

PROJECT:

EL-BETHEL CHURCH

STORMWATER RUN-OFF CALCULATIONS (SWALE DRAINAGE)

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]

$$[4] TC = \frac{\left(L^{0.8} \left(\frac{1000}{c} - 9 \right)^{0.7} \right)}{(1140(s^{0.5}))}$$

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.

AREA SERVICED BY SWALE – POST DEVELOPMENT

25 Year Frequency

$Q_1 = Aci$

Watertight Surfaces		0	sqft = 0.000 Acres
c(1) =	0.9		
Gravel Surface		25471	sqft = 0.585 Acres
c(2) =	0.25		
Green Space		40218	sqft = 0.923 Acres
c(3) =	0.1		
Summary		65689	sqft = 1.508 Acres
c =	0.16		

Duration (D) = Time of concentration (TC)

where L = 300 run-off length ft Elev diff = 1.1
 c = 0.16 run-off coef
 S = 0.3667 percent slope
 therefore TC = D = 23.29 minutes
 Expected Rainfall Intensity i = 3.50 in/hr

$Q_1 = 0.835 \text{ cfs}$