

PROJECT: **Senior Design**

DRAINAGE RUN OFF CALCULATIONS -- RATIONAL METHOD

**PRIOR DEVELOPMENT**  
25 Year Frequency

$Q_1 = CIA$

Watertight Surfaces	c(1) = 0.9	sqft =	0.000 Acres
Gravel Surface	c(2) = 0.14	sqft =	0.000 Acres
Green Space	c(3) = 0.2	sqft = 1516656	34.818 Acres
Summary	c = 0.20	sqft = 1516656	34.818 Acres

Duration (D) = Time of concentration (TC)  
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$

where	L = 901	Runoff length ft	Elev diff = 0.8
	c = 0.20	Runoff coef	
	S = 0.0888	Percent Slope	
therefore	TC = D = 101.02	minutes or	
and from Rainfall Intensity Table	I = 4.80	in/hr	

$Q_1 = 33.425 \text{ cfs}$

**POST DEVELOPMENT**  
25 Year Frequency

$Q_2 = CIA$

Watertight Surfaces	c(1) = 0.95	sqft = 600974	13.796 Acres
Gravel Surface	c(2) = 0	sqft =	0.000 Acres
Green Space	c(3) = 0.2	sqft = 915682	21.021
Summary	c = 0.50	sqft = 1516656	34.818 Acres

D = Time of concentration (TC)  
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$

where	L = 901	Runoff length ft	Elev diff = 0.8
	c = 0.50	Runoff coef	
	S = 0.0888	Percent Slope	
therefore	TC = D = 36.07	minutes or	
and from Rainfall Intensity Table	I = 4.80	in/hr	

$Q_2 = 83.092 \text{ cfs}$

**RESULTS**

DETENTION REQUIRED $Q_2 - Q_1$	49.667	cfs	
ONE HOUR DETENTION	178802.2	ft <sup>3</sup>	
DETENTION DIMENSIONS	WIDTH		feet
	LENGTH		feet
	DEPTH	#DIV/0!	feet