Block and Gravel Inlet Protection (BIP)

Practice Description

Block and gravel inlet protection is a sediment control barrier formed around a storm drain inlet by the use of standard concrete block and gravel. The purpose is to help minimize sediment entering storm drains during construction. This practice applies where use of the storm drain system is necessary during construction and where inlets have a drainage area of 1 acre or less and an approach slope of 1% or less.

Planning Considerations

Storm sewers that are made operational before their drainage area is stabilized can convey large amounts of sediment to natural drainageways. In case of extreme sediment loading, the storm sewer itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets.

This practice is for drainage areas of less than 1 acre. Runoff from large disturbed areas should be routed through a sediment basin (see *Sediment Basin Practice*). This method is for areas where heavy flows are expected and where overflow capacity is necessary to prevent excessive ponding around the structure.

The best way to prevent sediment from entering the storm sewer system is to minimize erosion by leaving as much of the site undisturbed as possible and disturbing the site in small increments, if possible. After disturbance, stabilize the site as quickly as possible to prevent erosion and sediment delivery.

Design Criteria and Construction

Drainage Area

Drainage area should be less than 1 acre per inlet.

Capacity

The design storm for the inlet should be able to enter the inlet without bypass flow.

Approach

The approach to the block and gravel structure should be less than 1%.

Height

The height of the block structure should be 1 to 2 feet.

Side Slopes

Gravel placed around the concrete block structure should have 2:1 (Horizontal: Vertical) side slopes or flatter.

Dewatering

Place a minimum of one block on the bottom row (more as needed) on its side to allow for dewatering the pool.

Site Preparation

Determine exact location of underground utilities (see Appendix C: MS One-Call and 811 Color Coding available in the Appendices Volume).

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

Grade the approach to the inlet uniformly. The top elevation of the structure must be 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.

Installation of Blocks, Wire Mesh and Gravel

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

Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, with the ends of adjacent blocks abutting. The height of the barrier can be varied, depending on design needs, by stacking combinations of 4″, 8″ and 12″ wide blocks. The barrier of blocks should be at least 12″ high and no greater than 24″ high.

The top elevation of the structure must be at least 6″ 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.

Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Hardware cloth or comparable wire mesh with ½″ openings should be used.

Place stone of the specified gradation around blocks to the lines and dimensions shown on the drawings and smooth to an even grade.

Gravel

Stone should be piled against the wire to the top of the block barrier, as shown in the typical details in Figure BIP-1. Coarse aggregate or similar gradations should be used.

If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the blocks, cleaned, and replaced.

Erosion Control

Stabilize disturbed areas in accordance with the vegetation plan.

Construction Verification

Check finished grades and dimensions of block and gravel barrier. Check materials for compliance with specifications.

Safety

Provide protection to prevent children from entering the area.

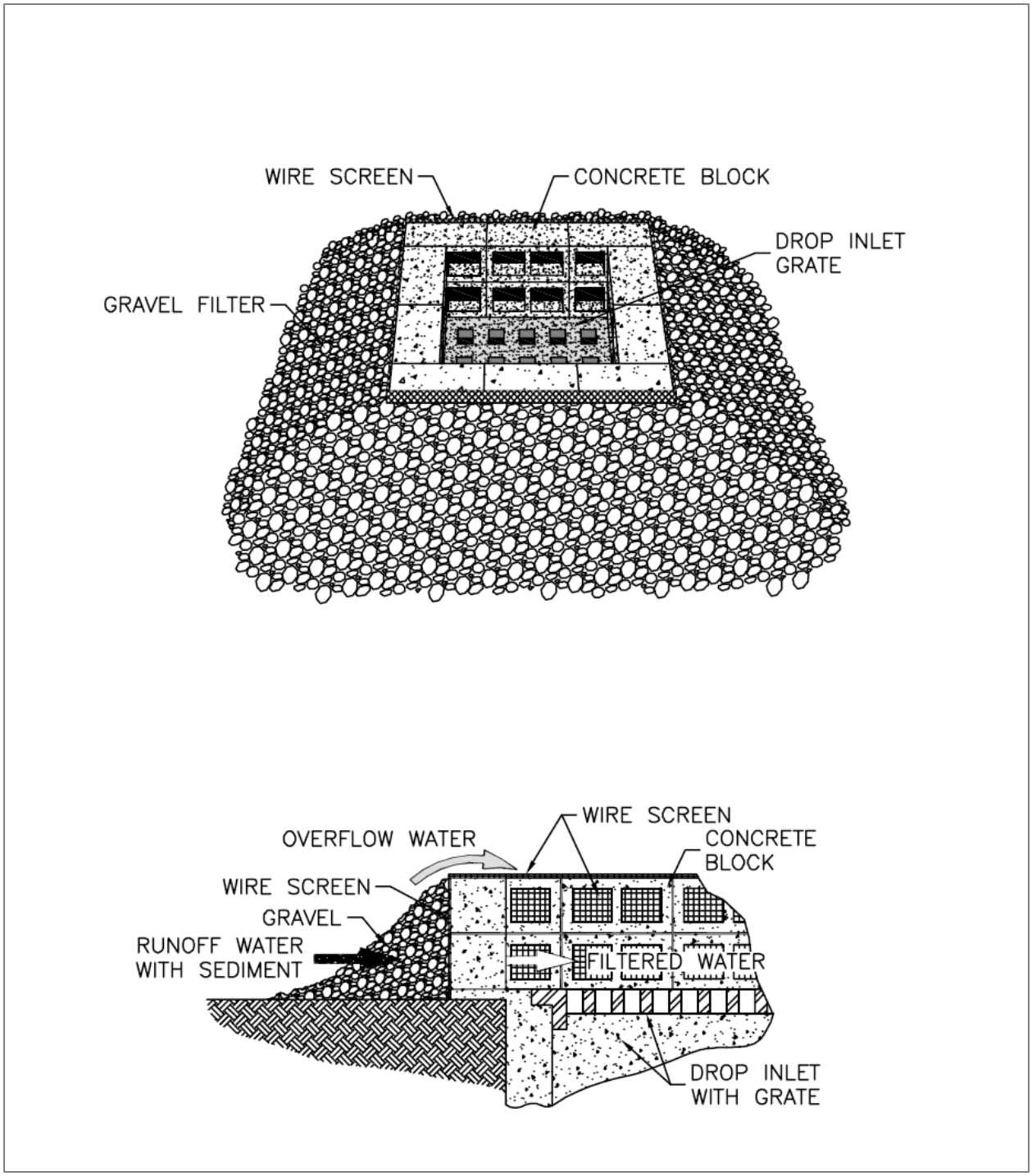


Figure BIP–1 Typical Details of Block and Gravel Inlet Protection

Common Problems

Consult with qualified 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 promptly following storms to provide adequate storage volume for subsequent rains and prevent sediment entering the storm drain in subsequent rains.

If the gravel becomes clogged with sediment so that barrier does not drain properly, remove gravel and replace with clean gravel of the specified gradation.

When the contributing drainage area has been adequately stabilized, remove all materials and any sediment, bring the disturbed area to proper grade, and stabilize it with vegetation or other materials shown in the design plan.

References

BMPs from Volume 1

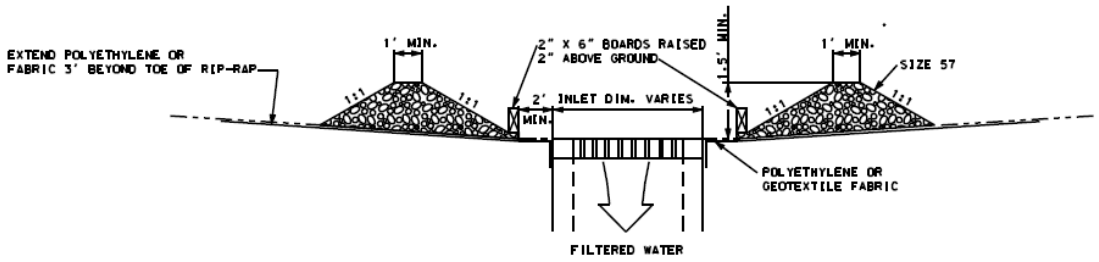
Chapter 4

Sediment Basin (SBN) 4-298

MDOT Drawing ECD-1

Inlet Protection Details for Coarse Aggregate on Grades and Sags 4-238

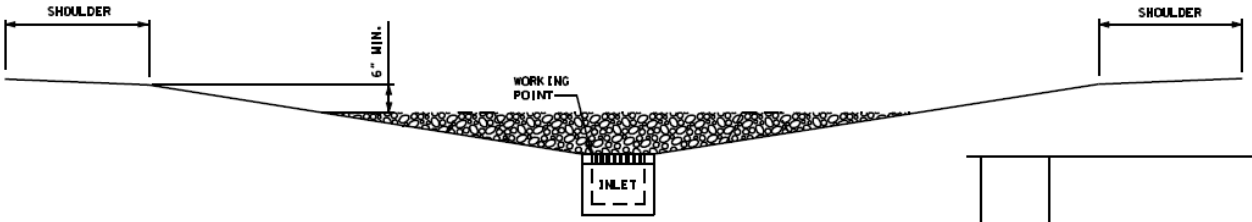
STATE	PROJECT NO.
MISS.	



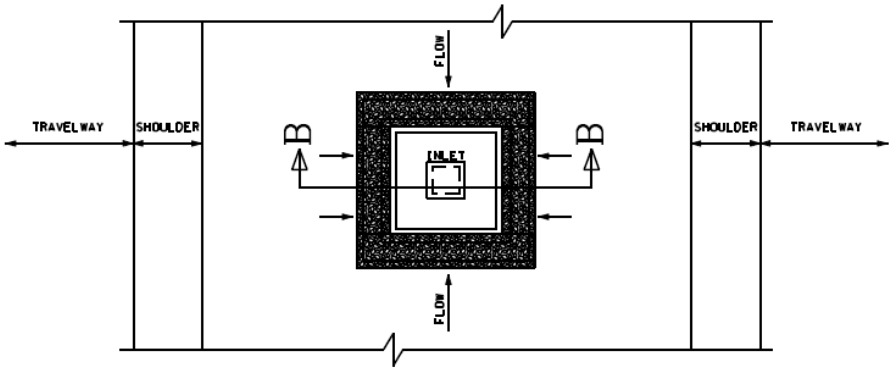
SECTION B-B

NOTES:

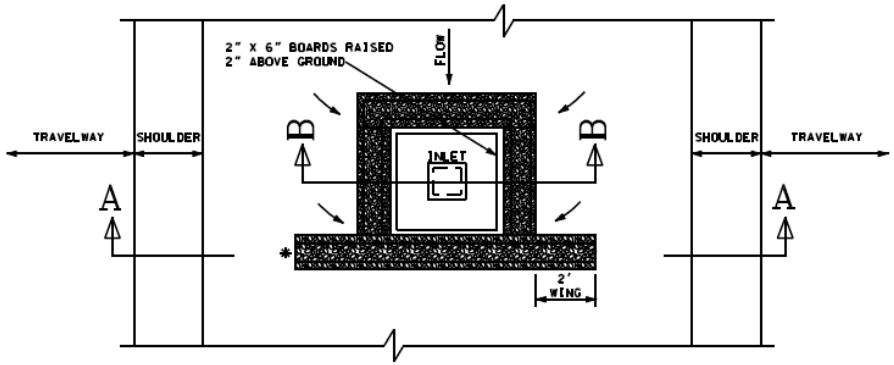
1. THE ELEVATION OF THE TOP OF THE REQUIRED STONE BERM SHALL BE A MINIMUM OF 1.5' ABOVE THE ELEVATION OF THE INLET WORKING POINT AND A MINIMUM OF 6" BELOW THE ELEVATION OF THE OUTSIDE EDGE OF THE INSIDE SHOULDER.
2. THIS COARSE AGGREGATE INLET PROTECTION SHALL NOT BE UTILIZED DURING STAGE 1 AND STAGE 2 INLET CONSTRUCTION. SEE INLET PROTECTION TYPICAL APPLICATIONS AND DETAILS)
3. 2" X 6" BOARDS MAY BE REPLACED WITH WIRE MESH W/OPENINGS LESS THAN 1" X 1". COST IS ABSORBED.



SECTION A-A



PLAN - IN SAG



PLAN - ON GRADE

* CONSTRUCT WINGS TO PREVENT BYPASS

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

INLET PROTECTION
DETAILS FOR COARSE AGGREGATE
ON GRADES & SAGS

BY | REVISION | DATE

WORKING NUMBER: ECD-11

SHEET NUMBER

FILENAME: EROSION CONTROL\ECD-11.DGN

DESIGN TEAM _____ CHECKED _____ DATE _____