

Project: Sample CalculationBy: Jane DoeDate: 8/21/2001**A9 RATIONAL METHOD PIPE DESIGN FOR INLET CONTROL**

Type of Channel

Concrete Channel x 0.2Elevation 1 0Elevation 2 3 $\Delta Y$  3 ftL 250 ft

Type of Channel

Grassed Channel x 1.0Elevation 1 3Elevation 2 8 $\Delta Y$  5 ftL 250 ft

Type of Channel

Overland Grass x 2.0Elevation 1 8Elevation 2 15 $\Delta Y$  7 ftL 500 ft**TIME OF CONCENTRATION**

$$T_c = \frac{3}{0.60} \times \frac{0.2}{1} \text{ min.} = 1.0 \text{ min.}$$

$$T_c = \frac{2.5}{2.50} \times \frac{1}{1} \text{ min.} = 1.0 \text{ min.}$$

$$T_c = \frac{4.7}{9.40} \times \frac{2}{1} \text{ min.} = 1.0 \text{ min.}$$

$$T_c \text{ total} = 12.50 \text{ min.}$$

**DETERMINATION OF "C" VALUE**Type of Land Use : 2/3 Single Family Residential, 0.30-0.50; 1/3 Neighborhood Business, 0.50-0.70Range = VariesChoose C = 0.41Reason for C : Distribution of 0.35 for Single Family Residential;  
and 0.55 for Neighborhood Business**RAINFALL INTENSITY** $T_c \text{ total} = 12.5 \text{ min.}$ Return Period 25 yearsRainfall Intensity, I = 6.35 in/hr**DRAINAGE AREA**Area = 1,176,120 sq. ft. / 43,560Drainage Area = 27.0 acres**DISCHARGE CALCULATION**

$$Q = \frac{0.41}{C} \times \frac{6.35}{I \text{ (in/hr)}} \times \frac{27.0}{A \text{ (acres)}}$$

$$Q = 70.29 \text{ cfs}$$

**PIPE SIZE AND HEADWATER**

For RCP &amp; HDPE use : n = 0.012

n = 0.012 s = 1.0 %Q = 70.29 cfsHW/D = 0.95 (scaling factor)

$$HW = \frac{0.95}{(HW/D)} \times \frac{48}{\text{Diameter}} / 12 \text{ in}$$

Diameter = 48 in.Velocity = 5.80 ft/s

$$HW = 3.8 \text{ ft}$$