

PROJECT:	La Quinta In West Monroe		
	STORMWATER RUN-OFF CALCULATIONS		
Formulas used:			
[1] RATIONAL METHOD: Q=Aci			
where:	Q=	Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.	
	A=	Area of watershed in acres.	
	c=	Coefficient of run-off [2].	
	i=	Intensity of rainfall in inches per hour based on concentration time. [3]	
[4] TC= $\frac{L^{0.8} \left(\frac{1000}{c} - 9\right)^{0.7}}{(1140(s^{0.5}))}$			
where:	TC=	Time of concentration= time required for rain falling at most remote point to reach discharge point.	
	c=	Site run-off coefficient based on conditions shown.	
	s=	Percent slope of overland flow.	
PRIOR DEVELOPMENT			
25 Year Frequency			
Q₁ = Aci			
Watertight Surfaces		0	sqft = 0.000 Acres
c(1) =	0.9		
Gravel Surface		0	sqft = 0.000 Acres
c(2) =	0.25		
Green Space		80474.7	sqft = 1.847 Acres
c(3) =	0.15		
Summary		80474.7	sqft = 1.847 Acres
c =	0.15		
Duration (D) = Time of concentration (TC)			
where	L =	218 run-off length ft	Elev diff = 1
	c =	0.15 run-off coef	
	S =	0.4587 percent slope	
therefore	TC = D =	20.94 minutes	
Expected rainfall intensity	i =	3.64 in/hr	
	Q₁ =	1.009 cfs	10% reduction 0.101 cfs
POST DEVELOPMENT			
25 Year Frequency			
Q₂ = Aci			
Watertight Surfaces		59205	sqft = 1.359 Acres
c(1) =	0.9		
Gravel Surface		0	sqft = 0.000 Acres
c(2) =	0.25		
Green Space		21269.7	sqft = 0.488 Acres
c(3) =	0.15		
Summary		80474.7	sqft = 1.847 Acres
c =	0.70		
Duration (D) = Time of concentration (TC)			
where	L =	294 run-off length ft	Elev diff = 1
	c =	0.70 run-off coef	
	S =	0.3401 percent slope	
therefore	TC = D =	7.75 minutes	
Expected rainfall intensity	i =	3.64 in/hr	
	Q₂ =	4.719 cfs	
DETENTION REQUIREMENTS			
Detention required Q ₂ -Q ₁		3.71 cfs	
ONE HOUR DETENTION		13357.8 cuft	
DETENTION DIMENSIONS	WIDTH	70 feet	
	LENGTH	426 feet	
	DEPTH	0.45 feet	
DISCHARGE END AREA REQUIREMENTS			
10 Year Frequency			
[5] A= $\frac{Q}{(c\sqrt{2gh})}$			
where:	A=	Discharge Area required	
	g=	Acceleration of gravity	
	c=	Discharge coefficient	
	h=	Hydraulic head	
	Q=	Flow volume from run-off	
Pipe Servicing Site Drainage	Q =	0.101 cfs	h = 3.00 feet
	c =	0.62 coefficient	A = 0.012 sqft
	g =	32.16 ft/sec/sec	
REQUIRED CONDUIT = 1.47 inch inside diameter			
References:			
1. Chen, W.F. <u>The Civil Engineering Handbook</u> . 1995. Eq.# 31.1, pg. 1036			
2. Seelye, Elwyn E. <u>Data Book for Civil Engineers</u> . Vol.1 1960. Tbl. B, pg. 18-02			
3. Seelye, Elwyn E. <u>Data Book for Civil Engineers</u> . Vol.1 1960. Fig.B, pg. 18-01			
4. Chen, W.F. <u>The Civil Engineering Handbook</u> . 1995. Tbl. 31.2 Regan Equation (n=0.013)			
5. Chen, W.F. <u>The Civil Engineering Handbook</u> . 1995. Eq.# 28.32, pg. 969			