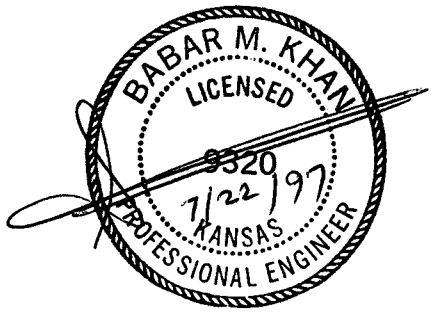
DRAINAGE PLAN

SMITHMOOR SIXTH ADD.
SMITHMOOR SEVENTH ADD.
WICHITA, SEDGWICK COUNTY, KANSAS

Date: July 22, 1997



DRAINAGE PLAN

SMITHMOOR SIXTH & SEVENTH ADDITION

2.0 HYDROLOGY :

USE RATIONAL METHOD:

SOIL TYPE = I_a

HYDRO GROUP = D

LAND USE = SINGLE FAMILY

SIZE 6,600 S.F. ±

RUNOFF COEFFICIENTS:

$C_2 = 0.55$

$C_{100} = 0.78$

$T_c = 15$ MIN.

$i_2 = 3.83''$

$i_{100} = 7.37''$

(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 (6600 S.F.)	50	0.55 [0.57]	0.61	0.66	0.78 [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

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

3.0 RUNOFF :

DRAINAGE BASIN	AREA (AC.)	Q_2 (CFS)	Q_{100} (CFS)
A	0.9	1.9	5.2
B	5.0	10.5	28.7
C	3.1	6.5	17.8
D	2.8	5.9	16.1
E	5.8	12.2	33.3
F	6.6	13.9	37.9
G	2.5	5.3	14.4
H	1.6	3.4	9.2
I	3.1	6.5	17.8

4.0 STREET FLOWS (2 YEARS):

HONEYTREE HAS $6\frac{5}{8}$" C & G.

X-SLOPE = $\frac{3}{8}$" PER FT. = 0.03125

Z = $1/0.03125$ = 32

n (ASPH.) = 0.016

Z/n = $32/0.016$ = 2,000

MIN SLOPE (S) = 0.032

d = 0.55

HALF STREET

Q_{CAP} = 14 CFS > Q_2 FROM F, G, & H.

SHILOH / BRANDON HAVE $3\frac{5}{8}$" CURB:

X-SLOPE = $\frac{3}{8}$" PER FT. = 0.03125

Z = $1/0.03125$ = 32

n (ASPH.) = 0.016

Z/n = $32/0.016$ = 2,000

MIN SLOPE = 0.018

d = 0.30

HALF STREET

Q_{CAP} = 6.5 CFS > $\frac{1}{2}$ Q_2 FROM B & E

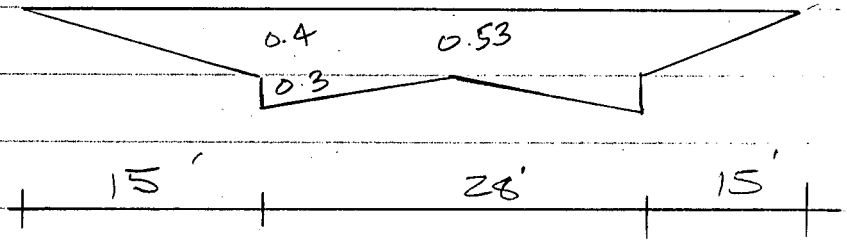
> Q_2 FROM C & D

O.K.

5.0 STREET FLOW (100 YEAR)

BRANDON AND SHILOH:

WALK GRADE = +0.



n (PARKING) = 0.03 ; n (GUTTER) = 0.013

n (ASPH.) = 0.016

$$n \text{ (COMP.)} = \frac{(2 \times 15 \times 0.03 + 2 \times 2.5 \times 0.013 + 23 \times 0.016)}{58}$$

$$= 0.023$$

$$A = \frac{15 \times 0.4 \times 2}{2} + \frac{14 \times 0.3 \times 2}{2} + 0.53 \times 28$$

$$= 25.0 \text{ S.F.}$$

$P = 58$ FT.

$R = 25/58 = 0.43$

$S = 0.018$

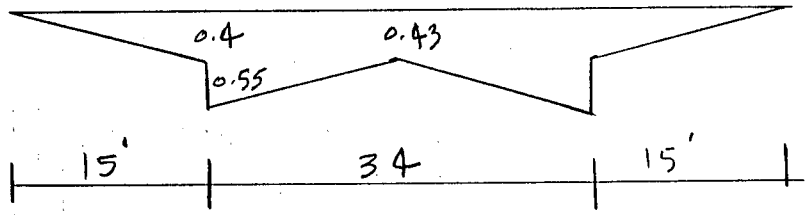
$$Q_{CAP} = 25 \times \frac{1.486}{0.023} \times 0.43^{2/3} \times 0.018^{1/2}$$

$$= 123 \text{ CFS} > \text{ALL } Q_{100}$$

O.K.

6.0 STREET FLOW (100 YEAR) (HONEY TREE)

WALK GRADE = + 0.4'



n (PARKING) = 0.03

n (GUTTER) = 0.013

n (ASPHALT) = 0.016

$$n(\text{COMP.}) = \frac{(2\times 14.5\times 0.03) + (2\times 3.05\times 0.013) + 30\times 0.016}{65.1}$$

n (COMP.) = 0.022

$$A = \frac{2\times 0.4\times 15}{2} + \frac{2\times 0.52\times 17}{2} + 0.43\times 34$$

$$= 29.5 \text{ S.F.}$$

P = 65.1

$$R = A/P = \frac{29.5}{65.1} = 0.45$$

S = 0.0032 (MIN.)

$$Q_{CAP} = 29.5 \times \frac{1.486}{0.022} \times 0.45^{2/3} \times 0.0032^{1/2}$$

Q_{CAP} = 66.0 CFS > ALL Q_{100} O.K.

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

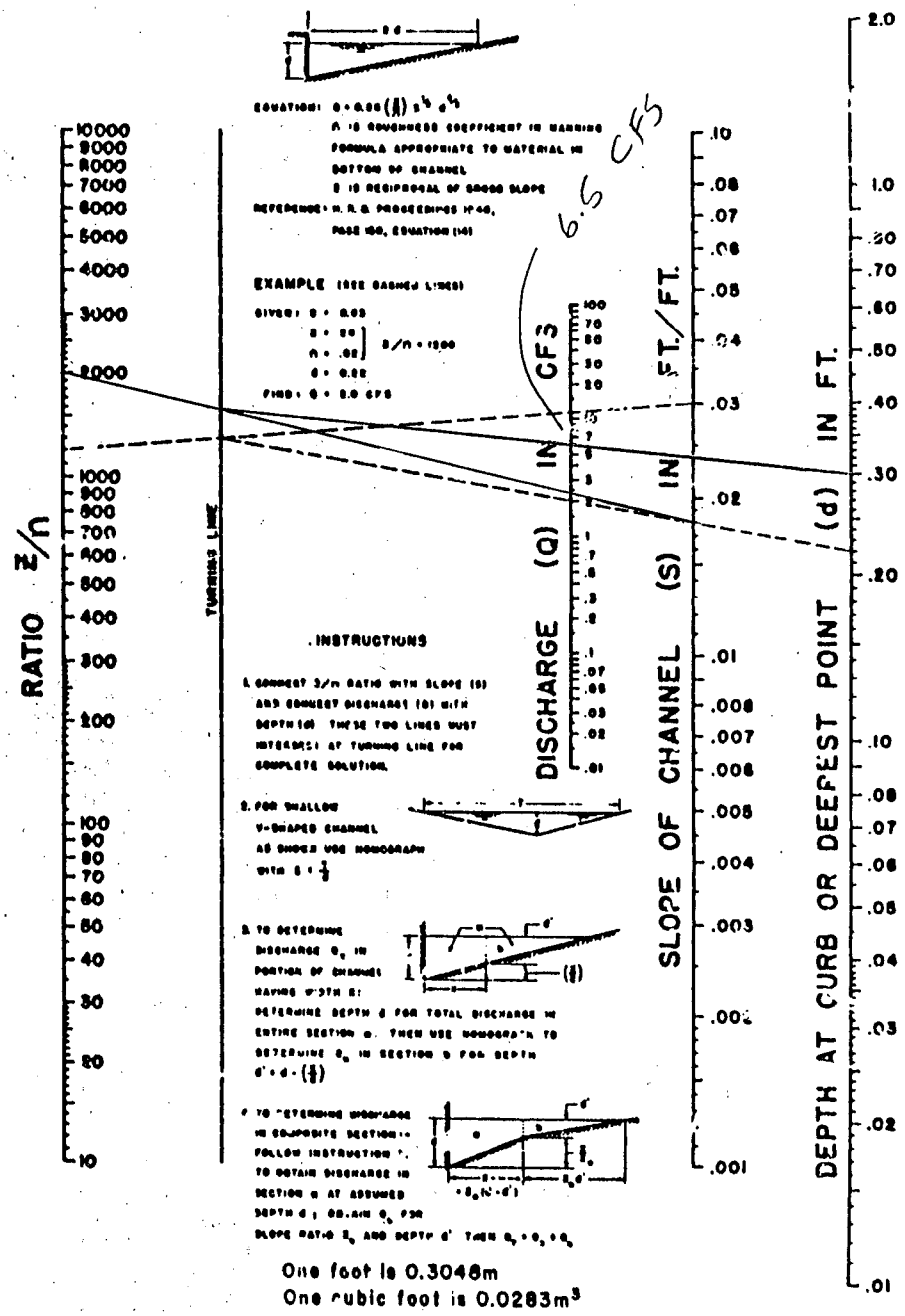


FIG. 5-1 (After FHWA)

HALF STREET @ CAP FOR SHICOH / BRANDON

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

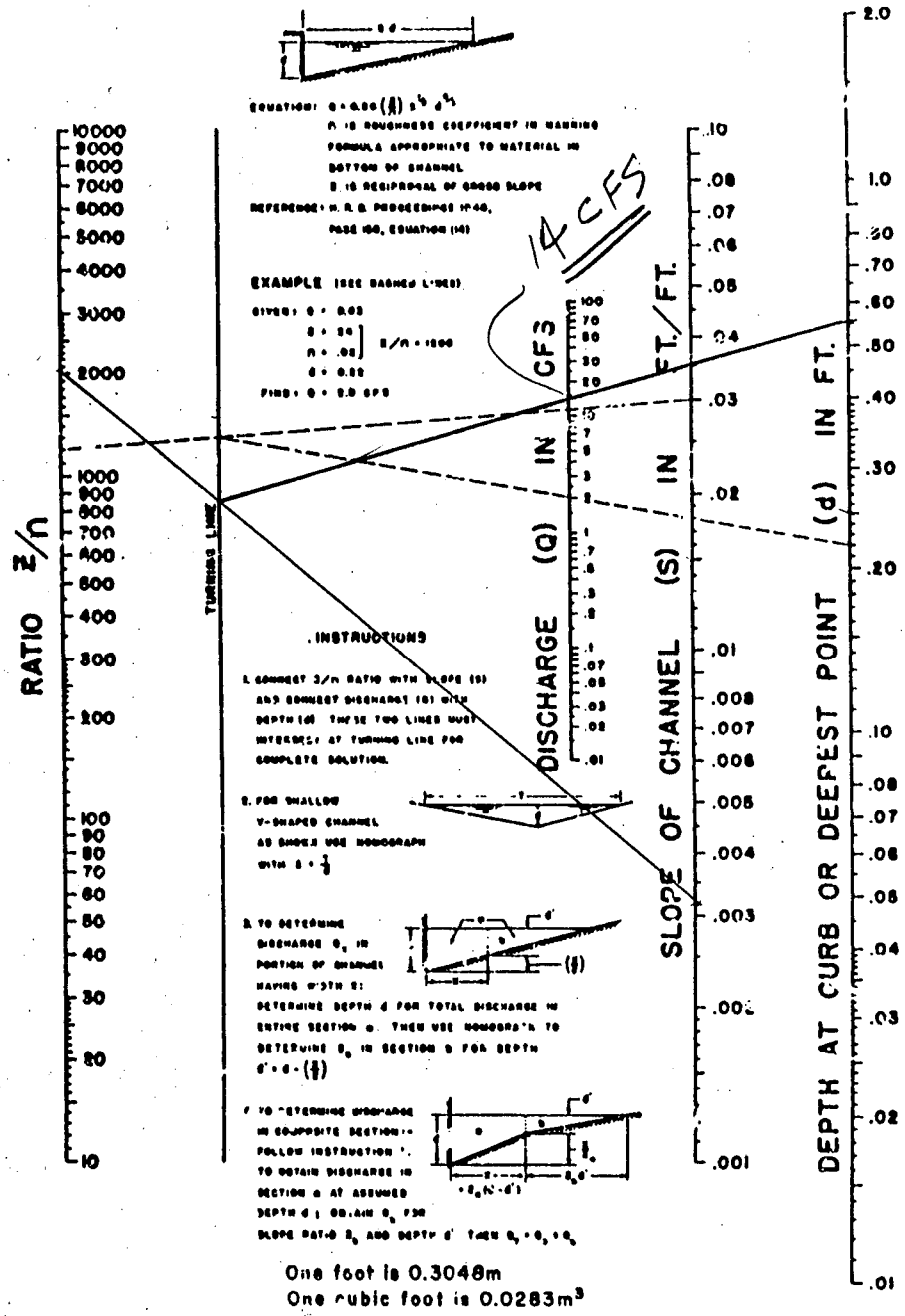


FIG. 5-1 (After FHWA)

Q_{CAP} HALF STREET (HONKY TREK)

7.0 INLET SIZE:

NODE	Q_2 CFS	EXIST. INLET L	INLET COND.	Q_{MAX} CFS	REMARK
100	1.9	5'	SUMP	11	O.K.
101	10.5	10'	"	22	"
102	6.5	5'	"	11	"
103	5.9	5'	"	11	"
104	12.2	10'	"	22	"
105	13.9	10'	"	22	"
106	8.7	10'	"	22	"

8.0 PIPE SIZE:

FROM NODE	TO NODE	Q_2 CFS	ΣQ_2 CFS	EXISTING PIPE	Q_{CAP} CFS	REMARK
100	101	1.9	1.9	15" RCP @ 0.38% SL.	4.0	O.K.
101	102	10.5	12.4	24" RCP @ 0.20% SL.	10.5	O.K.
102	103	6.5	18.9	30" RCP @ 0.35% SL.	25.0	O.K.
103	104	5.9	24.8	36" RCP @ 0.15% SL.	28.0	O.K.
104	105	12.2	37.0	42" RCP @ 0.15% SL.	42.0	O.K.
105	106	13.9	50.9	42" RCP @ 0.25% SL.	54.0	O.K.
106	107	5.3+3.4	59.6	42" RCP @ 0.25% SL.	54.0	O.K.

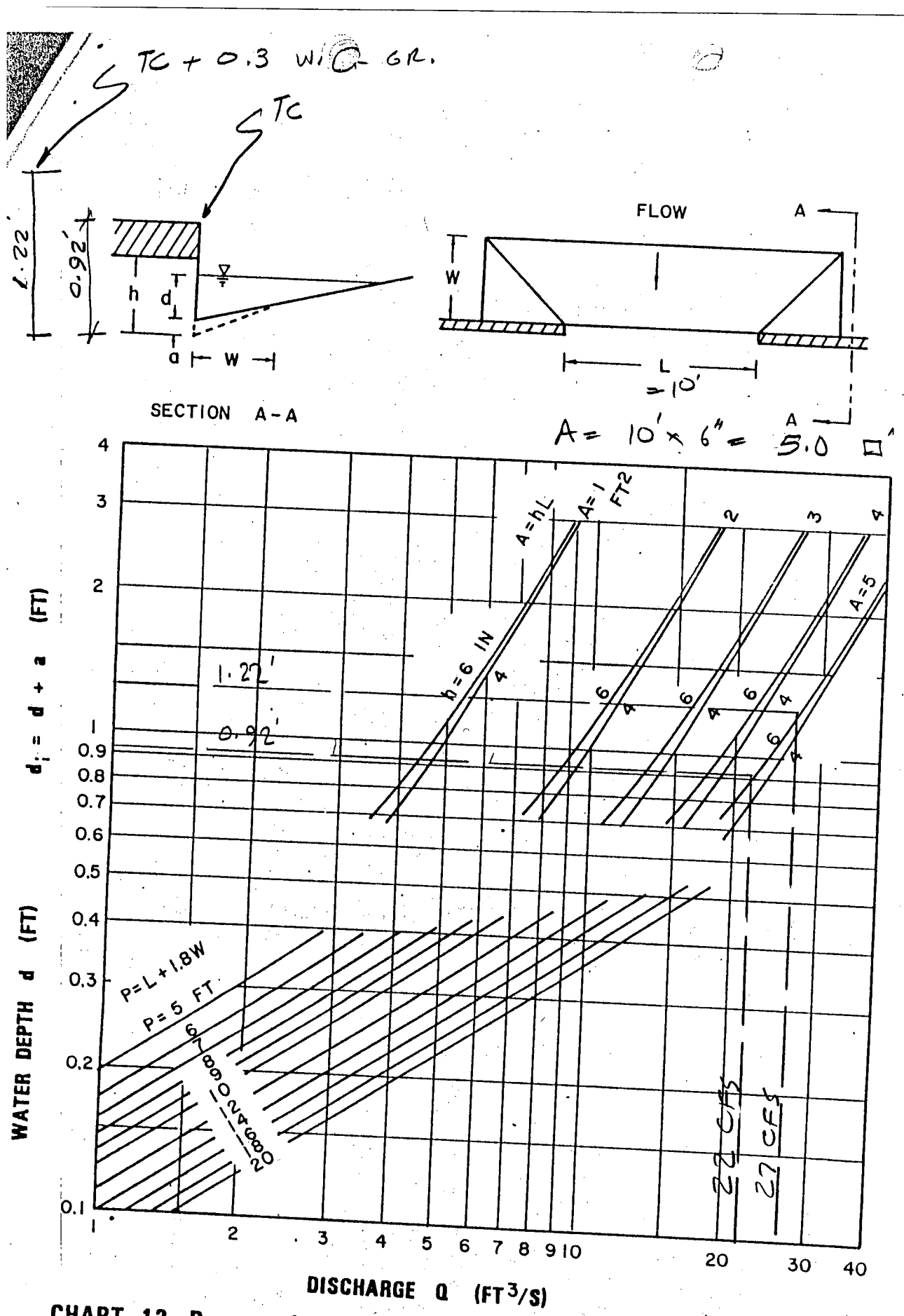


CHART 12. Depressed curb-opening inlet capacity in sump locations.

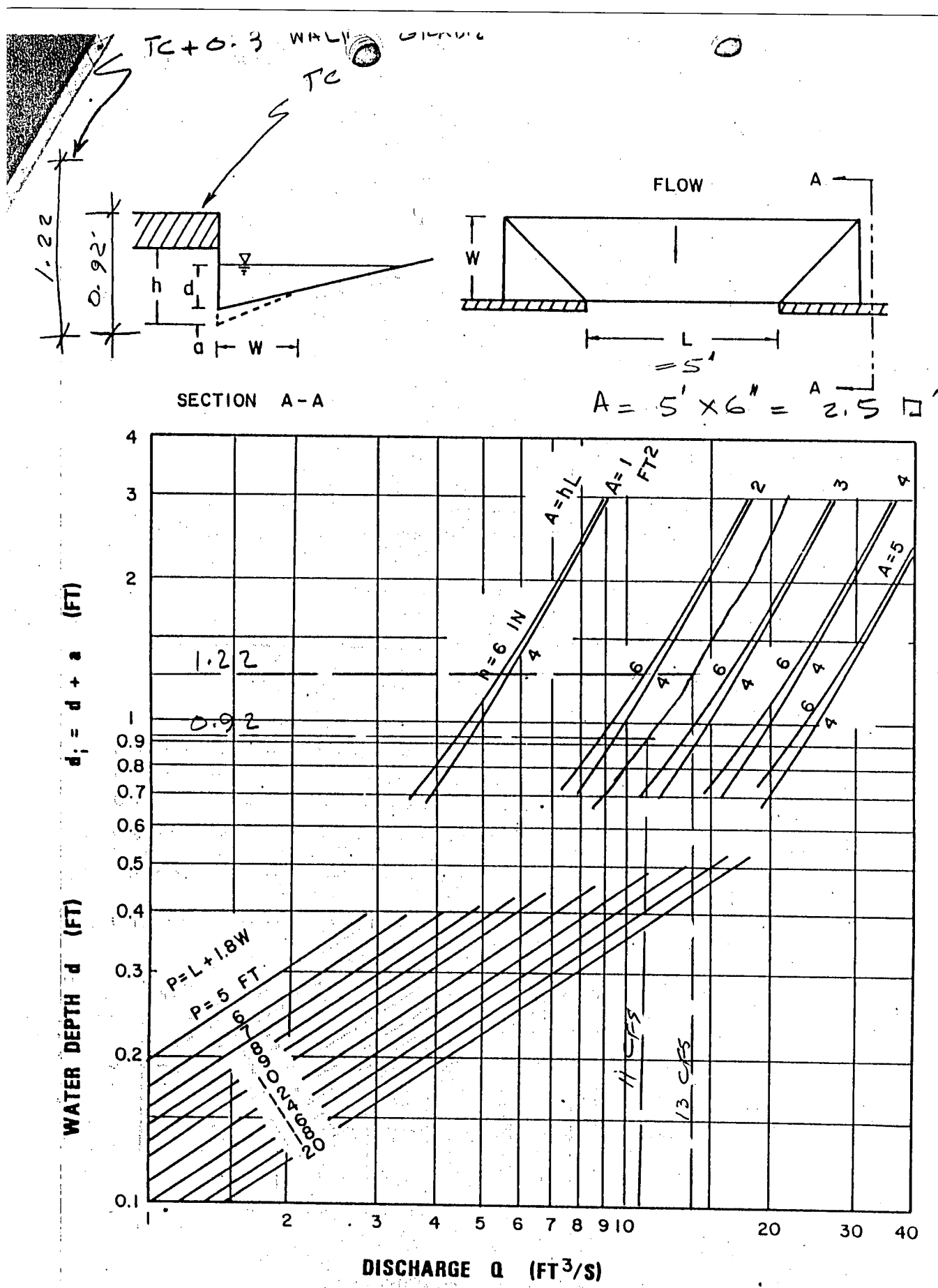
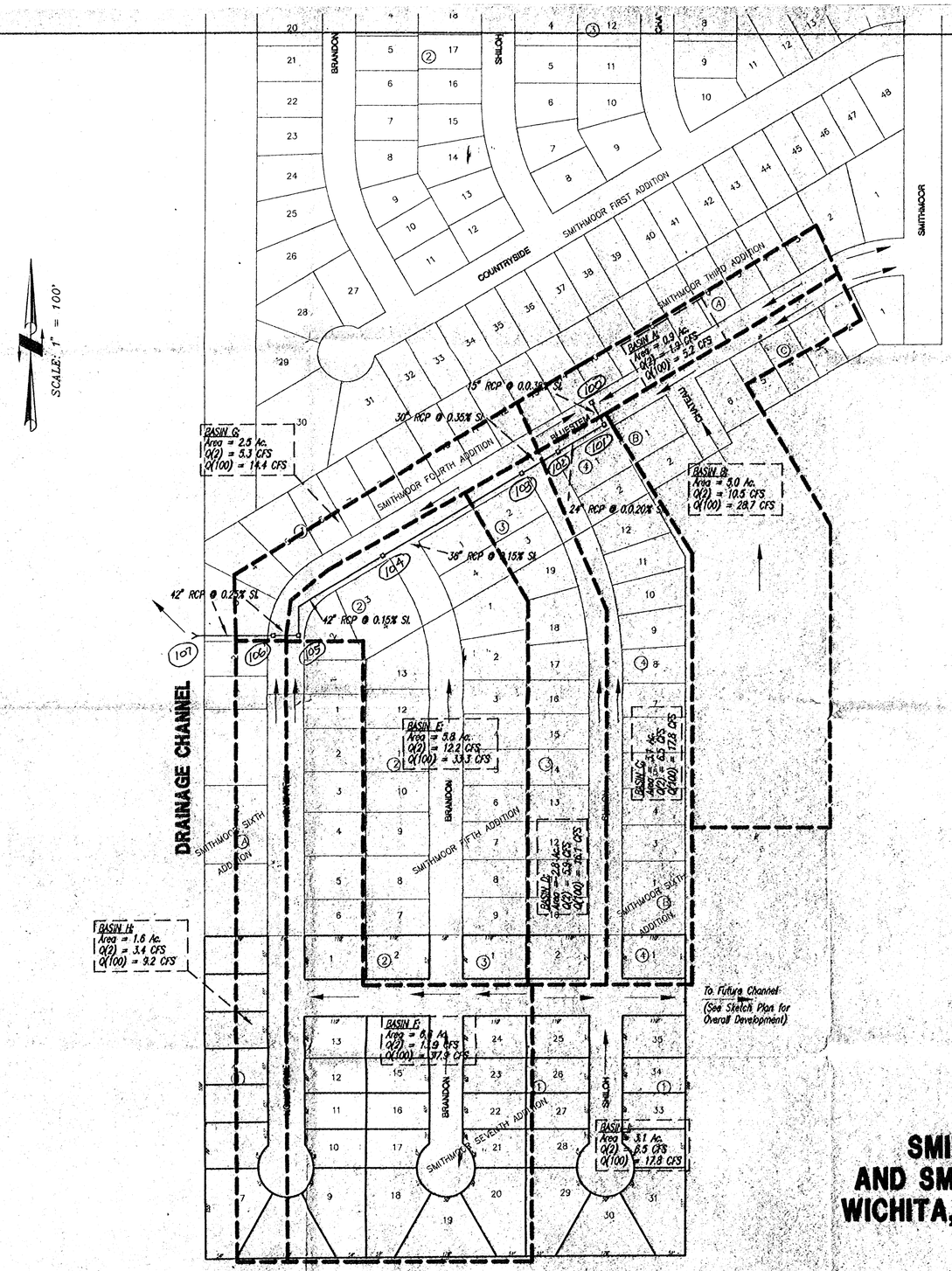


CHART 12. Depressed curb-opening inlet capacity in sump locations.

SKETCH PLAN
NE 1/4,
SEC. 33-27S-2E
WICHITA, SEDGWCK COUNTY, KANSAS

SCALE:	APPROVED:	DRAWN BY:
DATE:		CHECKED:
PROJECT NO:		SHEET NO.:

MUNICIPAL ENGINEERS, P.A.
204-LAURA, SUITE 201
WICHITA, KANSAS 67211
316-262-3042



DRAINAGE PLAN
SMITHMOOR SIXTH ADDITION
AND SMITHMOOR SEVENTH ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

BABAR M. KHAN
LICENSED
9326
7/12/97
KANSAS
PROFESSIONAL ENGINEER

NOTES:

1. All storm sewers shown are existing.
2. Refer to preliminary plats for Smithmoor third, Fourth, Fifth, Sixth & Seventh Additions for topographic information.

MUNICIPAL ENGINEERS, P.A.
254-LAURA, SUITE 201
WICHITA, KANSAS 67211
316-262-3042