

PROJECT: TABERNACLE CHURCH

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] $TC = \frac{(L^{0.8} (\frac{1000}{e} - 9)^{0.7})}{(1140(e^{0.5}))}$

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	c(1) = 0.9	5824	sqft =	0.134	Acres
Gravel Surface	c(2) = 0.25	0	sqft =	0.000	Acres
Green Space	c(3) = 0.15	22963	sqft =	0.527	Acres
Summary	c = 0.30	28787	sqft =	0.661	Acres

Duration (D) = Time of concentration (TC)
 where L = 60 run-off length ft
 c = 0.30 run-off coef
 S = 1.6667 percent slope
 TC = D = 8.71 minutes
 Expected rainfall intensity i = 2.33 in/hr

POST DEVELOPMENT
 25 Year Frequency

Q₂ = CIA

Watertight Surfaces	c(1) = 0.9	14805	sqft =	0.340	Acres
Gravel Surface	c(2) = 0.14	13982	sqft =	0.000	Acres
Green Space	c(3) = 0.2	28787	sqft =	0.321	Acres
Summary	c = 0.56	28787	sqft =	0.661	Acres

RESULTS

DETENTION REQU Q ₁ -Q ₂	0.398	cfs
ONE HOUR DETENTION	1431.7	cuft
DETENTION DIMENSIONS	62	feet
	100	feet
	0.23	feet

DISCHARGE END AREA REQUIREMENTS

10 Year Frequency
 Area requirements for pipe servicing swale located in Zone #1 of the corresponding Key Plan

[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

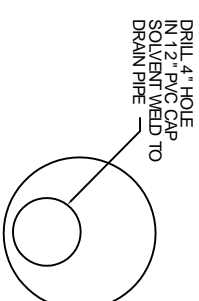
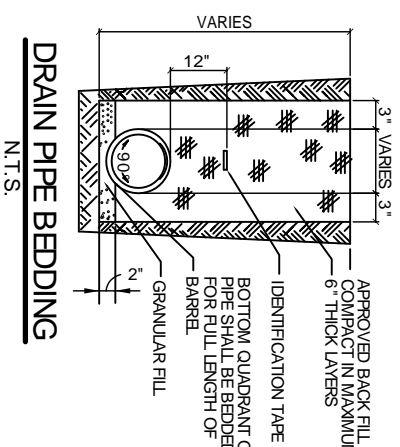
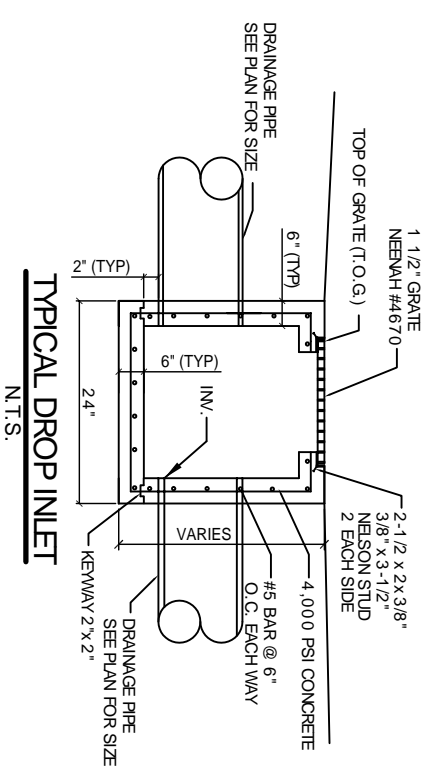
Pipe Servicing Site Drainage

Q =	0.862	cfs	H =	7.00	feet
c =	0.62	coefficient	A =	0.07	sqft
g =	32.16	ft/ft/sec			

REQUIRED CONDUIT = 3.47 Inch diameter Use 4" orifice

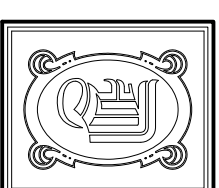
References:

1. Chen, W.F. The Civil Engineering Handbook, 1995, Eq. # 31.1, pg. 1036
2. Seelye, Elwyn E. Data Book for Civil Engineers, Vol. 1 1960, Tbl. B, pg. 18-02
3. Seelye, Elwyn E. Data Book for Civil Engineers, Vol. 1 1960, Fig. B, pg. 18-01
4. Chen, W.F. The Civil Engineering Handbook, 1995, Tbl. 31.2 Regan Equation (r=0.013)
5. Chen, W.F. The Civil Engineering Handbook, 1995, Eq. # 28.32, pg. 969



GUTTERS AND DOWN SPOUTS TO BE SEAMLESS ALUMINUM 24 GAUGE. COLOR TO BE SELECTED BY OWNER. GUTTERS TO BE "OGEE" IN CROSS SECTION. MINIMUM 6" WIDTH.

- NOTES:**
- 1) DRAIN PIPE & FITTINGS WITHIN PROPERTY LINE SHALL BE POLYVINYL CHLORIDE PLASTIC PIPE MEETING CLASS 100 C-900 PVC.
 - 2) ELEVATIONS SHOWN ARE M.S.L.
 - 3) FIELD SLOPE SHALL BE 2% UNLESS OTHERWISE NOTED.
 - 4) MUCK OUT 24" DEEP FOR FOUNDATION PAD MINIMUM, OR TO UNDISTURBED SOIL CAPABLE OF 1500 PSF BEARING.
 - 5) DOWN SPOUTS SHALL FLOW INTO SUB-SURFACE DRAINAGE.
 - 6) THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE PROPERTY. NEW DRAINAGE CALCULATIONS ARE DETERMINED ACCORDINGLY.
 - 6) THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE



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NEW
 CHURCH

TABERNACLE
 BAPTIST CHURCH
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DRAINAGE
 DETAILS AND
 CALCULATIONS

REV:

SCALE AS NOTED

JOB#: 2050

DATE 2-8-10

SHEET 7

C-6

OF 25