

Rev. 10-25-91

D.A. = 19.5 Acres

Determine Runoff (Q_{100} peak) from undeveloped site:
 (Use Rational Method)

Group D soil, short grass/pasture, slope 0.1% $C = 0.63$

Overland flow velocity (from Attach. E) = 0.09 fps

Overland flow length = 1220' $\frac{1220}{0.09} \div 60 = 225$ min.

$T_c = 225$ min. $I_{100} = 1.43$ "/hr.

$Q_{100} = 0.63(1.43)(19.5) = 17.6$ cfs (Allowable discharge)

Developed Site Conditions:

1.1 Ac. Bldg ($C = 0.98$), 8.9 Ac. Rock Surface ($C = 0.80$), 9.0 Ac. grass ($C = 0.63$)

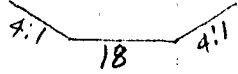
$C_w = \frac{1.1(0.98) + 8.9(0.80) + 9.5(0.63)}{19.5 \text{ Ac.}} = 0.73$

Max. flow length = 690' overland (grass @ 0.1%) $V = 0.09$ fps = 128 min.
 980' grassed channel @ 0.36% $V = 0.35$ fps = 46 min

$T_c = 174$ min

(See Modified Rational Method output - TR 55) - Pages 3-7
 WCP MOD 2 / WCP 100 B 10-23-91

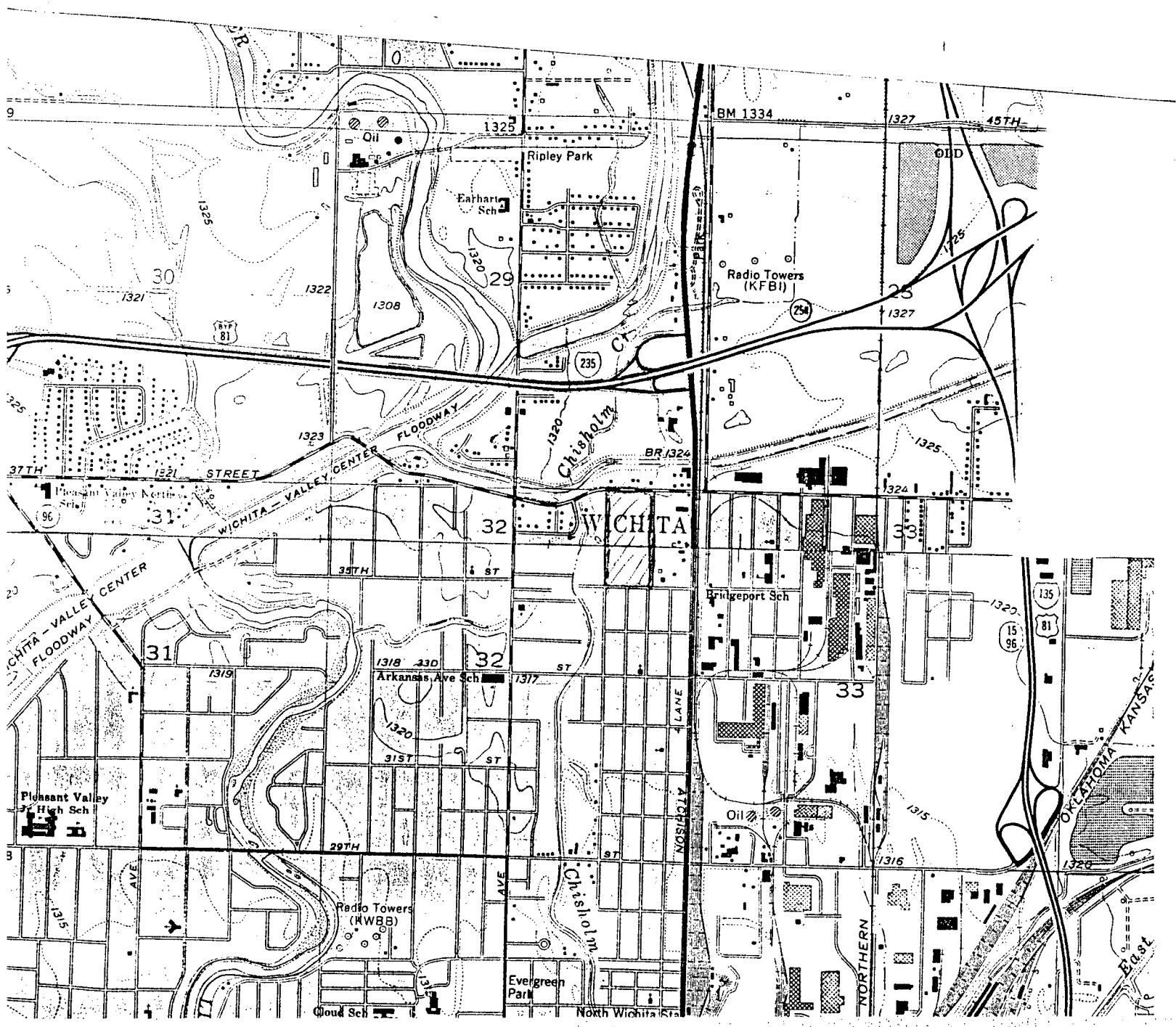
Storage Required = 1.80 Ac. ft. = 2904 cu. yds.

Use trapezoidal channel  slope 0.36%
 depth varies from 1.0' @ s. end to 4.0' @ n. end

(See Drainage Plan)

Outlet pipe - 470 LF Slope = $\frac{130.5 - 124.5}{470} = 0.0128$ ($Q = 17.1$)

Try 21" RCP. @ 1.28%, $Q_{pipe} = 17.9$ cfs (OK)



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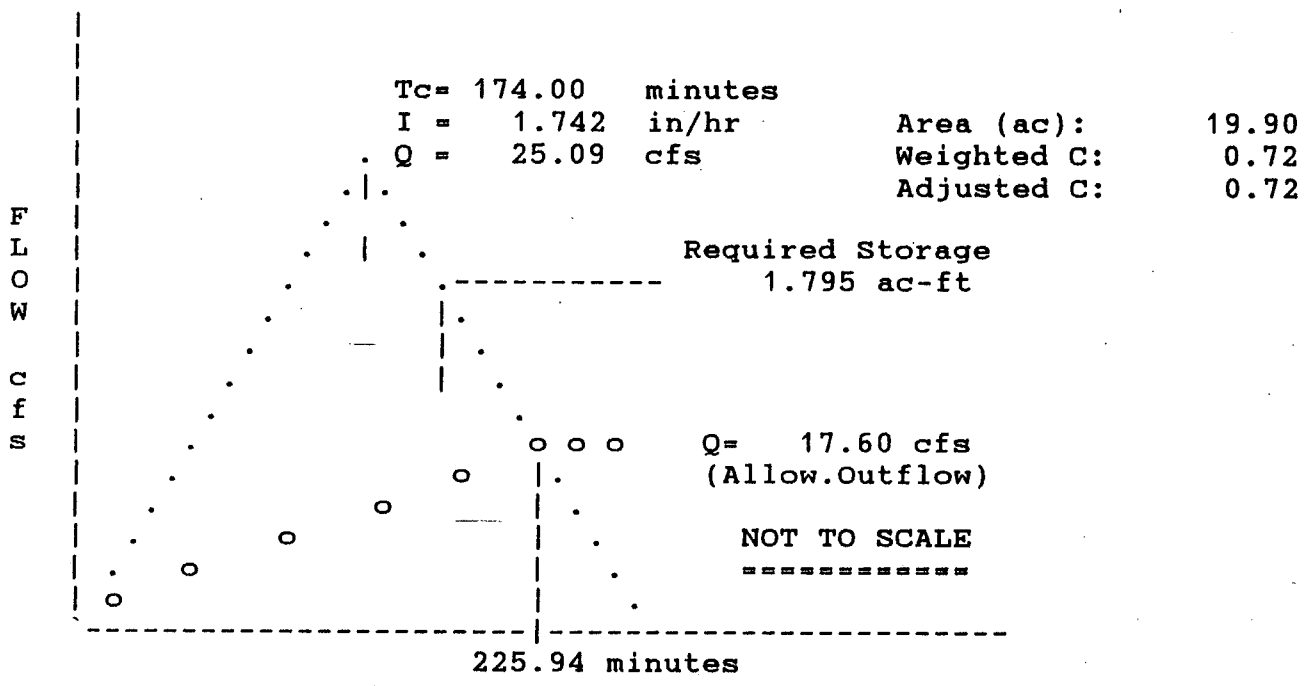
MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

WICHITA CONCRETE PIPE CO. - B.R. STEPHENSON ADDITION
100-YR RUNOFF

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*****
*
* RETURN FREQUENCY: 100 yr | Allowable Outflow: 17.60 cfs *
* 'C' Adjustment: 1.000 | Required Storage: 1.795 ac-ft *
*
* STORM DURATION = Tc for Max.Storage *
*-----*
* Peak Inflow: 25.09 cfs Inflow .HYD stored: WCP100C .HYD *
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WICHITA CONCRETE PIPE CO. - B.R. STEPHENSON ADDITION
100-YR RUNOFF

**** Modified Rational Hydrograph ****

Weighted C = 0.724 Area= 19.900 acres Tc = 174.00 minutes

Adjusted C = 0.724 Td= 174.00 min. I= 1.74 in/hr Qp= 25.09 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.00

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time | Time increment = 0.017 Hours
Hours	Time on left represents time for first Q in each row.

Specified time increment 1.666667E-02 hrs would result in 349 ordinates.
This program can only store up to 300 ordinates.

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WICHITA CONCRETE PIPE CO. - B.R. STEPHENSON ADDITION
 100-YR RUNOFF

***** SUMMARY OF RATIONAL METHOD PEAK DISCHARGES *****

$$Q = \text{adj} * C * I * A$$

Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
 adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
 'C' adjustment, k = 1
 Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
BLDG	0.950	1.10						
ROCK SURF	0.800	8.90						
UNIMPROVED	0.630	9.90						
			174.00	0.724	0.724	1.742	19.90	25.09

