

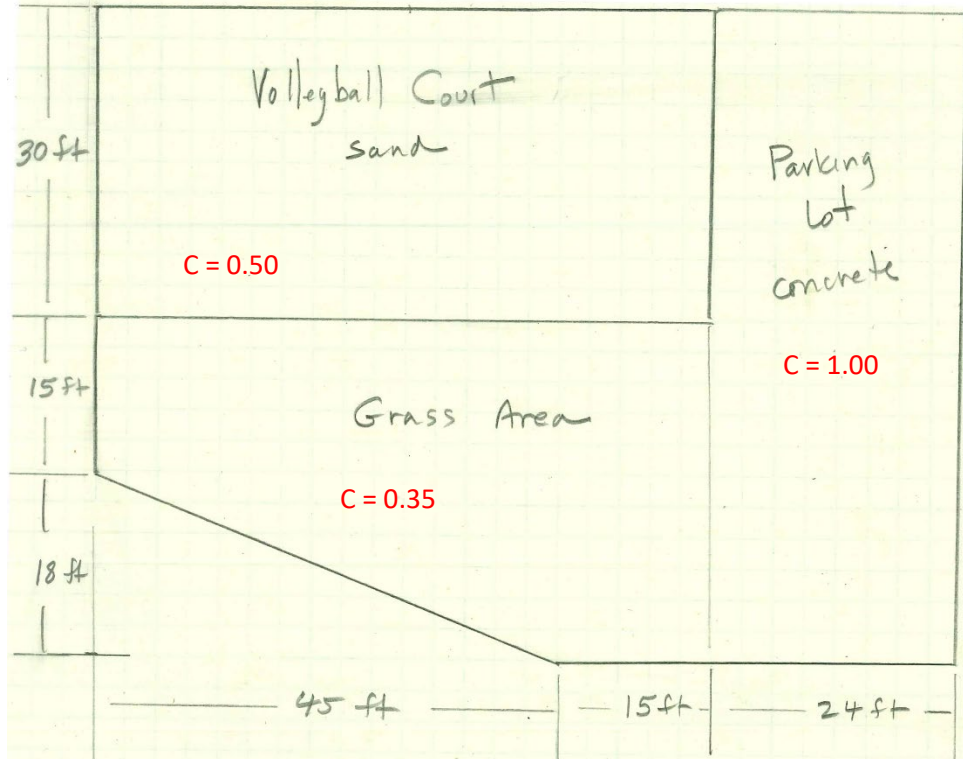
Homework #17– Stormwater Management

Points: 20

Due: 10/20/2022

Solution

Use the Rational Method to determine the peak runoff rate (gpm) and volume (gallons) for the drainage area given. The rainfall intensity is 6.3 in/hr.



How to Calculate Storm Drainage - Doctor Drainage

Coefficient of Runoff (C)= Runoff / Rainfall			
Soil Texture	C	Soil Texture	C
Concrete, Asphalt, Roof	1.00	Loam - Bare	0.60
Gravel - Compact	0.70	Loam - Light Vegetation	0.45
Clay - Bare	0.75	Loam - Dense Vegetation	0.35
Clay - Light Vegetation	0.60	Sand - Bare	0.50
Clay - Dense Vegetation	0.50	Sand - Light Vegetation	0.40
Gravel - Bare	0.65	Sand - Dense Vegetation	0.30
Gravel - Light Vegetation	0.50	Grass Area	0.35
Gravel - Dense Vegetation	0.40		

Volleyball Court - Area = 30 ft x 60 ft = 1800 ft²

Parking Lot - Area = 24 ft x 63 ft = 1512 ft²

Grass Area - Area = 60 ft x 33 ft – ½ x 45 ft x 18 ft = 1980 ft² – 405 ft² = 1575 ft²

Runoff Calculation

$Q = (C \times I \times A) / 96.23$

$Q = [(0.5 \times 1800 \text{ ft}^2 + 1.00 \times 1512 \text{ ft}^2 + 0.35 \times 1575 \text{ ft}^2) \times 6.3 \text{ in/hr}] / 96.23 = 159 \text{ gpm}$

Volume in one hour (60 min)

$V = 159 \text{ gpm} \times 60 \text{ min} = 9,540 \text{ gal}$