

Req'd: Determine drainage ditch size to carry peak runoff from drainage area as shown in attached diagram.
 Use storm intensity from "City of L.G. Surface Water Management Plan" as recommended by Union Co. Planning.
 Determine detention/infiltration basin size. See attached diagram.

• Determine peak runoff.

Use rational formula $Q_p = C I A_d$ where $C = 0.2$ (Unimproved)
 $I = 2.3 \text{ in/hr}$
 $A_d = 8.63 \text{ ac}$
 $= 4.00 \text{ cfs.}$

$A_d = \frac{375,780 \text{ sf}}{43,560 \frac{\text{ac}}{\text{sf}}}$
 $= 8.63 \text{ ac.}$



EXPIRES: 6/30/2024

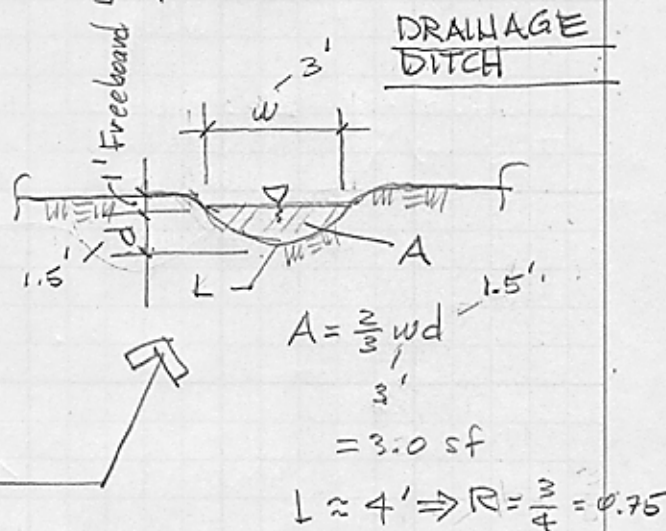
• Determine ditch configuration (Manning equation).

$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$
 $AR^{2/3} = \frac{n Q}{1.486 S^{1/2}} = 0.83$

$n = 0.028$ Unlined Channel
 No vegetation [1]
 [1] Table 21-11.

$S = \frac{2831-2826}{600} = 0.0083$

$AR^{2/3} = 2.47 \gg 0.83 \leftarrow \text{O.K.}$



• Determine runoff volume for 24-hr storm

$V_{\text{Runoff}} = (4.00 \frac{\text{ft}^3}{\text{s}}) (24 \text{ hr}) (\frac{3600 \text{ s}}{\text{hr}}) (0.2) = 69,120 \text{ cf}$

$V_{\text{Infil}} = (A_{\text{Infil}}) (r_{\text{Infil}}) (24 \text{ hr})$

where $r_{\text{Infil}} = 1.0 \frac{\text{in}}{\text{hr}}$ "Soil Survey of Union Co. Area" 1985.
 $= 0.003 \frac{\text{ft}}{\text{hr}}$

$V_{\text{Infil}} = 47,810 \text{ cf}$

$V_{\text{Total}} = V_{\text{Basin}} + V_{\text{Infil}} = 90,020 \text{ cf} > V_{\text{Runoff}} \leftarrow \text{O.K.}$

[1] "Standard Handbook for C.E."

