

ScourStop® DESIGN GUIDE Circular Culvert Outlet Protection



why use the SCOURSTOP SYSTEM?

ScourStop transition mats protect against erosion and scour at culvert outlets with a vegetated solution in areas traditionally protected with rock or other hard armor.

ScourStop is part of a system that includes semi-rigid transition mats installed over sod or turf reinforcement mats. Each 4' x 4' x 1/2" mat is made of high-density polyethylene and secured tightly to the ground with anchors.

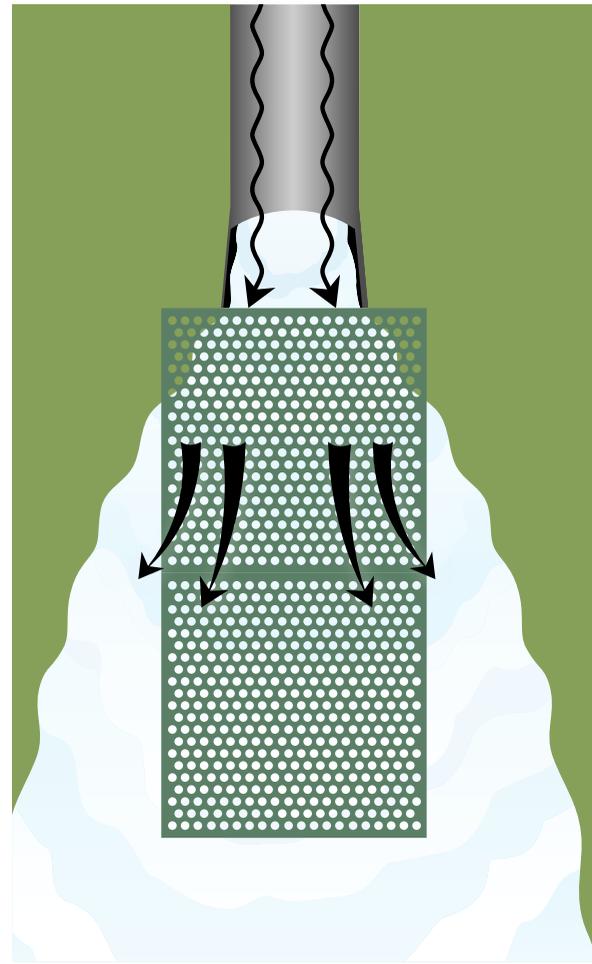


Circular Culvert Outlet Protection

PIPE DIAMETER	VELOCITY ≤ 10 FT/SEC		10 < VELOCITY < 16 FT/SEC	
	TRANSITION MAT W x L	QUANTITY OF MATS	TRANSITION MAT W x L	QUANTITY OF MATS
12"	4' x 4'	1	4' x 8'	2
24"	8' x 8'	4	8' x 12'	6
36"	8' x 12'	6	12' x 20'	15
48"	12' x 16'	12	12' x 24'	18
60"	12' x 20'	15	16' x 32'	32
72"	16' x 24'	24	20' x 36'	45

These are minimum recommendations. More ScourStop protection may be needed depending upon site and soil conditions, per project engineer.

- If velocity is greater than 16 fps, contact manufacturer for design assistance.
- ScourStop mats have been shown to at least double the effectiveness of turf reinforcement mats.
- ScourStop fully vegetated channel (2:1 slope): velocity = 31 fps, shear stress = 16 psf.



PERFORMANCE ◦ AESTHETICS
NPDES-COMPLIANT ◦ COST-EFFECTIVE

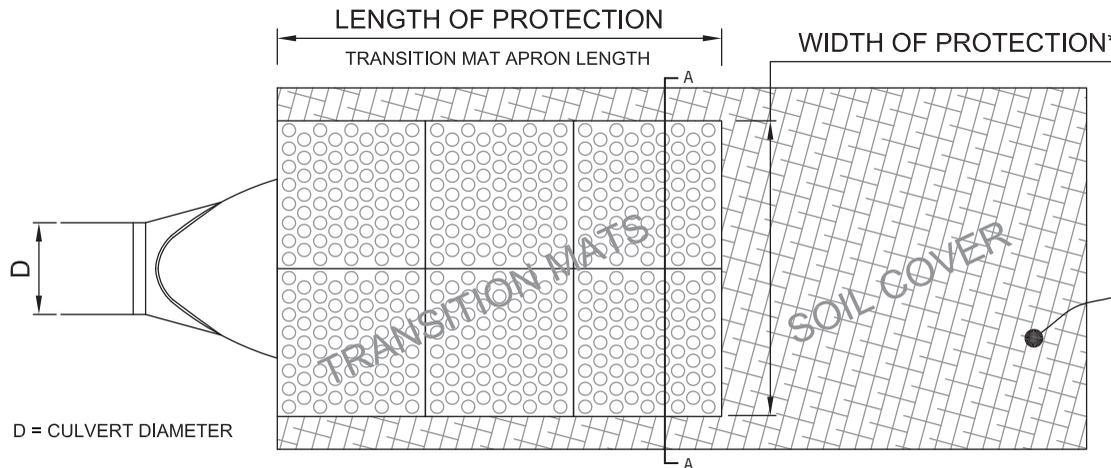
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ScourStop® Installation Recommendations



1. ScourStop mats must be installed over a soil cover: sod, seeded turf reinforcement mat (TRM), geotextile, or a combination thereof.
2. For steep slopes (>10%) or higher velocities (>10 ft/sec), sod is the recommended soil cover.
3. Follow manufacturer's **ScourStop Installation Guidelines** to ensure proper installation.
4. Install ScourStop mats at maximum 1-2" below flowline of culvert or culvert apron. (No waterfall impacts onto ScourStop mats.)
5. Performance of protected area assumes stable downstream conditions.



Transition mat apron protects culvert outlet.

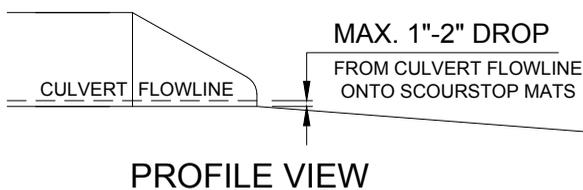
*Width of protection:

Bottom width of channel and up both side slopes to a depth at least half the culvert diameter.

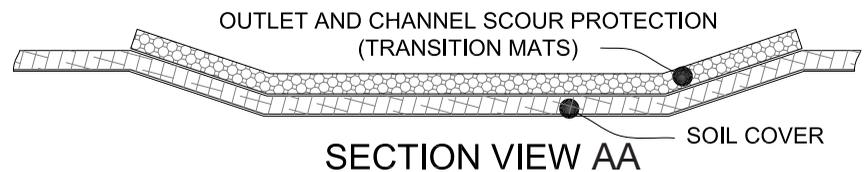
Protect bare/disturbed downstream soils from erosion with appropriate soil cover.

Use normal-depth calculator to compute for downstream protection.

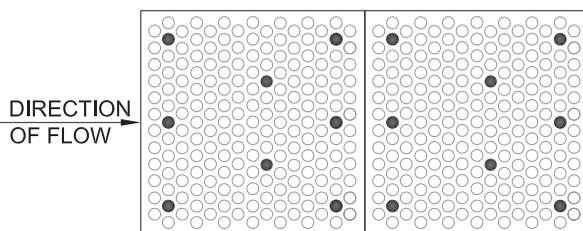
CULVERT OUTLET PROTECTION – PLAN VIEW



PROFILE VIEW

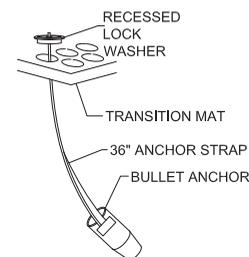


SECTION VIEW AA



ANCHOR PATTERN

- Abut transition mats to end of culvert or culvert apron.
- Adjacent mats abut together laterally and longitudinally.
- Minimum 8 anchors per mat.
- Extra anchors as needed for loose or wet soils.
- Extra anchors as needed for uneven soil surface.



ANCHOR ILLUSTRATION

- Install anchors per **ScourStop Installation Guidelines**.
- Minimum depth 24" in compacted, cohesive soil.
- Minimum depth 30" in loose, sandy, or wet soil.
- Extra anchors as needed to secure mat tightly over soil cover.



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