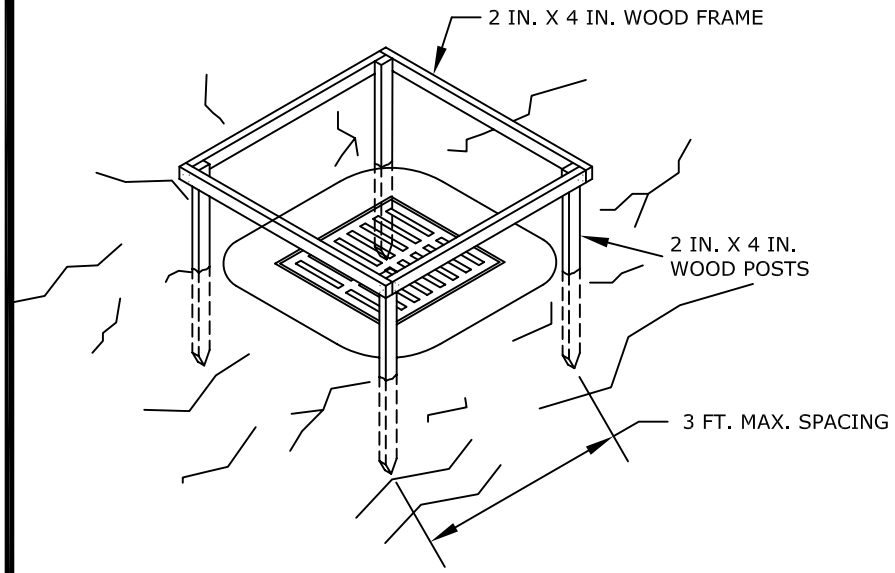
Maintenance

- Replace clogged fabric immediately.
- Remove sediment when depth exceeds half the height of the filter or half the depth of the sediment trap.
- Inspect all inlets and catch basins weekly before and after each rain event.
- Inspect once every 24 hours during heavy rainfall events.
- After site is stabilized remove all inlet devices within 30 days.
- Bring disturbed area to final grade and smooth and compact it.
- Clean around and inside the storm drain inlet.

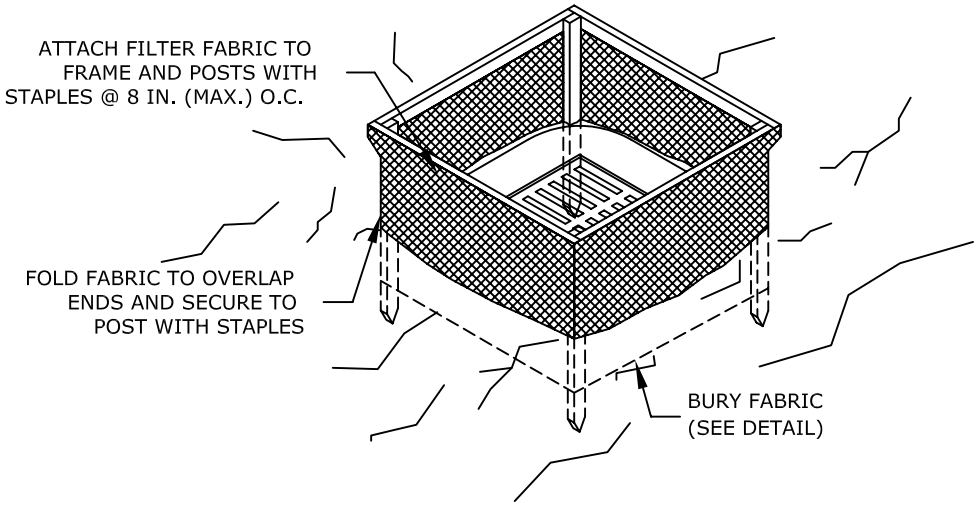
Inspection Checklist

- ❑ Filter fabric stakes are secure.
- ❑ Filter fabric is cleaned or replaced to prevent clogging.
- ❑ Sediment from behind the fabric less than ½ the height of the silt fence.
- ❑ Gravel filter is in working order. No evidence of gravel washing through.
- ❑ Do not clean any gravel adjacent to any inlet or waterway.
- ❑ Bags are properly maintained.
- ❑ No evidence of displacement of the practice.

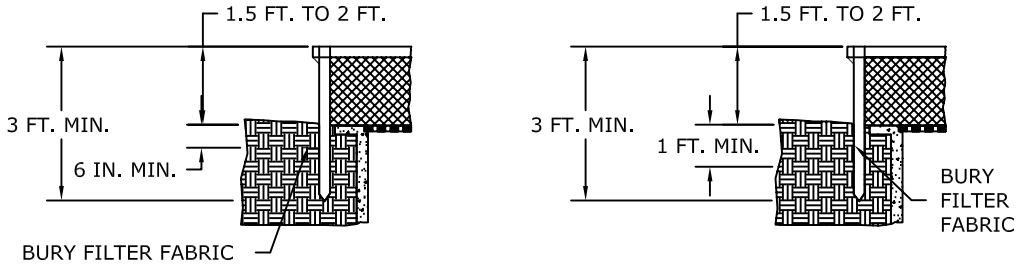
CONSTRUCT DOWNSTREAM DIKE WHEN REQUIRED
TO PREVENT BY-PASS FLOW.



WOOD FRAME INSTALLATION DETAIL



FILTER FABRIC INSTALLATION DETAIL



FILTER FABRIC BURIAL OPTIONS

THIS STRUCTURE IS FOR USE IN UNPAVED AREAS ONLY.
MAXIMUM CONTRIBUTING DRAINAGE AREA = 1 ACRE

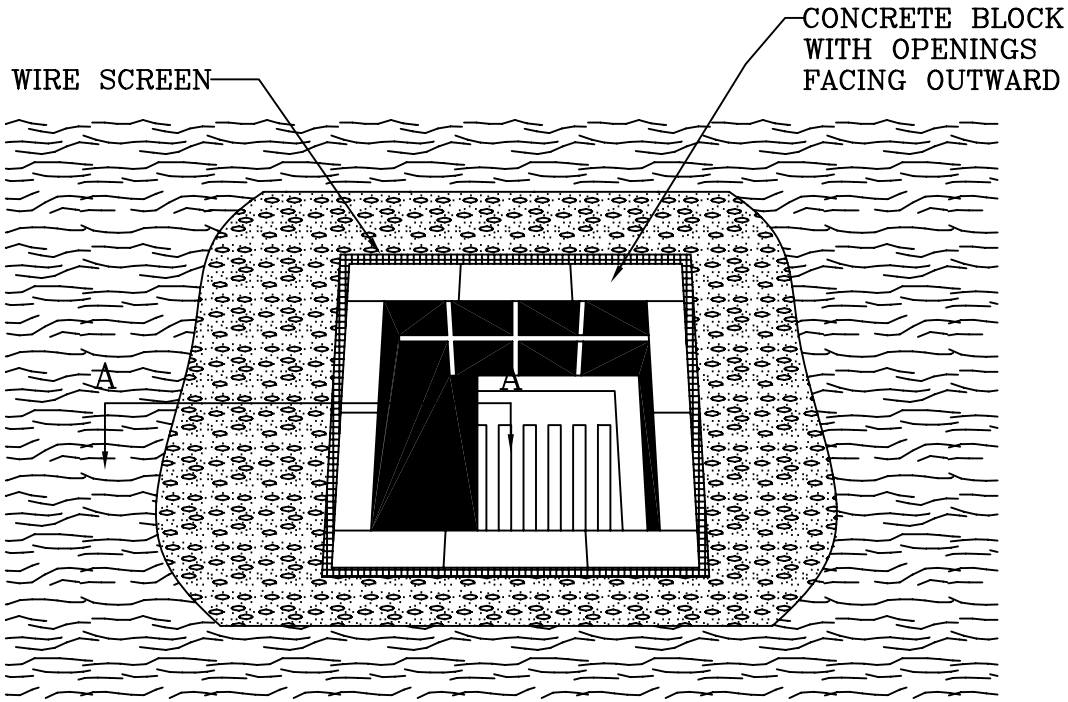
SOURCE: LOUISVILLE MSD, INDIANA HANDBOOK FOR EROSION CONTROL IN DEVELOPING AREAS, NORTH CAROLINA SWDIMENT AND EROSION CONTROL PLANNING AND DESIGN MANUEL

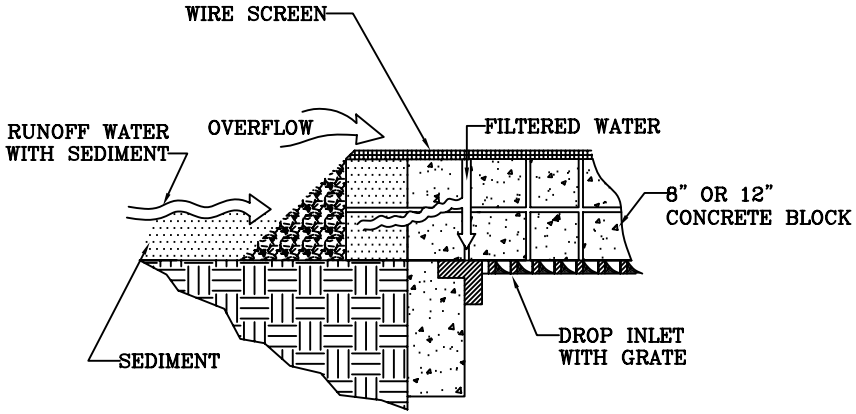
City of Bowling Green
Public Works Planning and Design
1011 College Street
Bowling Green, Kentucky 42101

FILTER FABRIC INLET PROTECTION

STANDARD DRAWING NO. SMP-11-01

APPROVED BY: _____ DIRECTOR OF ENGINEERING _____ DATE





CROSS SECTION A–A

SOURCE: LOUISVILLE MSD

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BLOCK AND GRAVEL DROP INLET PROTECTION

STANDARD DRAWING NO. SMP-11-02

APPROVED BY: _____ DIRECTOR OF ENGINEERING _____ DATE

Installation:

Block and gravel filters can be used where heavy flows and higher velocities are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure.

Gravel shall consist of KTC No.3 Crushed Stone.

Place concrete blocks lengthwise on their side so that the open end faces outward, not upward.

The height of the barrier can be varied, depending upon design needs by stacking a combination of blocks that are 8- and 12-inches wide.

Wire mesh should be placed over the outside vertical face of the concrete blocks to prevent stones from being washed through the holes in the blocks. Hardware cloth or comparable wire mesh with 1/2-inch openings should be used.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Any needed repairs should be handled immediately.

Sediment should be removed when it reaches approximately 1/3 the height of the blocks. If a sump is used, sediment should be removed when it fills approximately 1/3 the depth of the hole.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

SOURCE: LOUISVILLE MSD

City of Bowling Green
Public Works Planning and Design
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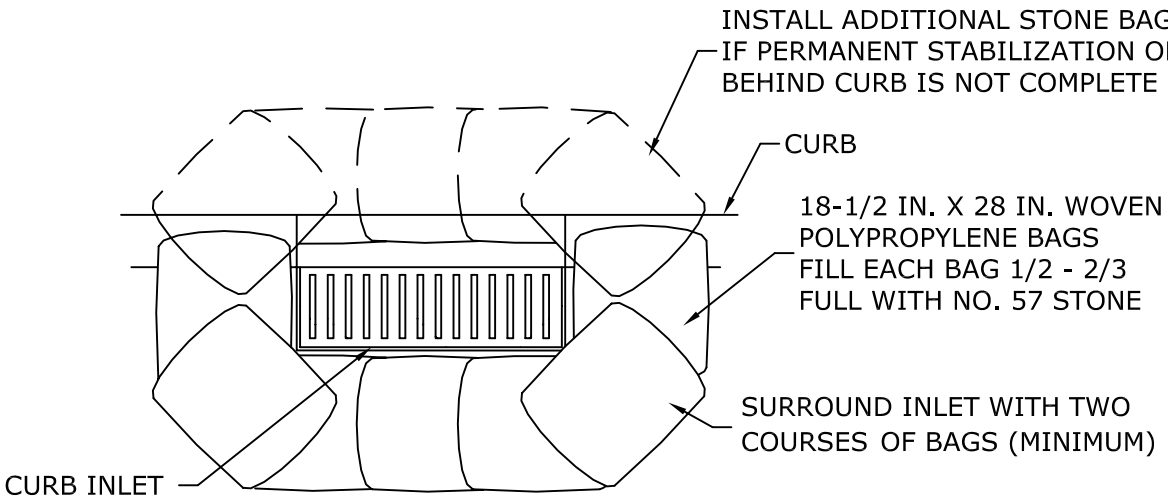
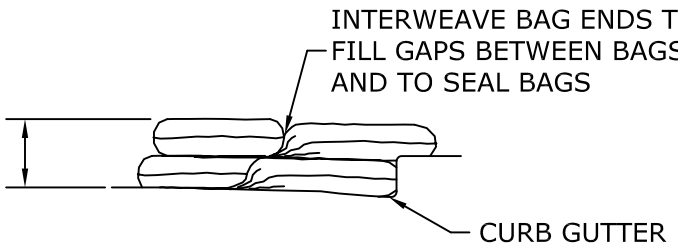
BLOCK AND GRAVEL DROP INLET PROTECTION

STANDARD DRAWING NO. SMP-11-03

APPROVED BY: _____ DIRECTOR OF ENGINEERING _____ DATE



PLAN VIEW



SIDE ELEVATION

STONE BAG INLET PROTECTION
FOR CURB INLETS
NOT TO SCALE

SOURCE: LOUISVILLE MSD

City of Bowling Green
Public Works Planning and Design
1011 College Street
Bowling Green, Kentucky 42101

STONE BAG CURB INLET PROTECTION

STANDARD DRAWING NO. SMP-11-04

APPROVED BY: _____ _____
DIRECTOR OF ENGINEERING DATE

Installation:

Stone fill bags shall be woven polypropylene bags with approximate dimensions of 18-1/2 Inches by 28 Inches.

The bags shall be filled 3/4 to 2/3 full with KTC No. 57 stone. Tie the ends of filled bags using either draw strings or wire ties.

Interweave the loose ends of the bags so that the gaps between bags are filled and the ends of the bags are sealed.

Completely surround the inlet with a minimum of two (2) rows of bags to a minimum of 12 inches in height.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Any needed repairs should be handled immediately.

If sediment accumulates, remove it from the face of the bags before it accumulates to a height equal to 1/3 the structure height. Any needed repairs should be handled immediately. Take care not to damage or undercut the bags when removing sediment.

Remove and replace any damaged bags and dispose of them properly.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized.

Remove all construction material and sediment, and dispose of them properly.

Grade the disturbed area to the elevation of the drop inlet structure crest. Use appropriate permanent stabilization methods to stabilize bare areas around the inlet.

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STONE BAG CURB INLET PROTECTION

STANDARD DRAWING NO. SMP-11-05

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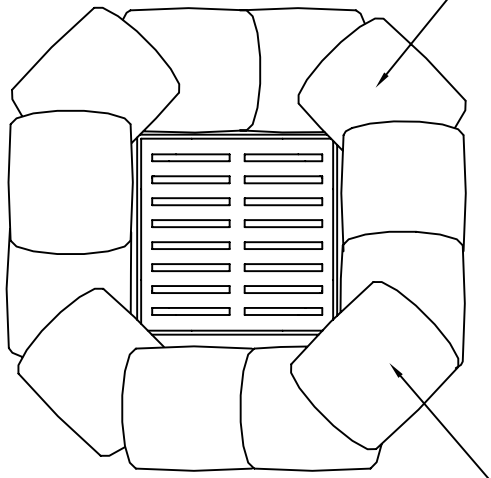
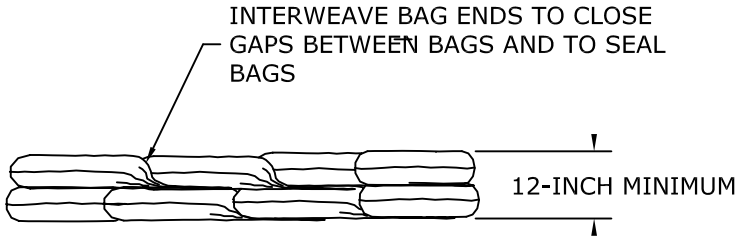


PLAN VIEW

NOTE: THE 12-INCH HEIGHT REQUIREMENT IS WAIVED IN CASES WHERE IT WILL CAUSE FLOOD DAMAGE IF THE STONE BAGS ARE OVERTOPPED.



ELEVATION

TYPE III STONE BAG SILT CHECK AT CATCH BASINS

NO SCALE

SOURCE: LOUISVILLE MSD

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Public Works Planning and Design
1011 College Street
Bowling Green, Kentucky 42101

STONE BAG INLET PROTECTION

STANDARD DRAWING NO. SMP-11-06

APPROVED BY: _____ DIRECTOR OF ENGINEERING _____ DATE

Installation:

Stone fill bags shall be woven polypropylene bags with approximate dimensions of 18-1/2 Inches by 28 Inches.

The bags shall be filled 3/4 to 2/3 full with KTC No. 57 stone. Tie the ends of filled bags using either draw strings or wire ties.

Interweave the loose ends of the bags so that the gaps between bags are filled and the ends of the bags are sealed.

Completely surround the inlet with a minimum of two (2) rows of bags to a minimum of 12 inches in height.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Any needed repairs should be handled immediately.

If sediment accumulates, remove it from the face of the bags before it accumulates to a height equal to 1/3 the structure height. Any needed repairs should be handled immediately. Take care not to damage or undercut the bags when removing sediment.

Remove and replace any damaged bags and dispose of them properly.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized.

Remove all construction material and sediment, and dispose of them properly.

Grade the disturbed area to the elevation of the drop inlet structure crest. Use appropriate permanent stabilization methods to stabilize bare areas around the inlet.

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STONE BAG INLET PROTECTION

STANDARD DRAWING NO. SMP-11-07

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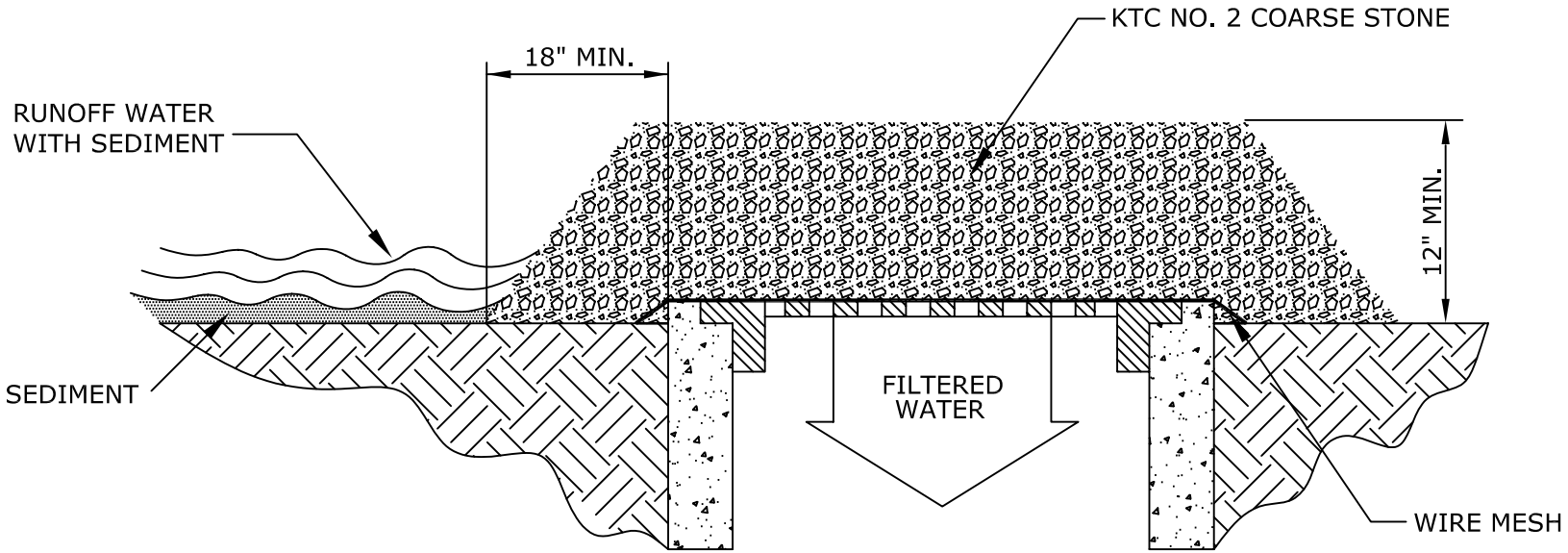

CROSS SECTION

SOURCE: LOUISVILLE MSD

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Bowling Green, Kentucky 42101

GRAVEL AND WIRE MESH INLET SEDIMENT FILTER

STANDARD DRAWING NO. SMP-11-08

APPROVED BY: _____ DIRECTOR OF ENGINEERING _____ DATE

Installation:

Gravel and mesh filters can be used where heavy concentrated flows are expected and subject to disturbance by site traffic. Gravel and mesh filters should not be used where ponding around the structure might cause excessive inconvenience or damage to adjacent structures and unprotected areas. Gravel and mesh filters have no overflow mechanism, therefore ponding is likely especially if sediment is not removed regularly. Gravel and mesh filters must never be used where overflow may endanger an exposed fill slope. Wire mesh shall be laid over the drop inlet so. that the wire extends a minimum of 1-foot beyond each side of the inlet structure. Hardware cloth or comparable wire mesh with 1/2-inch openings shall be used. If more than one strip of mesh is necessary, the strips shall be overlapped.

KTC No.2 Coarse Stone shall be placed over the wire mesh as indicated. The depth of stone shall be at least 12-inches over the entire inlet opening. The stone shall extend beyond the inlet opening at least 18-inches on all sides.

If the stone becomes clogged with sediment, the stones must be pulled away from the inlet, cleaned and replaced.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Any needed repairs should be handled immediately.

Accumulated sediment must be removed after every rainfall event.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet. Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

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GRAVEL AND WIRE MESH INLET SEDIMENT FILTER

STANDARD DRAWING NO. SMP-11-09

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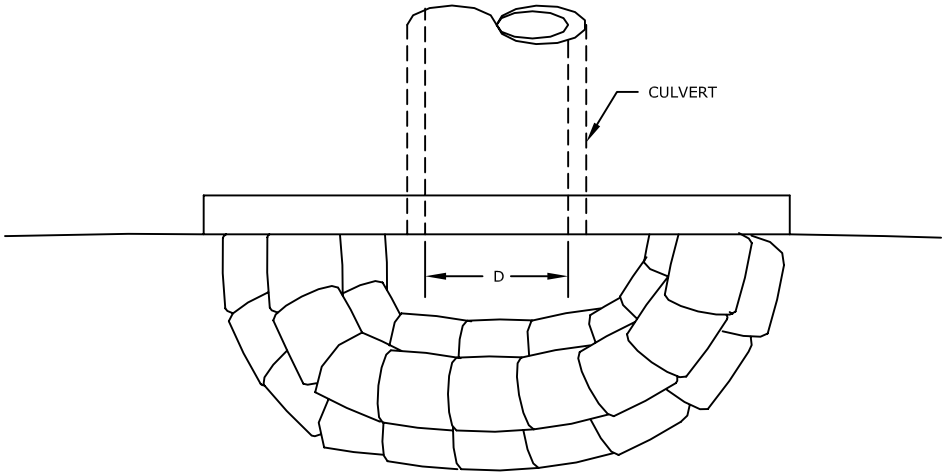
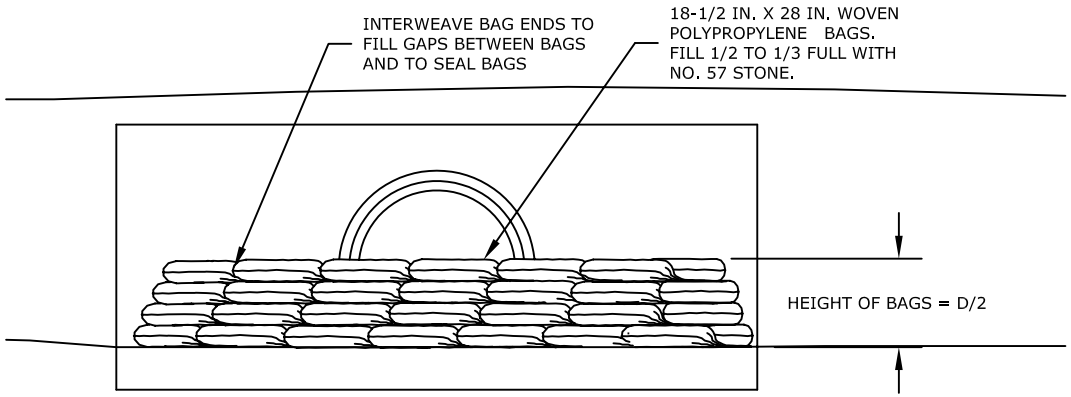


PLAN VIEW



UPSTREAM ELEVATION

Purpose:

Install stone bag protection at ell headwall inlets to pool water. providing opportunity for settling sediment before It enters headwall.

Design Criteria:
Bag specifications: Approximately 18 1/2-Inch X 28-Inch woven polypropylene bags.
Stone: Use KTC No. 57 Stone.

Height of stone bags above culvert Inverts: Construct a minimum of two courses of bags. The stone-filled bags shall be stacked to a height equal to 1/2 the diameter of the culvert being protected.

SOURCE: LOUISVILLE MSD

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Public Works Planning and Design
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STANDARD HEADWALL INLET PROTECTION

STANDARD DRAWING NO. SMP-11-10

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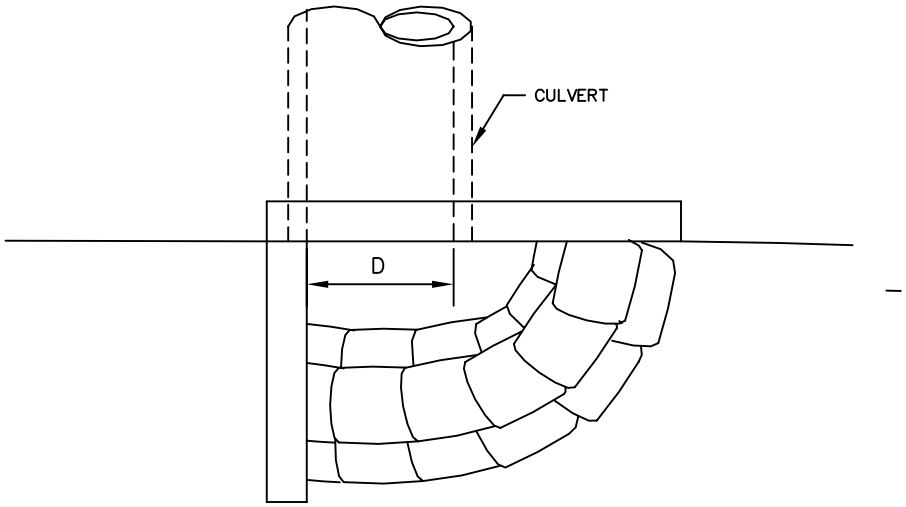
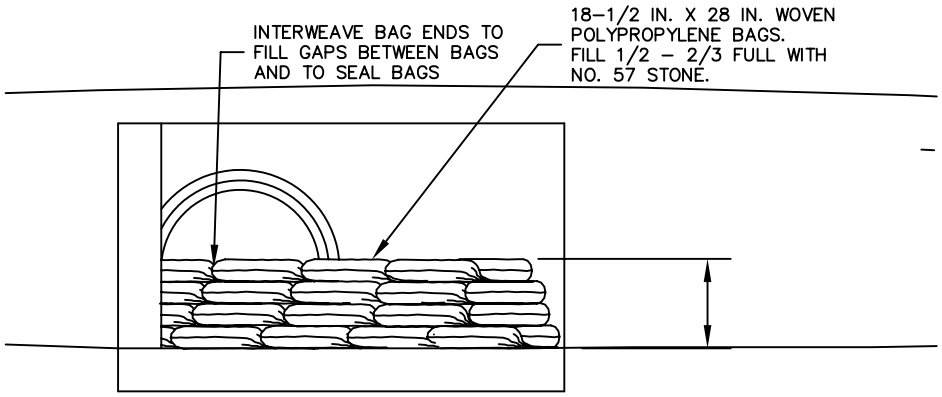


PLAN VIEW



UPSTREAM ELEVATION

Design Criteria:

Bag specifications: Approximately 18 1/2-Inch X 28-Inch woven polypropylene bags.

Stone: Use KTC No. 57 Stone.

Height of stone bags above culvert Inverts: Construct a minimum of two courses of bags. The stone-filled bags shall be stacked to a height equal to 1/2 the diameter of the culvert being protected.

Maintenance:

Replacement of Inlet protection structures damaged by storm flows or natural deterioration will be reimbursed at the unit cost established for Installation. Replacement of stone bag Inlet protection that was damaged by activities Incidental to construction will not be reimbursed. Inspect inlet protection every seven (7) days and after every storm event. Inlet protections should be maintain until site stabilization.

SOURCE: LOUISVILLE MSD

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Bowling Green, Kentucky 42101

ELL HEADWALL INLET PROTECTION

STANDARD DRAWING NO. SMP-11-11

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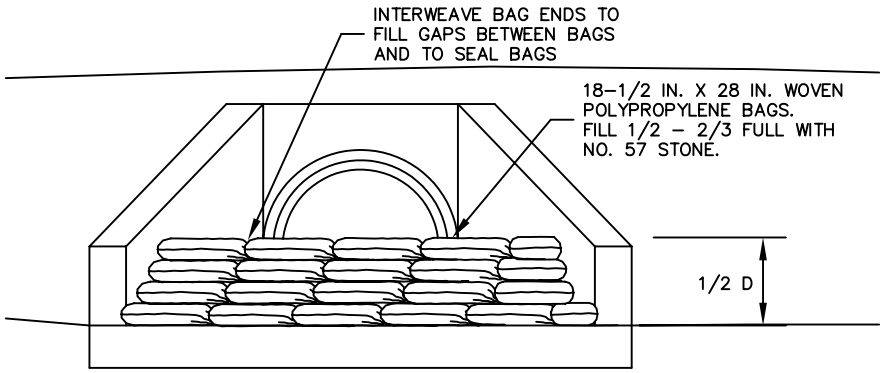
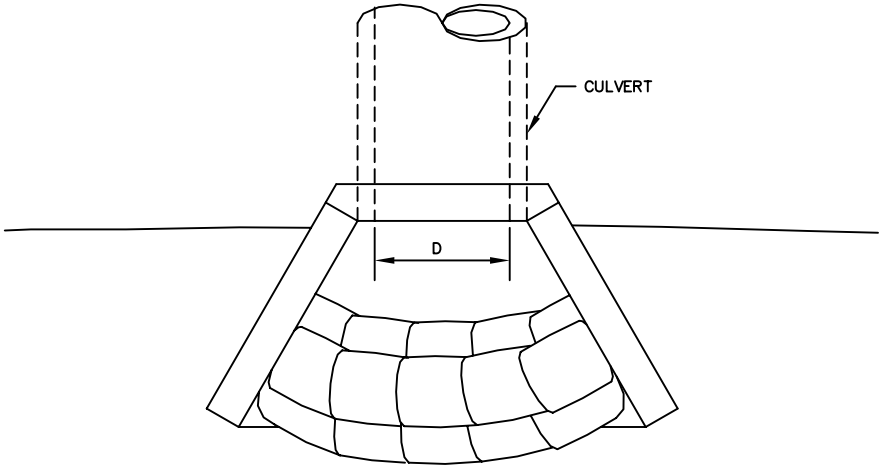


UPSTREAM ELEVATION



PLAN VIEW

Purpose:

Install stone bag protection at ell headwall inlets to pool water. providing opportunity for settling sediment before It enters headwall.

Design Criteria:
Bag specifications: Approximately 18 1/2-Inch X 28-Inch woven polypropylene bags.
Stone: Use KTC No. 57 Stone.

Height of stone bags above culvert Inverts: Construct a minimum of two courses of bags. The stone-filled bags shall be stacked to a height equal to 1/2 the diameter of the culvert being protected.

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SLOPED HEADWALL INLET PROTECTION

STANDARD DRAWING NO. SMP-11-12

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