

URBAN HYDROLOGY FOR SMALL WATERSHEDS (TR-55)
PEAK DISCHARGE WORKSHEET
FOR CHAPTER 4 (APPENDICES D & E)

Project: CRAG OPTICAL By K.HILL Date 5-27-92
Checked _____ Date _____

Steps Peak Discharge Computations for up to 3 Storms: Type II, Duration 24 hours.

1. Data: Watershed Condition = FUTURE (present or future).

Drainage Area (DA) = 9.0 acres. Ave. Watershed Slope (S) = 0.3 %.

2. Runoff Curve Number (CN)

Hydrologic Soil Group (Appendix B)	Land Use Description (Table 2-2)	CN (3)	% or Area (4)	Product (3)(4)
D	WOODLAND	93	50	4650
D	PASTURE OR RANGE LAND	67	50	3350
Totals =				100 8000

CN (weighted) = $\frac{\text{total col. (5)}}{\text{total col. (4)}} = \frac{8000}{100} = 80$ use CN = 80

3. Rainfall Frequency (F)

1st Storm	2nd Storm	3rd Storm	yr.
10	25	100	
5.5	6.2	8.0	inches

4. Runoff Depth (Q)

1st Storm	2nd Storm	3rd Storm	inches
4.47	5.15	6.93	

5. Basic Peak Discharge (q)
Use S, DA, CN, and Figure D-2.
For graph: Flat (S = less than 3%)
labeled: Moderate (S = 3% to 7.9%)
(check one) Steep (S = 8% & greater)

6. Watershed Slope Factor
Use S, DA, and Table E-1.

7. Peak Discharge (q_p)
where q_p = Steps #4 x 5 x 6

1st Storm	2nd Storm	3rd Storm	cfm
28.4	32.7	44.0	

See Steps 8 to 13 for adjustments that may be applicable.
(TR NOTICE 55-A, September 1981)

TR-55, CHAPTER 4 (APPENDICES D & E), PEAK DISCHARGE WORKSHEET (CONT.)

Steps Peak Discharge Computations with Adjustments

8. Data: Obtain if Adjustments are Applicable

Ponding and Swampy areas (PND) = _____ acres, _____ % of DA
Impervious Area (IPA) = 2.9 acres, 36 % of DA
Total Hydraulic Length (HL) = 820 feet
Hydraulic Length Modified (HLM) = 470 feet, 59 % of HL

Rainfall Frequency (F) from Step 3

1st Storm	2nd Storm	3rd Storm	yr.
10	25	100	

Peak Discharge (q_p) from Step 7

1st Storm	2nd Storm	3rd Storm	cfm
28.4	32.7	44.0	
X	X	X	

9. Ponding and Swampy Area Peak Factor
Use PND, F, and Tables E-2, 3 or 4.
Location in: at Design Point (E-2)
Watershed: Center or Spreadout (E-3)
(check one) Upper Reaches (E-4)

10. Watershed Shape Peak Factor
Use HL with Figure E-1 and read:
Equiv. Drainage Area (EDA) = _____ acres.

Use Figure D-2 graph from Step 5, CN, and EDA for:
Equiv. Peak/Inch Runoff (q_i) = _____ cfm/in.
Factor = $\left[\frac{q_i}{q_p} \text{ from Step 5} \right] \times \left[\frac{DA}{EDA} \right]$

11. Impervious Area Peak Factor
Use IPA, CN and Figure 4-1.

12. Hydraulic Length Modified Peak Factor
Use HLM, CN and Figure 4-2.

13. Adjusted Peak Discharge (q_a)
q_a = q_p (from Step 7) x Steps #9 x 10 x 11 x 12

* If the adjustment is not applicable, enter a Factor of 1.0

1st Storm	2nd Storm	3rd Storm	cfm
28.4	32.7	44.0	
35.3	40.6	54.0	

(TR NOTICE 55-A, September 1981)

URBAN HYDROLOGY FOR SMALL WATERSHEDS (TR-55)
PEAK DISCHARGE WORKSHEET
FOR CHAPTER 4 (APPENDICES D & E)

Project: CRAG OPTICAL By K.HILL Date 5-27-92
Checked _____ Date _____

Steps Peak Discharge Computations for up to 3 Storms: Type II, Duration 24 hours.

1. Data: Watershed Condition = PRESENT (present or future).

Drainage Area (DA) = 13.3 acres. Ave. Watershed Slope (S) = 0.3 %.

2. Runoff Curve Number (CN)

Hydrologic Soil Group (Appendix B)	Land Use Description (Table 2-2)	CN (3)	% or Area (4)	Product (3)(4)
D	PASTURE OR RANGE LAND	67	89	5963
Totals =				100 5963

CN (weighted) = $\frac{\text{total col. (5)}}{\text{total col. (4)}} = \frac{5963}{100} = 59$ use CN = 59

3. Rainfall Frequency (F)

1st Storm	2nd Storm	3rd Storm	yr.
10	25	100	
5.5	6.2	8.0	inches

4. Runoff Depth (Q)

1st Storm	2nd Storm	3rd Storm	inches
4.26	4.93	6.69	

5. Basic Peak Discharge (q)
Use S, DA, CN, and Figure D-2.
For graph: Flat (S = less than 3%)
labeled: Moderate (S = 3% to 7.9%)
(check one) Steep (S = 8% & greater)

6. Watershed Slope Factor
Use S, DA, and Table E-1.

7. Peak Discharge (q_p)
where q_p = Steps #4 x 5 x 6

1st Storm	2nd Storm	3rd Storm	cfm
35.3	40.8	55.2	

See Steps 8 to 13 for adjustments that may be applicable.
(TR NOTICE 55-A, September 1981)

TR-55, CHAPTER 4 (APPENDICES D & E), PEAK DISCHARGE WORKSHEET (CONT.)

Steps Peak Discharge Computations with Adjustments

8. Data: Obtain if Adjustments are Applicable

Ponding and Swampy areas (PND) = _____ acres, _____ % of DA
Impervious Area (IPA) = _____ acres, _____ % of DA
Total Hydraulic Length (HL) = 1120 feet
Hydraulic Length Modified (HLM) = 220 feet, 20 % of HL

Rainfall Frequency (F) from Step 3

1st Storm	2nd Storm	3rd Storm	yr.
10	25	100	

Peak Discharge (q_p) from Step 7

1st Storm	2nd Storm	3rd Storm	cfm
35.3	40.8	55.2	
X	X	X	

9. Ponding and Swampy Area Peak Factor
Use PND, F, and Tables E-2, 3 or 4.
Location in: at Design Point (E-2)
Watershed: Center or Spreadout (E-3)
(check one) Upper Reaches (E-4)

10. Watershed Shape Peak Factor
Use HL with Figure E-1 and read:
Equiv. Drainage Area (EDA) = _____ acres.

Use Figure D-2 graph from Step 5, CN, and EDA for:
Equiv. Peak/Inch Runoff (q_i) = _____ cfm/in.
Factor = $\left[\frac{q_i}{q_p} \text{ from Step 5} \right] \times \left[\frac{DA}{EDA} \right]$

11. Impervious Area Peak Factor
Use IPA, CN and Figure 4-1.

12. Hydraulic Length Modified Peak Factor
Use HLM, CN and Figure 4-2.

13. Adjusted Peak Discharge (q_a)
q_a = q_p (from Step 7) x Steps #9 x 10 x 11 x 12

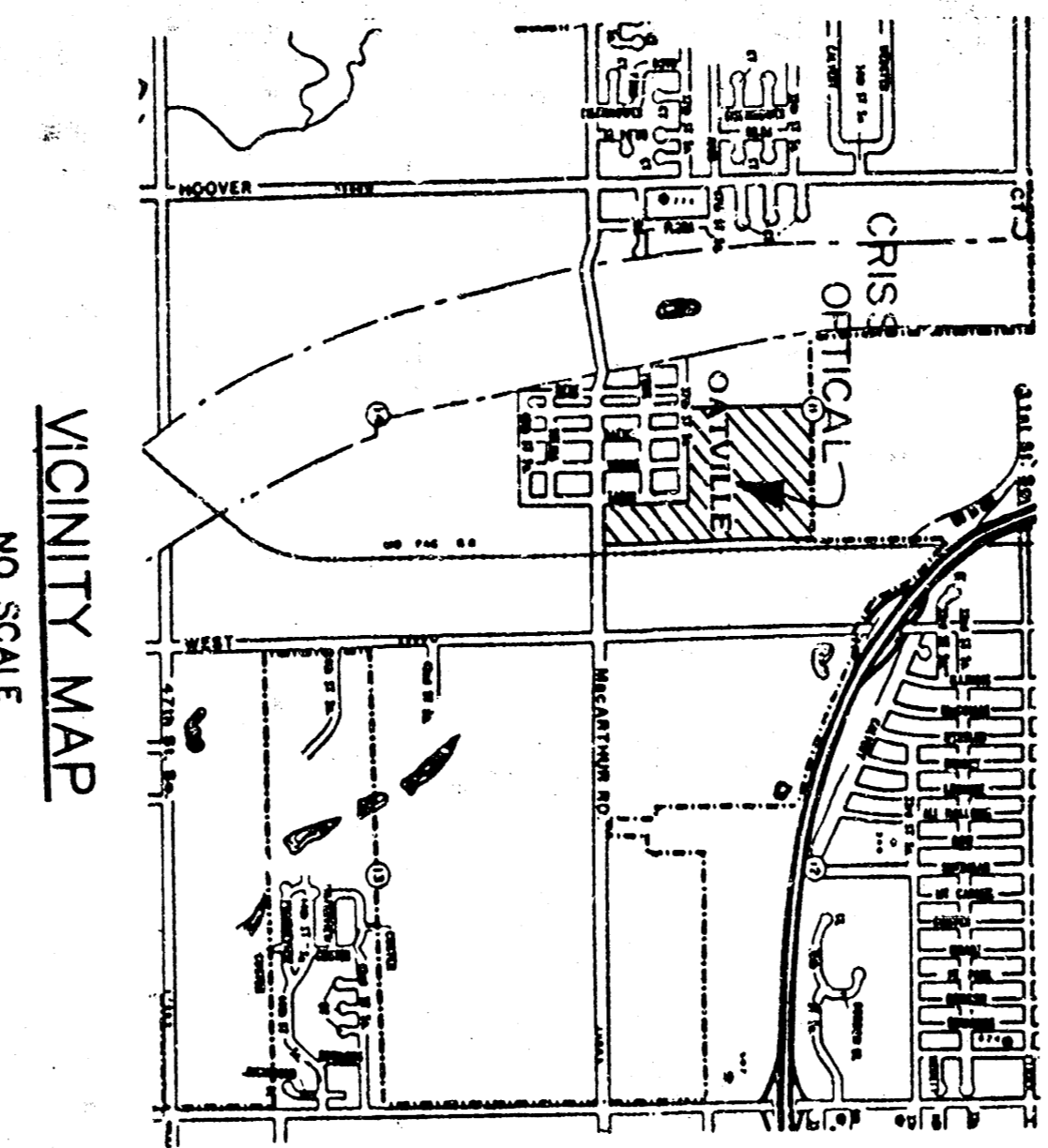
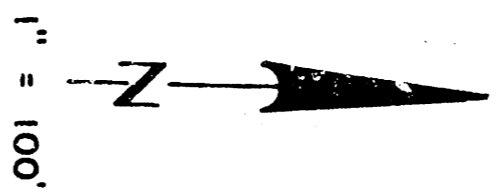
* If the adjustment is not applicable, enter a Factor of 1.0

1st Storm	2nd Storm	3rd Storm	cfm
35.3	40.8	55.2	
37.4	43.2	58.5	

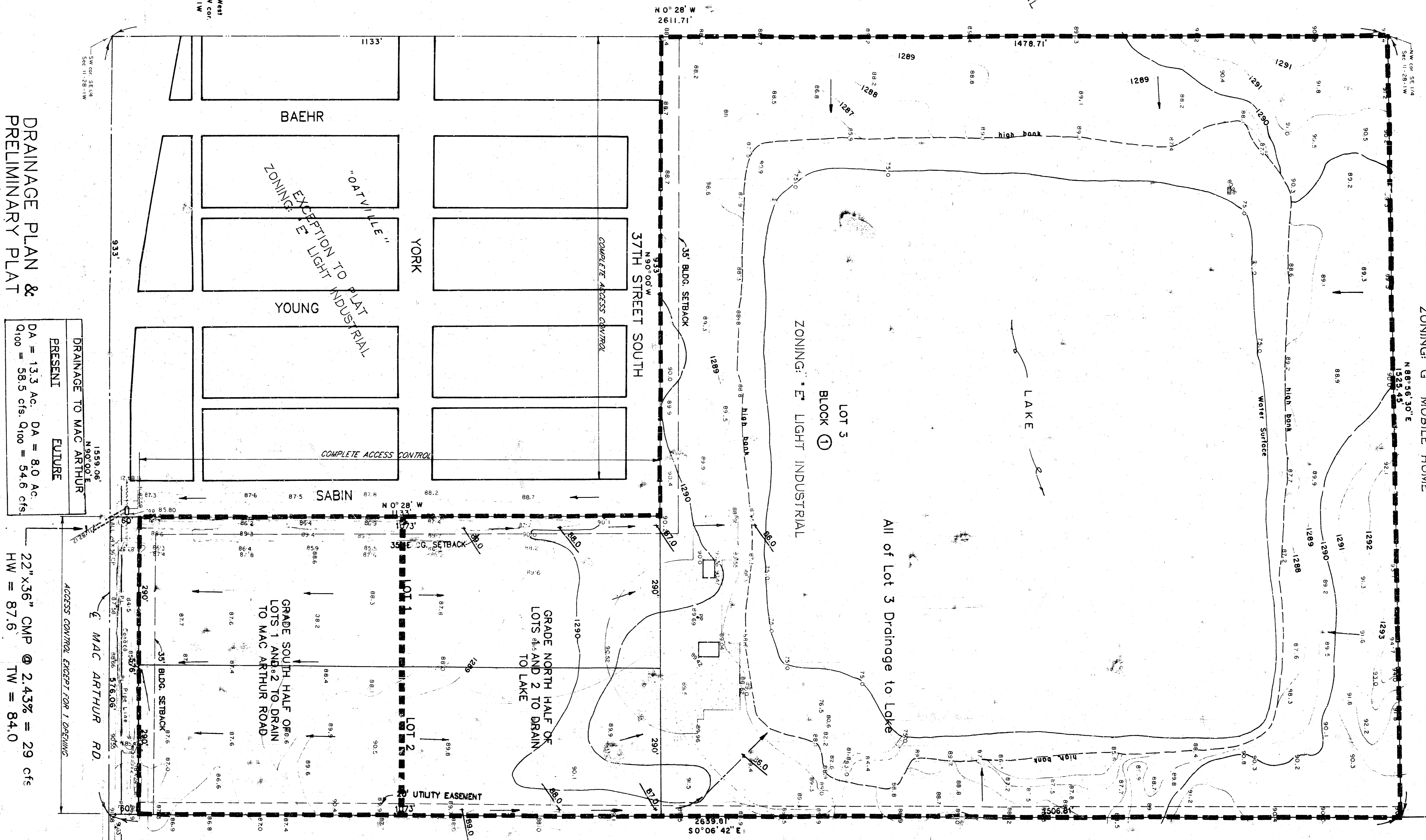
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BIG LAKE ADDITION
ZONING: G MOBILE HOME

UNPLATTED COMMERCIAL
ZONING: E LIGHT COMMERCIAL



B.M. - ELEV. 1289.15 - 606'± H.L.P. 90' West
9.4'± South of SW cor.
SE 1/4, Sec. 11-28-1W



DRAINAGE PLAN &
PRELIMINARY PLAT

DRAINAGE TO MAC ARTHUR	
PRESENT	FUTURE
DA = 13.3 AC.	DA = 8.0 AC.
Q ₁₀₀ = 58.5 cfs	Q ₁₀₀ = 54.6 cfs

22' x 36' CMP @ 2.43% = 29 cfs
HW = 87.6 TW = 84.0

CRISS OPTICAL ADDITION

TO SEDGWICK COUNTY, KANSAS
DATE: MAY 27, 1992

OWNER: CRISS OPTICAL MFG. CO., INC.

ENGINEER: POE & ASSOCIATES OF KANSAS

MO. PAC. R.R. R/W ROYAL INDUSTRIAL ADDITION
ZONING: E LIGHT COMMERCIAL