



## STORM BULLETIN 13

# COMPARISON BETWEEN GRAVITY SEPARATORS AND STORM SEWERS

- **Oil-grit gravity separators** are sized to trap sand, grit, and oil sheen. Storm sewers are sized to prevent flooding on paved surfaces. The example table below compares site hydrology values when sizing for both.

Location: Northeast US      Land Use: Retail/Commercial      Area: 1.0 acre  
 Pavement = 0.64 acres      Roof = 0.21 acres      Vegetated = 0.15 acres  
 Thus the land is 85% Impervious and 15% non-impervious.

### SYSTEM BEING SIZED

Hydrology and Treatment Design Parameters	Oil – Grit Gravity Separator	Storm Sewer	
E = Point Rainfall Intensity, in/hr	1.0	NA	The point rainfall intensity equals the intensity adequate to scour 80% of the sediment from a point anywhere on the pavement.
Events per year	3-5	NA	
Return Interval, yrs	NA	10	
Concentration Time, min	10	10	
C = Runoff Coefficient	NA	0.85	
I = Site Rainfall Intensity, in/hr	NA	4.5	Intensity – Duration – Frequency Curve (IDF)
A = Site Drainage Area, acres	NA	1.0	
Q = Design Storm Flow, ft <sup>3</sup> /sec	NA	3.8	C x I x A = Q
PWI = Pavement Wash-off Intensity	0.70	NA	
H = Impervious Area, acres	0.85	NA	Assumes runoff from vegetated area is insignificant.
T = Required Treatment before Bypass, ft <sup>3</sup> /sec	0.56	NA	PWI x H Most situations won't require bypass
P = Rainfall Depth, in	0.70	3.8	
SCS CURVE NO.	98	95	NRCS TR-55
R = Runoff Depth, in	0.50	3.1	NRCS TR-55
V = Runoff Volume, acre-ft	0.033	0.30	H x R/12 A x R/12
S = Detention Volume, acre-ft	0.0	0.0	Negligible detention
B = Peak Flow from Treatment, ft <sup>3</sup> /sec	0.56	NA	
O = Peak Flow from Design Storm, ft <sup>3</sup> /sec	NA	3.8	
M = Sediment Parameter	20.0		



			<p>Sediment Parameter refers to the ideal separator area per ft<sup>3</sup>/sec of treatment flow required for 80% annual removal efficiency of sand and grit. It is an empirical value dependent on the annual wash-off process for sand and grit. Long-term monitoring data from existing stormwater treatment system suggests 20.0 is a reasonable value. Sediment Parameter does not include Total Suspended Solids (TSS), clay, silt, or products of decay of organic matter retained in the storm sewers and treatment systems.</p>
Ideal Separator Area, ft <sup>2</sup>	11.2		B x M
E= Separator Shape Factor	0.80		<p>Separator Shape Factor is a proprietary value consistent with sedimentation science and laboratory testing of a model of the separator configuration. This factor accounts for poor flow distribution, turbulence, mixing, or re-entrainment of accumulated sediment. An ideal gravity separator would have a shape factor of 1.0.</p>
Design Separator Area, ft <sup>2</sup>	14.0		B x M/E