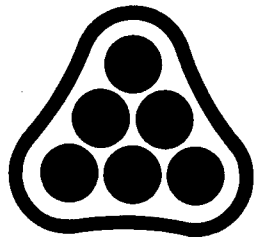

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DRAINAGE PLAN

AND

SUPPORTING CALCULATIONS

FOR

EXPRESSWAY CENTER

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

ENGINEERS

WICHITA, KANSAS

OCTOBER 21, 1988

1440 EAST ENGLISH
WICHITA, KANSAS 67211
(316) 262-2691

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Date 10·19·88 Page 1 of 5

Project Expressway Center

Item Drainage Plan - Storm Sewer

I HYDROLOGY Use Rational Formula $Q = CIA$

Determine "C"

Node	Soil Type	Hydrologic Grp	Proposed Land Use	C_5	C_{100}
103	Fb	B	Neighborhood Bus.	0.69	0.80
102	Fb	B	Neighborhood Bus.	0.69	0.80
101	Fb	B	Neighborhood Bus.	0.69	0.80
100	(End Section)				

Determine "I"

Node	t_c	I_5	I_{100}
103	15	4.56	7.37
102	15	4.56	7.37
101	15	4.56	7.37
100	(End Section)		

Determine "A"

Node	Plan. Units	Area - S.F.	Area - Ac.
103	583	98,280	2.14
102	934	149,440	3.43
101	830	132,800	3.05
100	(End Section)		

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Project Expressway Center

Item Drainage Plan - Storm Sewer

Determine "Q_5"

Node	C_5	I_5	A	Q_5
103	0.69	4.56	2.14	6.7
102	0.69	4.56	3.43	10.8
101	0.69	4.56	3.05	9.6
100	(End Section)			

Determine "Q_{100}"

Node	C_{100}	I_{100}	A	Q_{100}
103	0.80	7.37	2.14	12.6
102	0.80	7.37	3.43	20.2
101	0.80	7.37	3.05	18.0
100	(End Section)			

```
100 j,  178.5000  100    3    4    3
110 t,expressway center addition
120 t,drainage plan
130 t,storm water sewer system 100 analysis
140 i,  103     0.69     2.14     0.00     0.00     6.70    15.00   185.00
150 i,  102     0.69     3.43     0.00     0.00    10.80    15.00   182.00
160 i,  101     0.69     3.05     0.00     0.00     9.60    15.00   181.00
170 m,  100   178.50
180 p,  103  102   350.00   18 0.013   0.00   0.00
190 p,  102  101   410.00   27 0.013   0.00   0.00
200 p,  101  100   210.00   36 0.013  90.00   0.00
210 e
```

Date: 10-19-1988
Time: 10:50:33

Input File: express

expressway center addition
drainage plan
storm water sewer system 100 analysis

Storm Frequency = 5-Year

* * * HYDROLOGY * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
103	102	0.69	2.14	0.00	0.0	15.00	5.22	6.70	15.00	5.22	6.70	6.70	18"	3.79	350.00	1.54	16.54
102	101	0.69	3.42	0.00	0.0	15.00	5.22	10.80	16.54	5.02	10.40	17.10	27"	4.30	410.00	1.59	18.13
101	100	0.69	3.05	0.00	0.0	15.00	5.22	9.60	18.13	4.85	8.92	26.01	36"	3.68	210.00	0.95	19.08

Date: 10-19-1988
Time: 10:50:33

Input File: express

expressway center addition
drainage plan
storm water sewer system 100 analysis

Storm Frequency = 5-Year

* * * HYDRAULICS * * *

Node	Hyd-Slope (Ft/Ft)	Friction (Ft)	Bend (Ft)	Transition (Ft)	Manhole (Ft)	Deflection (Ft)	Junction (Ft)	Total (Ft)	Hyd-Gl Elevation	Desired Elevation	Diff. (Ft)
103	0.00407	1.4239	0.0000	0.0000	0.0000	0.0000	0.0000	1.4239	182.1901	185.0000	2.81
102	0.00305	1.2494	0.0000	0.0064	0.0000	0.0000	0.5390	1.7948	180.7662	182.0000	1.23
101	0.00132	0.3194	0.0000	0.0154	0.0000	0.0000	0.1366	0.4714	178.9714	181.0000	2.03
100	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	178.5000	178.5000	0.00

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Date 10·19·88 Page 1 of 3

Project Expressway Center

Item Drainage Plan - 37th st. Ditch

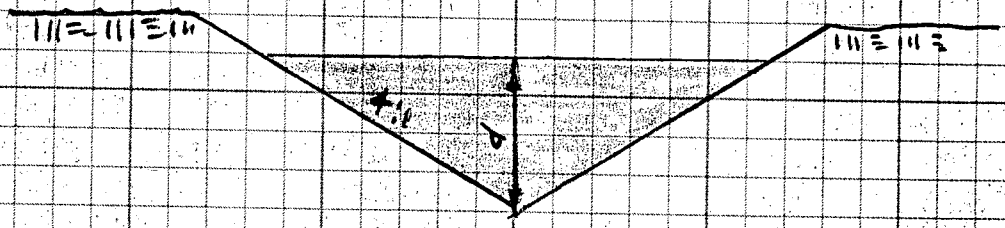
Reach #1

General Location: From Mo. Pac R.R downstream to W.L. Lot 4.

$Q = cIA$

$Q_{100} = 0.80 \times 7.37 \times 2.30 = 13.6$ cfs

Ditch Section:



Use Mannings Equation $Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$

$13.6 = \frac{1.486}{0.03} AR^{2/3} (0.015)$

$AR^{2/3} = 2.24$

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
1.0	4.0	8.25	0.485	0.617	2.47
0.9	3.24	7.42	0.437	0.575	1.86

USE d = 1.0 $V = Q/A = \frac{13.6}{4.0} = 3.4$ fps (OK)

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Date 10.19.88 Page 2 of 3

Project Expressway Center

Item Drainage Plan - 37th st. Ditch

Reach #2

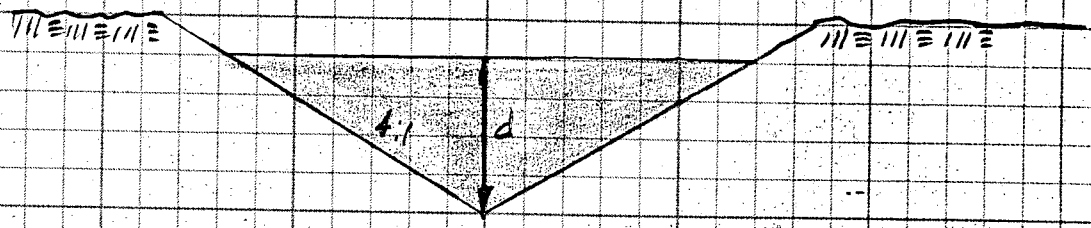
General Location: From W.L. Lot 4 downstream to W.L. Lot 3

$Q = cIA$

$Q_{100} = (0.80 \times 7.37 \times 2.3) + 13.6$ from Reach #1

$Q_{100} =$ 13.6 cfs + 13.6 = 27.2 cfs

Ditch Section:



Use Manning's Eq'n $Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$

$27.2 = \frac{1.486}{0.03} AR^{2/3} (0.01)^{1/2}$

$27.2 = 49.53 \times AR^{2/3} \times 0.1$

$AR^{2/3} = 549$

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
1.0	4.0	8.25	0.485	0.617	2.47
1.2	5.76	9.90	0.582	0.697	4.02
1.3	6.76	10.72	0.631	0.735	4.97
1.4	7.84	11.54	0.679	0.773	6.05

USE d = 1.3' $V = Q/A = 27.2/6.76 = 4.0$ fps ok

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Date 10.19.88 Page 3 of 3

Project Expressway Center

Item Drainage Plan -37th St. Ditch

Reach #3

General Location: W.L Lot 3 downstream to E.L. Floodway

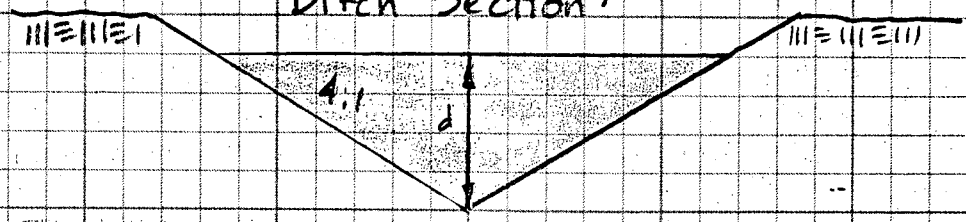
$Q = CIA$

$Q_{100} = (0.80 \times 7.37 \times 3.08) + 27.2$ from Reach #1 & Reach #2

$= 18.2 + 27.2$

$= 45.4$ cfs

Ditch Section:



Use Manning's Equation $Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$

$45.4 = \frac{1.486}{0.03} AR^{2/3} (0.01)^{1/2}$

$45.4 = 49.53 \times AR^{2/3} \times 0.1$

$AR^{2/3} = 9.17$

d	A	p	R	$R^{2/3}$	$AR^{2/3}$
1.8	12.96	14.84	0.873	0.914	11.83
1.7	11.56	14.02	0.825	0.879	10.17
1.6	10.24	13.19	0.776	0.845	8.64

USE $d = 1.6$ $V = Q/A = 45.4/10.24 = 4.4$

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Date 10·19·88 Page 1 of 4

Project Expressway Center

Item Drainage Plan - Culverts

Use RCP on all culverts

Culvert #1 Location: W.L. Lot 4

Q_{100} = 13.6 cfs

Inlet Control:

HW	D	HW/D	Q	
3.0'	15"	2.4	9.0	
3.0'	18"	2.0	12.5	
3.0'	24"	1.5	20.0	← USE

Outlet Control: $HW = H + h_o - LS_o$

$3.0 = H + 1.3 - 0.5$

$H = 2.2'$

D	L	K_e	H	Q	
15"	50'	0.5	2.2'	9.5	
18"	50'	0.5	2.2'	12.0	
24"	50'	0.5	2.2'	25.0	←

CULVERT #1 : USE 24" RCP w/ End sections.

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Date 10·19·88 Page 2 of 4

Project Expressway Center

Item Drainage Plan - Culverts

Culvert #2: Location: Joint Access Location between Lots 2 & 3.

Q_{100} = 27.2 cfs

Inlet Control:

HW	D	HW/D	Q
3.0	24"	1.5	20.0
3.0	30"	1.2	28.0 ←

Outlet Control: $HW = H + h_o - LS_o$

$3.0 = H + 1.6 - 0.5$

$H = 1.9'$

D	L	k_e	H	Q
24"	50'	0.5	1.9	24
30"	50'	0.5	1.9	40 ←

CULVERT #2: USE 30" RCP w/ End Sections.

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Date 10·19·88 Page 3 of 4

Project Expressway Center

Item Drainage Plan - Culverts

Culvert #3 : Location : W.L. Lot 2

Q_{100} = 45.4

Inlet Control

HW	D	HW/D	Q	
4.0	30"	1.6	36	
4.0	36"	1.33	50	←

Outlet Control

$HW = H + h_o - LS_o$

$4.0 = H + 1.6 - 0.5$

$H = 2.9'$

D	L	K_e	H	Q	
30"	50'	0.5	2.9	50	←
24"	50'	0.5	2.9	30	

Culvert #3 : Use 36" RCP w/ End Sections

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Date 10.10.88 Page 4 of 4

Project Expressway Center

Item Drainage Plan - Culverts

Culvert #4 Location: S.W Corner Lot 1

Q_{100} = 50.8 (from Nodes 101-103)

Inlet Control

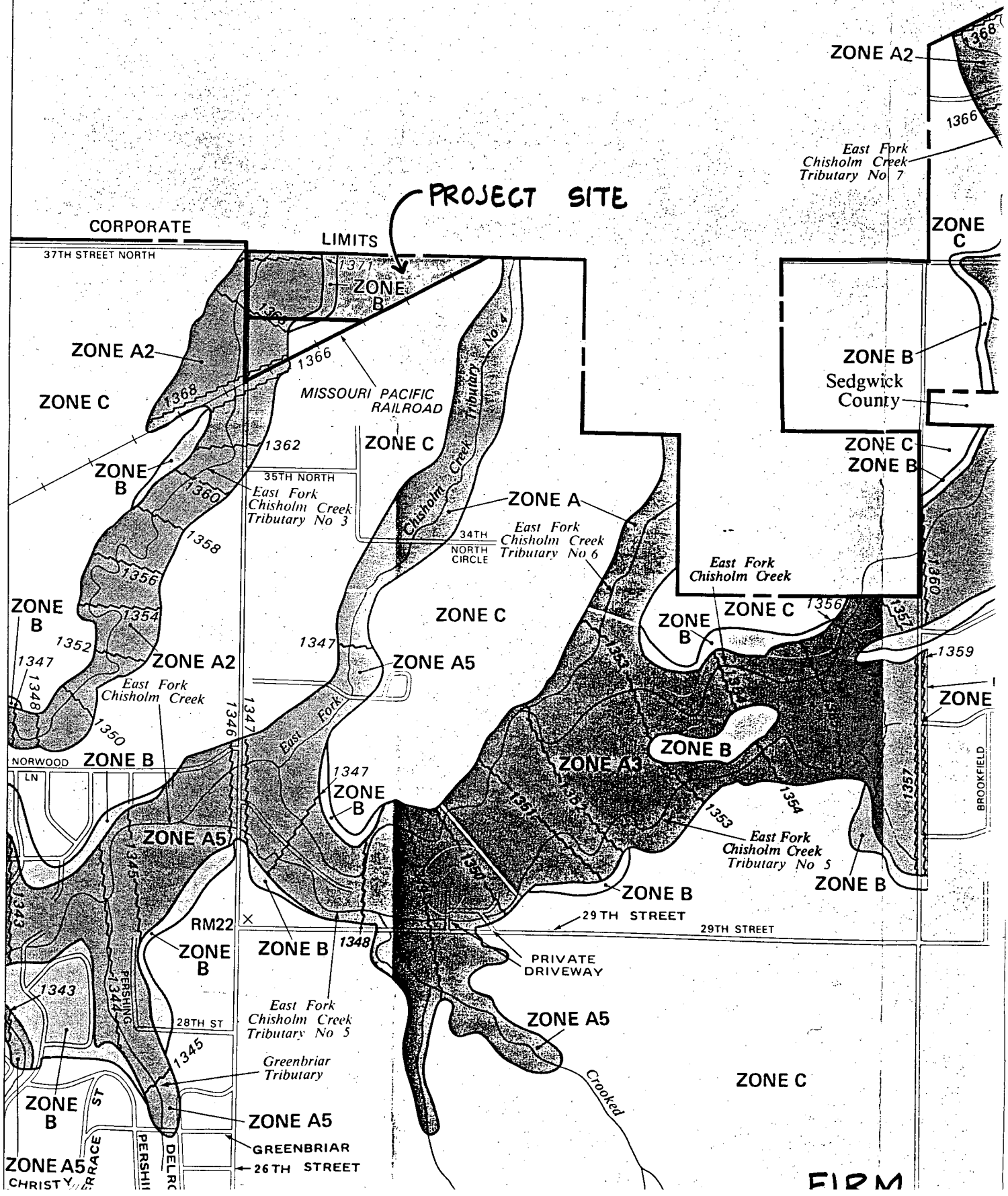
HW	D	HW/D	Q	
4.0	36"	1.33	50	←

Outlet Control

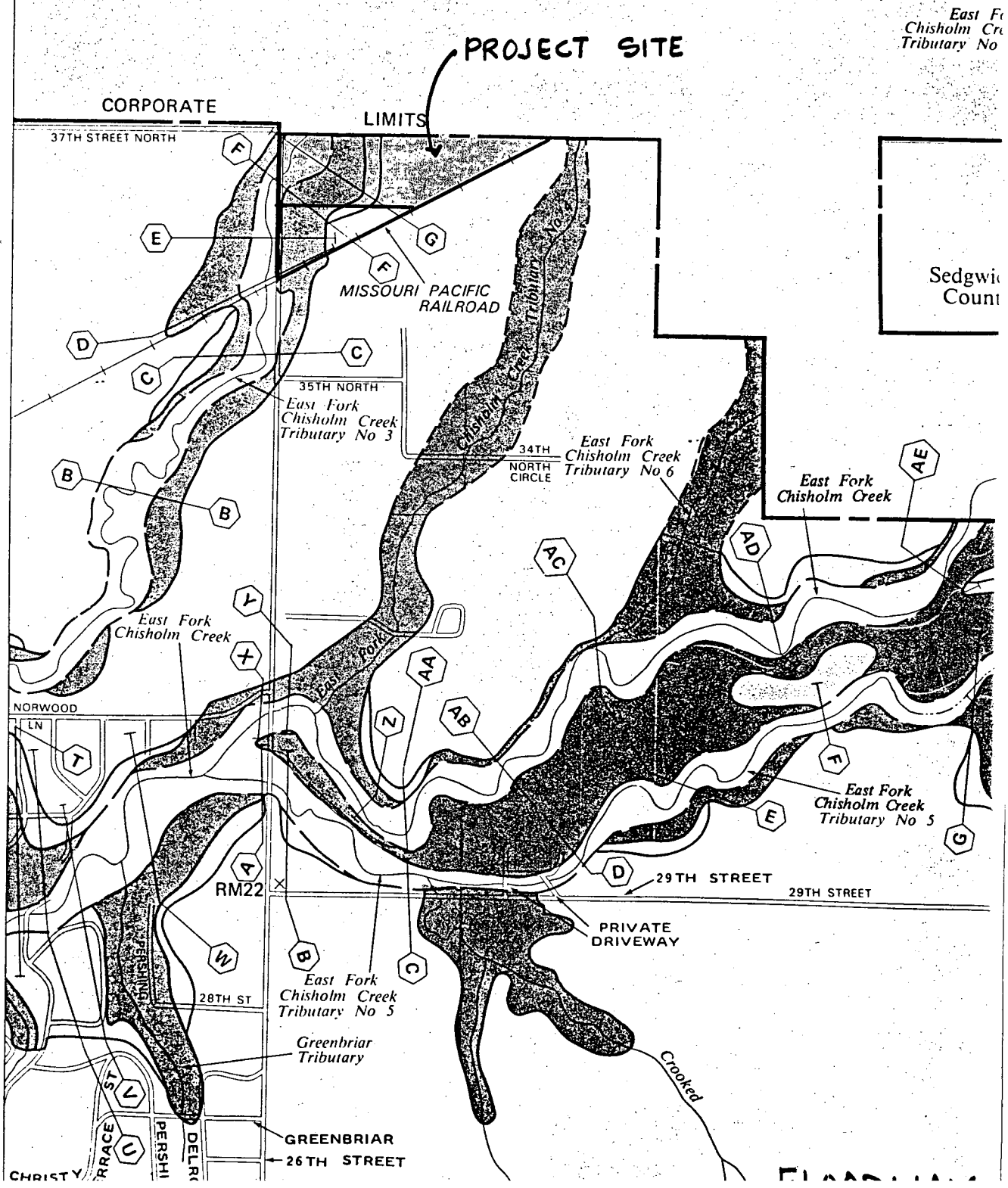
D	L	Ke	H	Q	
30"	50'	0.5'	2.9	50	←

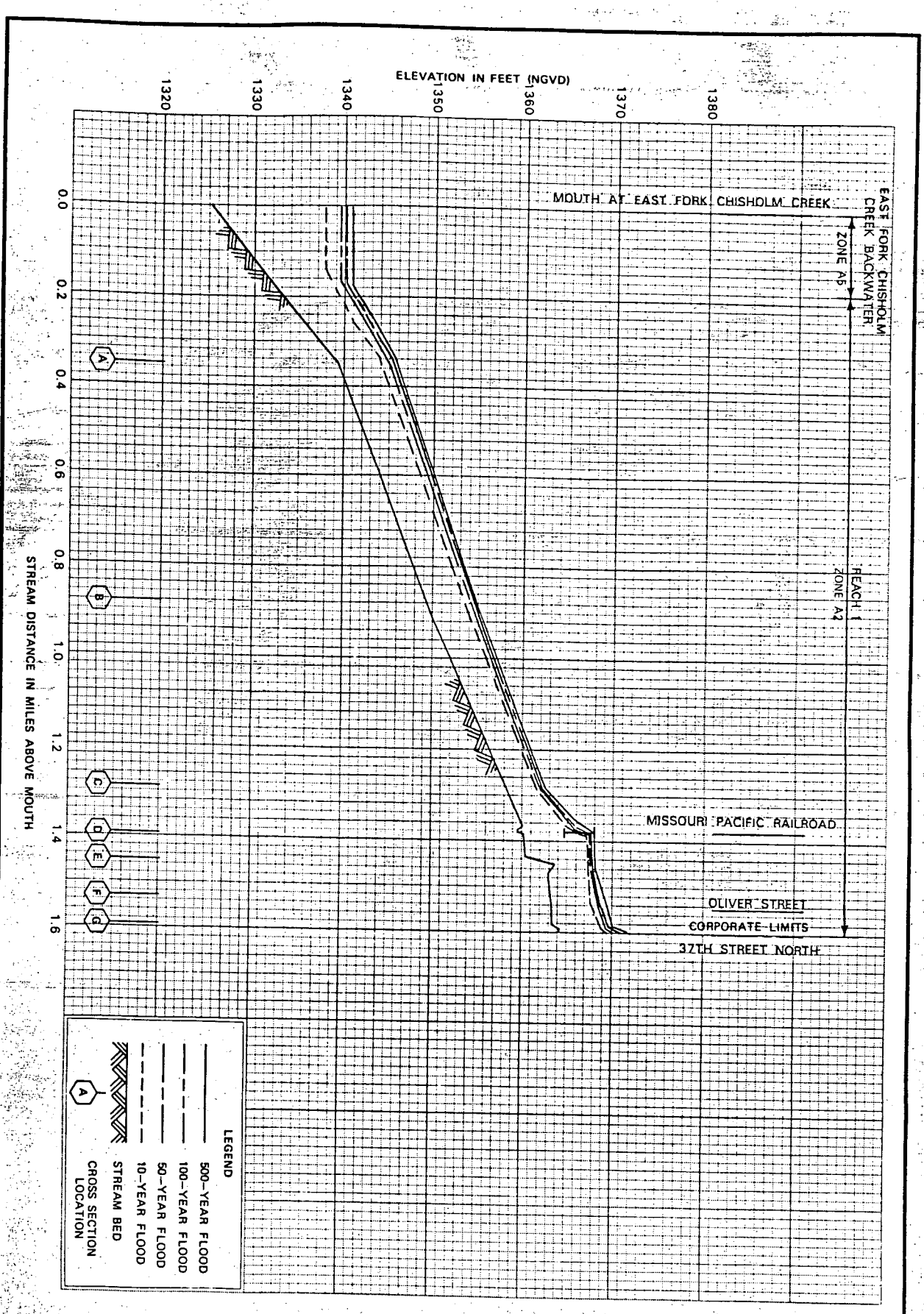
Culvert #4: Use 36" RCP w/ End Sections.

RM 23	1386.80	City of Wichita disk located 40 feet south of 13th Street centerline, 42.5 feet east of Woodlawn Avenue centerline.
RM 24	1388.05	City of Wichita disk located 45.4 feet north of 21st Street centerline, 45 feet east of Woodlawn Avenue centerline.



RM 23	1386.80	City of Wichita disk located 40 feet south of 13th Street centerline, 42.5 feet east of Woo Avenue centerline.
RM 24	1388.05	City of Wichita disk located 45.4 feet north of 21st Street centerline, 45 feet east of Woo Avenue centerline.





14P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF WICHITA, KS (SEDGWICK CO.)	FLOOD PROFILES EAST FORK CHISHOLM CREEK TRIBUTARY NO. 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 3								
A	0.35	107	352	5.6	1345.3	1345.3	1345.7	0.4
B	0.88	357	816	2.4	1354.3	1354.3	1354.9	0.6
C	1.29	180	328	6.0	1362.1	1362.1	1362.5	0.4
D	1.39	313	1123	1.8	1367.6	1367.6	1367.9	0.3
E	1.45	201	617	3.2	1367.7	1367.7	1368.1	0.4
F	1.53	193	640	3.1	1368.5	1368.5	1368.9	0.4
G	1.59	335	693	2.0	1369.7	1369.7	1370.3	0.6
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 5								
A	400[2]	360	1940	1.1	1345.8	1345.5[3]	1345.9	0.4
B	600[2]	360	1916	1.2	1346.8	1346.0[3]	1346.4	0.4
C	1760[2]	205	911	2.5	1348.0	1346.5[3]	1346.8	0.3
D	2240[2]	116	496	4.6	1348.3	1347.2[3]	1347.4	0.2
E	3750[2]	185	735	2.0	1352.0	1351.0[3]	1351.5	0.5
F	5250[2]	115	379	3.9	1353.5	1352.3[3]	1352.4	0.1
G	7250[2]	150	473	3.1	1356.5	1355.4[3]	1356.4	1.0
H	7375[2]	150	504	2.9	1356.6	1355.7[3]	1356.7	1.0

[1]MILES ABOVE MOUTH
[2]FEET ABOVE MOUTH
[3]ELEVATIONS WITHOUT CONSIDERING OVERFLOW EFFECT FROM EAST FORK CHISHOLM CREEK

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF WICHITA, KS

(SEDGWICK CO.)

FLOODWAY DATA

EAST FORK CHISHOLM CREEK TRIBUTARY NO. 3
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 5

TABLE 3 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CENTER DRAIN TRIBUTARY					
at confluence with Wichita Drainage Canal	3.12	1,430	2,500	2,950	4,250
CENTER DRAIN EAST TRIBUTARY					
mouth at Storm Water Management Basin	2.1	840	1,330	1,560	2,080
EAST FORK CHISHOLM CREEK					
at confluence with Wichita Drainage Canal	13.8	3,250	5,580	6,540	9,420
upstream of confluence of East Fork Chisholm Creek Tributary No. 5	6.3	2,240	3,310	3,740	5,850
at 45th Street	1.6	860	1,270	1,545	2,240
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 3					
at mouth	1.0	890	1,610	1,970	3,000
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 5					
downstream of Woodlawn Avenue	2.7	800	1,180	1,460	2,200
EAST FORK CHISHOLM CREEK TRIBUTARY NO. 7					
at mouth	0.6	720	1,300	1,580	2,400
MIDDLE FORK CHISHOLM CREEK					
at mouth	13.54	3,280	5,000	5,000	5,000
at 45th Street North	11.14	2,850	5,000	5,900	8,500

SEDGWICK COUNTY, KANSAS — SHEET NUMBER 27

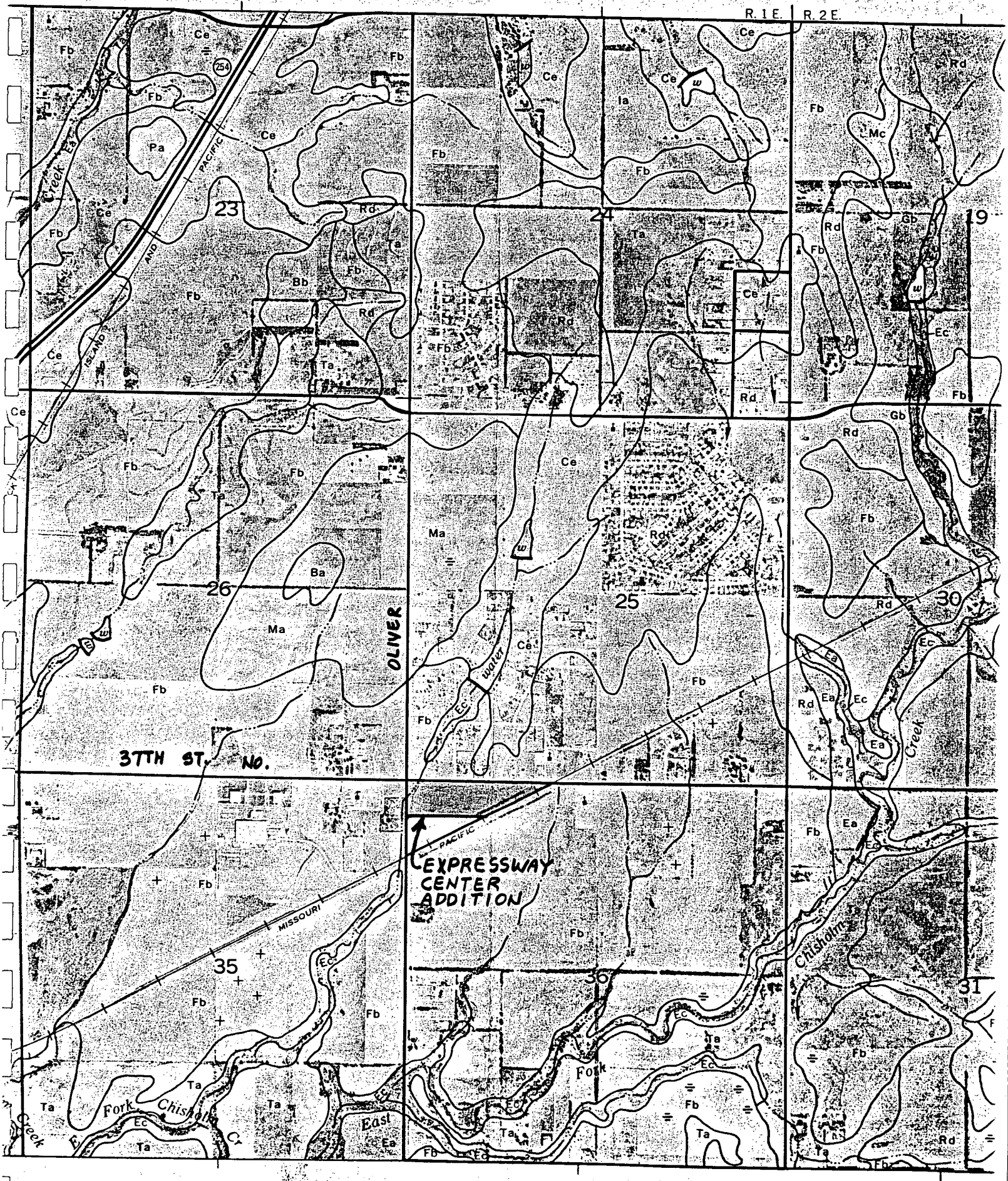
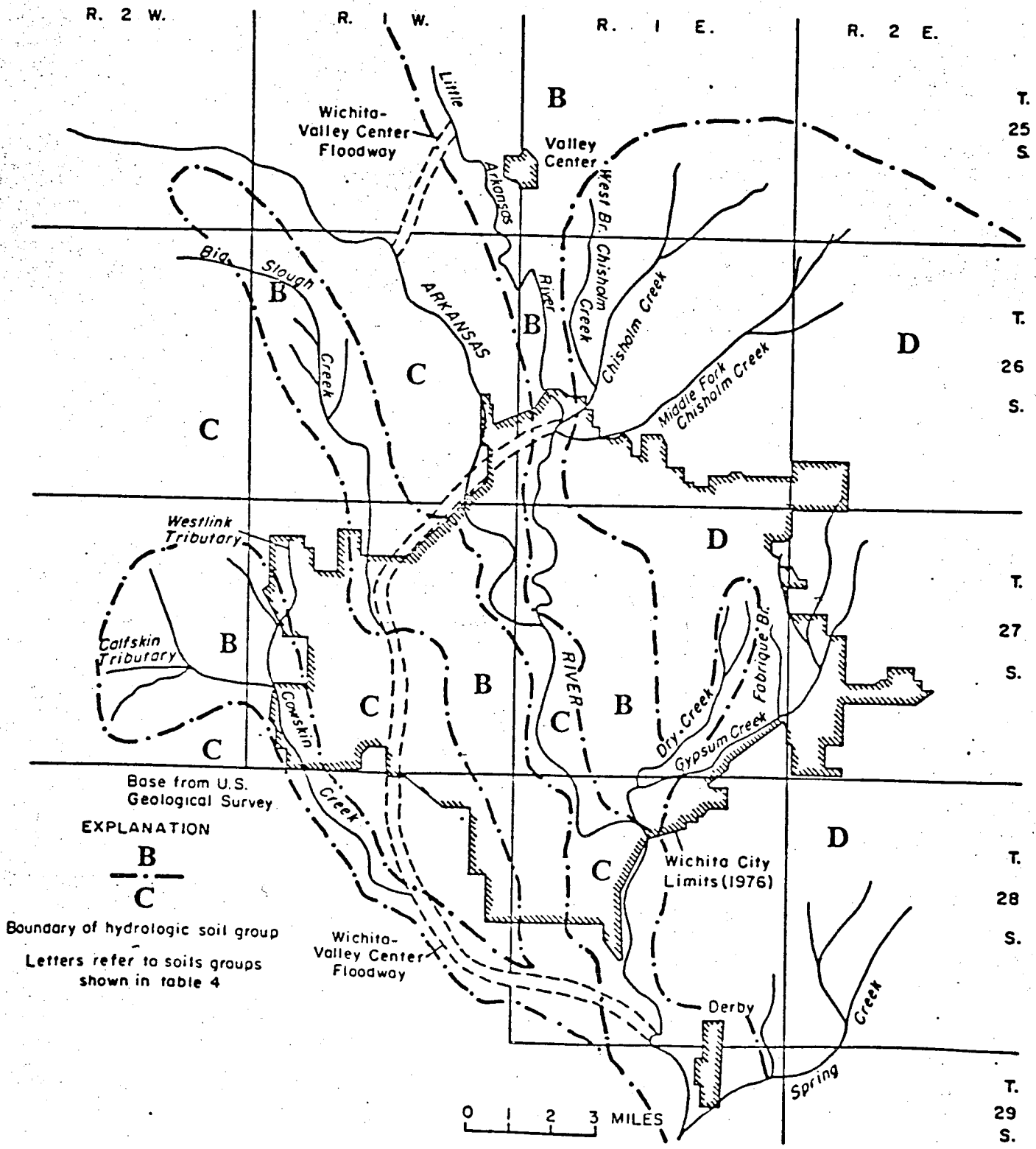


EXHIBIT NO. 1

SOIL LEGEND

SYMBOL	HYDROLOGIC GROUP	NAME
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loans, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loan, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loan
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Vb	B	Vanoss silt loam, 1 to 3 percent slopes
Vc	B	Vanoss silt loam, 3 to 6 percent slopes
Vd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ve	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent lopes
Wa	C	Waldeck sandy loam
Wb	D	Waurika silt loam

EXHIBIT NO. 2


R. 2 W.
R. 1 W.
R. 1 E.
R. 2 E.
T. 25 S.
T. 26 S.
T. 27 S.
T. 28 S.
T. 29 S.
Wichita-Valley Center Floodway
Little Arkansas River
Valley Center
West Br. Chisholm Creek
Chisholm Creek
Middle Fork Chisholm Creek
Big Slough Creek
ARKANSAS RIVER
Westlink Tributary
Calfskin Tributary
Calfskin Creek
Dry Creek
Fabrique Br.
Gypsum Creek
Wichita City Limits (1976)
Derby
Spring Creek
0 1 2 3 MILES
Base from U.S. Geological Survey
EXPLANATION
B/C
Boundary of hydrologic soil group
Letters refer to soils groups shown in table 4

(3 pages)

ATTACHMENT D

DRAINAGE CRITERIA

CITY OF WICHITA, KANSAS

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.73	0.80
2. Residential:					
Single Family (Soil Group D)					
1/8 Acre	50	0.57	0.61	0.66	0.79
1/4 Acre	38	0.50	0.54	0.62	0.76
1/3 Acre	30	0.46	0.50	0.59	0.73
1/2 Acre	25	0.42	0.48	0.56	0.72
3/4 Acre	22	0.42	0.46	0.55	0.71
1 Acre	20	0.41	0.45	0.54	0.71
Multi-Family (Soil Group D)					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.82
Multi-Unit (attached)	65	0.64	0.68	0.73	0.83
Apartments	75	0.70	0.73	0.79	0.86
Single Family (Soil Group C)					
1/8 Acre	50	0.55	0.58	0.64	0.73
1/4 Acre	38	0.48	0.51	0.57	0.68
1/3 Acre	30	0.43	0.46	0.53	0.65
1/2 Acre	25	0.40	0.43	0.50	0.63
3/4 Acre	22	0.39	0.42	0.49	0.62
1 Acre	20	0.37	0.40	0.48	0.61
Multi-Family (Soil Group C)					
Multi-Unit (detached)	60	0.60	0.63	0.69	0.77
Multi-Unit (attached)	65	0.63	0.66	0.71	0.79
Apartments	75	0.68	0.72	0.77	0.83
Single-Family (Soil Group B)					
1/8 Acre	50	0.52	0.54	0.59	0.67
1/4 Acre	38	0.44	0.46	0.52	0.61
1/3 Acre	30	0.39	0.41	0.47	0.57
1/2 Acre	25	0.36	0.38	0.44	0.54
3/4 Acre	22	0.34	0.36	0.42	0.52
1 Acre	20	0.33	0.35	0.40	0.51
Multi-Family (Soil Group B)					
Multi-Unit (detached)	60	0.58	0.60	0.65	0.72
Multi-Unit (attached)	65	0.61	0.64	0.68	0.75
Apartments	75	0.67	0.70	0.74	0.80

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
Single Family (Soil Group A)					
1/8 Acre	50	0.47	0.50	0.54	0.60
1/4 Acre	38	0.39	0.41	0.45	0.52
1/3 Acre	30	0.33	0.35	0.39	0.47
1/2 Acre	25	0.30	0.31	0.35	0.44
3/4 Acre	22	0.28	0.29	0.33	0.42
1 Acre	20	0.26	0.28	0.32	0.40
Multi-Family (Soil Group A)					
Multi-Unit (detached)	60	0.55	0.57	0.61	0.67
Multi-Unit (attached)	65	0.58	0.60	0.64	0.70
Apartments	75	0.65	0.68	0.72	0.77
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0.80
Heavy Areas	80	0.74	0.76	0.79	0.84
4. Playgrounds:	15	0.33	0.35	0.42	0.55
5. Schools:	40	0.49	0.51	0.56	0.66
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0.62
7. Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0.68
8. Streets:					
Paved	99	0.87	0.88	0.90	0.93
Gravel	00	0.24	0.26	0.33	0.48
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	0.89
10. Roofs:	90	0.80	0.85	0.90	0.93
11. Urban Lawn Areas (See Note No. 1 below):					
Soil Group A					
Slope less than 1%	00	0.08	0.09	0.13	0.23
Slope 1% to 4%	00	0.12	0.13	0.17	0.27
Slope more than 4%	00	0.16	0.17	0.21	0.31
Soil Group B					
Slope less than 1%	00	0.16	0.18	0.24	0.37
Slope 1% to 4%	00	0.20	0.22	0.28	0.41
Slope more than 4%	00	0.24	0.26	0.32	0.45
Soil Group C					
Slope less than 1%	00	0.24	0.27	0.35	0.51
Slope 1% to 4%	00	0.26	0.29	0.37	0.53
Slope more than 4%	00	0.28	0.31	0.39	0.55

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
Soil Group D					
Slope less than 1%	00	0.28	0.33	0.43	0.63
Slope 1% to 4%	00	0.30	0.35	0.45	0.65
Slope more than 4%	00	0.32	0.37	0.47	0.67

Note No. 1: Coefficients shown in the above table are for pervious open space areas with thick turf which includes pervious areas in parks and cemeteries. Coefficients shown above must be increased 0.02 for use with agricultural pasture areas. Coefficients shown above must be reduced by 0.04 for use with agricultural cultivated areas. Group A soils are well-drained, coarse textured sands with high infiltration rates. Group B soils are moderately well-drained, moderately coarse textured soils with moderate infiltration rates. Group C soils are moderately poor-drained, moderately fine textured soils with slow infiltration rates. Group D soils are poor-drained, fine textured soils with very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basins 320 acres or larger.

April 15, 1986

ATTACHMENT A
DRAINAGE CRITERIA MANUAL

CITY OF WICHITA, KANSAS

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.18	4.21	4.99	5.71	6.60	7.38	8.02
13	3.05	4.08	4.84	5.53	6.41	7.17	7.79
14	2.96	3.95	4.69	5.37	6.23	6.97	7.57
15	2.87	3.83	4.56	5.22	6.06	6.78	7.37
16	2.78	3.72	4.43	5.08	5.90	6.60	7.18
17	2.71	3.61	4.31	4.95	5.75	6.44	7.00
18	2.63	3.51	4.20	4.83	5.61	6.29	6.84
19	2.56	3.42	4.10	4.71	5.47	6.14	6.68
20	2.50	3.33	4.00	4.60	5.35	6.00	6.53
21	2.44	3.25	3.90	4.50	5.23	5.87	6.39
22	2.38	3.17	3.81	4.40	5.12	5.75	6.26
23	2.32	3.10	3.73	4.31	5.01	5.63	6.13
24	2.27	3.03	3.65	4.22	4.91	5.52	6.01
25	2.22	2.96	3.57	4.13	4.81	5.41	5.90
26	2.20	2.90	3.50	4.05	4.72	5.31	5.79
27	2.16	2.84	3.43	3.98	4.63	5.21	5.69
28	2.14	2.78	3.37	3.90	4.55	5.12	5.59
29	2.11	2.72	3.30	3.83	4.47	5.03	5.49
30	2.08	2.67	3.24	3.76	4.39	4.94	5.40
31	2.05	2.62	3.19	3.70	4.32	4.86	5.32
32	2.02	2.57	3.10	3.63	4.25	4.79	5.22
33	1.99	2.52	3.05	3.57	4.18	4.71	5.14
34	1.96	2.48	3.01	3.51	4.11	4.63	5.07
35	1.93	2.44	2.98	3.46	4.05	4.56	5.00
36	1.91	2.39	2.93	3.41	3.99	4.50	4.93
37	1.89	2.35	2.88	3.36	3.93	4.43	4.86
38	1.87	2.32	2.84	3.31	3.87	4.37	4.79
39	1.85	2.28	2.80	3.26	3.82	4.31	4.73
40	1.83	2.24	2.76	3.22	3.76	4.25	4.66
41	1.81	2.21	2.72	3.17	3.71	4.19	4.60
42	1.79	2.18	2.68	3.13	3.66	4.13	4.54
43	1.77	2.14	2.64	3.09	3.61	4.08	4.49
44	1.75	2.11	2.61	3.05	3.57	4.03	4.43
45	1.73	2.08	2.57	3.01	3.52	3.98	4.38

ATTACHMENT A CONTINUED
Page 2

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
46	1.70	2.05	2.54	2.97	3.48	3.93	4.33
47	1.67	2.02	2.50	2.93	3.44	3.88	4.28
48	1.66	2.00	2.47	2.90	3.39	3.84	4.23
49	1.64	1.97	2.44	2.86	3.35	3.79	4.18
50	1.61	1.95	2.41	2.83	3.32	3.75	4.13
51	1.59	1.92	2.38	2.79	3.28	3.71	4.09
52	1.56	1.89	2.35	2.76	3.24	3.67	4.05
53	1.54	1.86	2.33	2.73	3.20	3.63	4.00
54	1.52	1.84	2.30	2.70	3.17	3.59	3.96
55	1.50	1.81	2.27	2.67	3.14	3.55	3.92
56	1.47	1.79	2.25	2.64	3.10	3.51	3.88
57	1.45	1.76	2.22	2.61	3.07	3.48	3.84
58	1.43	1.74	2.20	2.59	3.04	3.44	3.81
59	1.42	1.72	2.18	2.56	3.01	3.41	3.77
60	1.40	1.69	2.15	2.53	2.98	3.37	3.73
61	1.38	1.67	2.13	2.51	2.95	3.34	3.70
62	1.36	1.65	2.11	2.48	2.92	3.31	3.67
63	1.34	1.63	2.09	2.46	2.89	3.28	3.63
64	1.33	1.61	2.07	2.44	2.86	3.25	3.60
65	1.31	1.59	2.05	2.41	2.84	3.22	3.57
66	1.30	1.57	2.03	2.39	2.81	3.19	3.54
67	1.28	1.56	2.01	2.37	2.79	3.16	3.51
68	1.26	1.54	1.99	2.35	2.76	3.13	3.48
69	1.25	1.52	1.97	2.33	2.74	3.10	3.45
70	1.24	1.50	1.95	2.31	2.71	3.08	3.42
71	1.22	1.49	1.93	2.28	2.69	3.05	3.39
72	1.21	1.47	1.92	2.26	2.67	3.02	3.36
73	1.20	1.46	1.90	2.25	2.64	3.00	3.34
74	1.18	1.44	1.88	2.23	2.63	2.98	3.31
75	1.17	1.43	1.86	2.21	2.61	2.95	3.29
76	1.16	1.41	1.85	2.19	2.58	2.93	3.26
77	1.15	1.40	1.83	2.17	2.55	2.90	3.24
78	1.13	1.38	1.82	2.15	2.53	2.88	3.22
79	1.12	1.37	1.80	2.14	2.50	2.86	3.19
80	1.11	1.36	1.79	2.12	2.48	2.84	3.16
81	1.10	1.34	1.77	2.10	2.46	2.82	3.13
82	1.09	1.33	1.76	2.08	2.43	2.79	3.10
83	1.08	1.32	1.74	2.06	2.41	2.76	3.07
84	1.07	1.31	1.73	2.04	2.39	2.74	3.04
85	1.06	1.30	1.72	2.02	2.37	2.71	3.01
86	1.05	1.28	1.70	2.00	2.34	2.69	2.99
87	1.04	1.27	1.69	1.99	2.32	2.66	2.96
88	1.03	1.26	1.68	1.97	2.30	2.64	2.93
89	1.02	1.25	1.68	1.95	2.28	2.62	2.91
90	1.01	1.24	1.66	1.93	2.26	2.59	2.88

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
91	1.00	1.23	1.65	1.92	2.24	2.57	2.86
92	1.00	1.22	1.63	1.90	2.22	2.55	2.83
93	0.99	1.21	1.62	1.89	2.20	2.53	2.81
94	0.98	1.20	1.61	1.87	2.19	2.51	2.79
95	0.97	1.19	1.59	1.85	2.17	2.49	2.76
96	0.96	1.18	1.58	1.84	2.15	2.46	2.74
97	0.96	1.17	1.57	1.82	2.13	2.44	2.72
98	0.95	1.16	1.56	1.81	2.12	2.42	2.70
99	0.94	1.15	1.54	1.80	2.10	2.41	2.67
100	0.93	1.14	1.53	1.78	2.08	2.39	2.65
101	0.93	1.13	1.52	1.77	2.07	2.39	2.65
102	0.92	1.13	1.51	1.75	2.05	2.35	2.61
103	0.91	1.12	1.50	1.74	2.04	2.33	2.59
104	0.90	1.11	1.49	1.73	2.02	2.31	2.57
105	0.90	1.10	1.47	1.72	2.01	2.30	2.55
106	0.89	1.09	1.46	1.70	1.99	2.28	2.54
107	0.88	1.09	1.45	1.69	1.98	2.26	2.52
108	0.88	1.08	1.44	1.68	1.96	2.25	2.50
109	0.87	1.07	1.43	1.67	1.95	2.23	2.48
110	0.87	1.06	1.42	1.65	1.93	2.21	2.46
111	0.86	1.06	1.41	1.64	1.92	2.20	2.45
112	0.85	1.05	1.40	1.63	1.91	2.18	2.43
113	0.85	1.04	1.39	1.62	1.89	2.17	2.41
114	0.84	1.03	1.38	1.61	1.88	2.15	2.40
115	0.84	1.03	1.37	1.60	1.87	2.14	2.38
116	0.83	1.02	1.36	1.59	1.86	2.12	2.36
117	0.82	1.01	1.36	1.58	1.84	2.11	2.35
118	0.82	1.01	1.35	1.57	1.83	2.09	2.33
119	0.81	1.00	1.34	1.56	1.82	2.08	2.32
120	0.81	0.99	1.33	1.55	1.81	2.07	2.30

DURATION IN HOURS	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
2	0.81	0.99	1.33	1.55	1.81	2.07	2.30
3	0.59	0.72	0.97	1.13	1.32	1.51	1.68
4	0.47	0.58	0.78	0.91	1.06	1.21	1.35
5	0.40	0.49	0.66	0.77	0.89	1.02	1.14
6	0.35	0.42	0.57	0.67	0.78	0.89	0.99
8	0.28	0.34	0.46	0.53	0.62	0.71	0.79
10	0.23	0.29	0.39	0.45	0.52	0.60	0.67
12	0.20	0.25	0.33	0.39	0.45	0.52	0.58
18	0.15	0.18	0.24	0.28	0.33	0.38	0.42
24	0.12	0.15	0.20	0.23	0.27	0.31	0.34