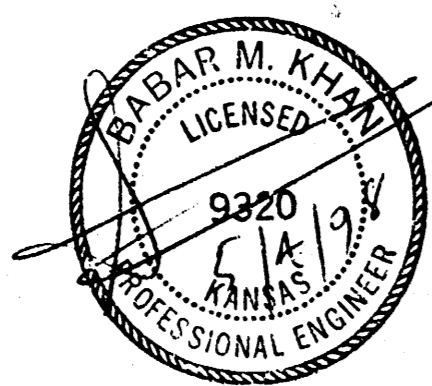


CITY OF WICHITA, KANSAS  
DRAINAGE PLAN  
FOR  
SMITHMOOR EIGHT ADDITION  
TO  
WICHITA, SEDGWICK COUNTY, KANSAS

PROJECT NO.: 98-29 (MEPA)

MAY, 1998



MUNICIPAL ENGINEERS, P.A.  
254-LAURA, SUITE 201, WICHITA, KANSAS 67211  
(316) 262-3842 (TEL.), (316) 262-8634 (FAX)

**ME** MUNICIPAL ENGINEERS, P.A.  
Civil Engineers & Land Surveyors

May 4, 1998

Ms. Vicki Huang, P.E.  
City Engineer's Office  
City Hall - 7th Floor  
455 North Main Street  
Wichita Kansas 67202

Re: Drainage Plan - Smithmoor Eight Addition  
Wichita, Sedgwick County, Kansas

Dear Ms. Huang:

Attached please find drainage plan for the referenced plat.

1.0 Introduction:

Smithmoor Eight Addition to Wichita, Sedgwick County, Kansas contains 26 lots. Twenty of these lots drain towards north and into a drainage basin for which storm sewers were constructed in Smithmoor Fourth Addition. Drainage calculations for these storm sewers were done in the drainage plan prepared for Smithmoor Fourth Addition. Six westerly lots of Smithmoor Eight Addition drain towards the south and will drain to a future drainage channel (Please refer to the overall development plan for this area).

Attached drainage calculations confirm adequacy of existing storm sewers.

Please review these and call me if you have questions.

Sincerely,  
MUNICIPAL ENGINEERS, P.A.

Babar M. Khan, P.E., L.S.

254 Laura, Suite 201 • Wichita, Kansas 67211 • (316) 262-3842 • Fax (316) 262-8634  
e-mail: mepa@southwind.net

DRAINAGE PLAN  
SMITHMOOR EIGHT ADDITION  
ADDITIONS

2.0 HYDROLOGY:

USE RATIONAL METHOD:

SOL TYPE = I<sub>a</sub>  
HYDRO GROUP = D  
LAND USE = SINGLE FAMILY  
SIZE 6,600 S.F. ±

RUNOFF COEFFICIENTS:

C<sub>2</sub> = 0.55  
C<sub>100</sub> = 0.78  
T<sub>c</sub> = 15 MIN.  
L<sub>c</sub> = 3.83"  
L<sub>100</sub> = 7.37"

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	0.75	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	0.59	0.76
1/3 Acre	30	0.46	0.50	0.55	0.72
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	0.37	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	0.57
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

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	3.16	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	2.09	2.57	3.01	3.52	3.98	4.38

3.0 RUNOFF:

DRAINAGE BASIN	AREA (AC.)	Q <sub>2</sub> (CFS)	Q <sub>100</sub> (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):

HONEYCREAK HAS 6% CURB.  
X-SLOPE = 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<sub>CR</sub> = 14 CFS > Q<sub>CR</sub> FROM F.G. & H.

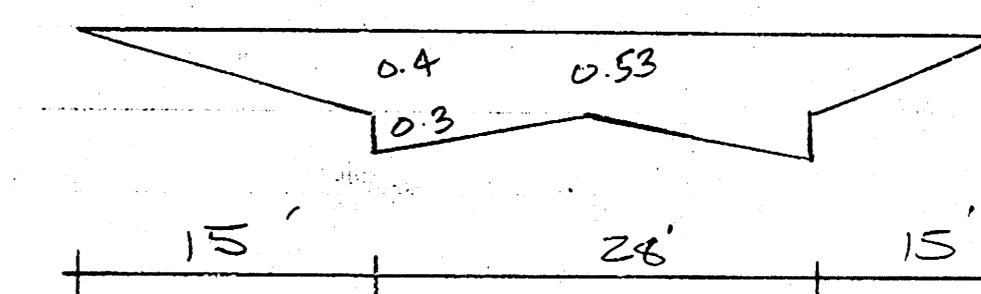
SHILOH / BRANDON HAVE 3% CURB:

X-SLOPE = 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<sub>CR</sub> = 6.5 CFS > 1/2 Q FROM B & E  
> Q<sub>CR</sub> FROM C & D

5.0 STREET FLOW (100 YEAR)

BRANDON AND SHILOH:  
WALK GRADE = +0



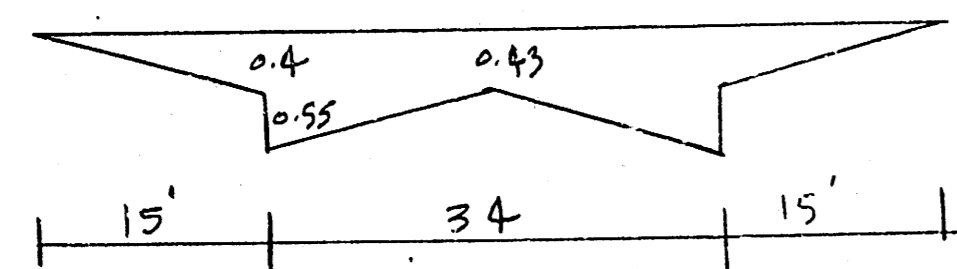
n (PARKING) = 0.03; n (GUTTER) = 0.013  
n (ASPH.) = 0.016  
n (COMP.) = (2 x 15 x 0.03 + 2 x 2.5 x 0.013 + 23 x 0.016) / 58

= 0.023  
A = (15 x 0.4 x 2 + 14 x 0.53 x 2 + 0.53 x 28) / 2  
= 25.0 SF.  
P = 58 FT.  
R = 25/58 = 0.43  
S = 0.018

Q<sub>CR</sub> = 25 x (1.486 / 0.023) x 0.43 x 0.018  
= 123 CFS > ALL Q<sub>100</sub>

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

$$R = 1/p = \frac{29.5}{65.1} = 0.45$$

S = 0.0032 (MIN)

$$Q_{\text{CAP}} = 29.5 \times \frac{1.486}{0.022} \times 0.45 \times 0.0032^{\frac{2}{3}} = 66.0 \text{ CFS}$$

Q<sub>CAP</sub> = 66.0 CFS > ALL Q<sub>100</sub> O.K.

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

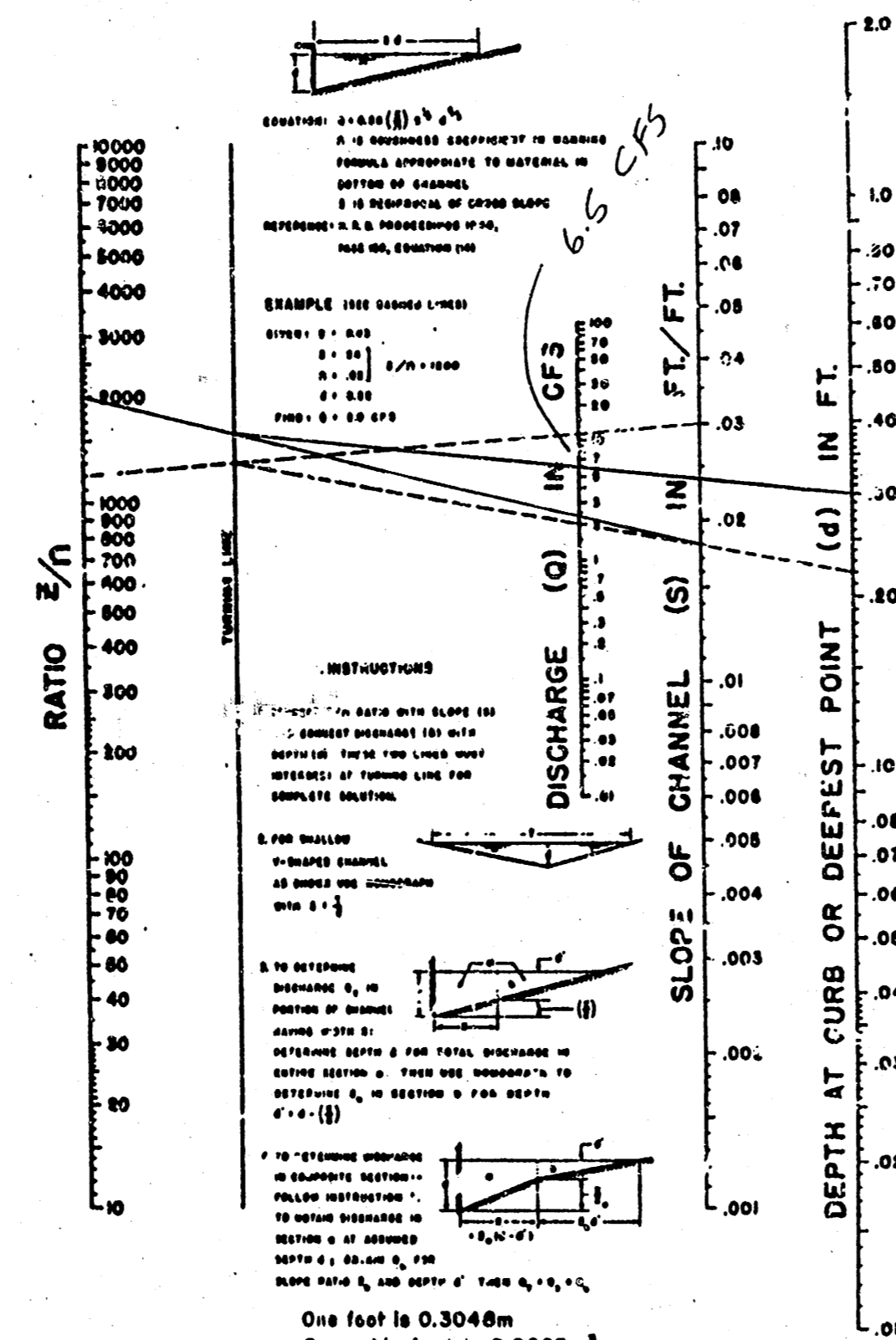


FIG. 5-1 (After FHWA)

HAUF STREET Q<sub>CAP</sub> FOR  
 SHILOA ISLAND 5-10

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

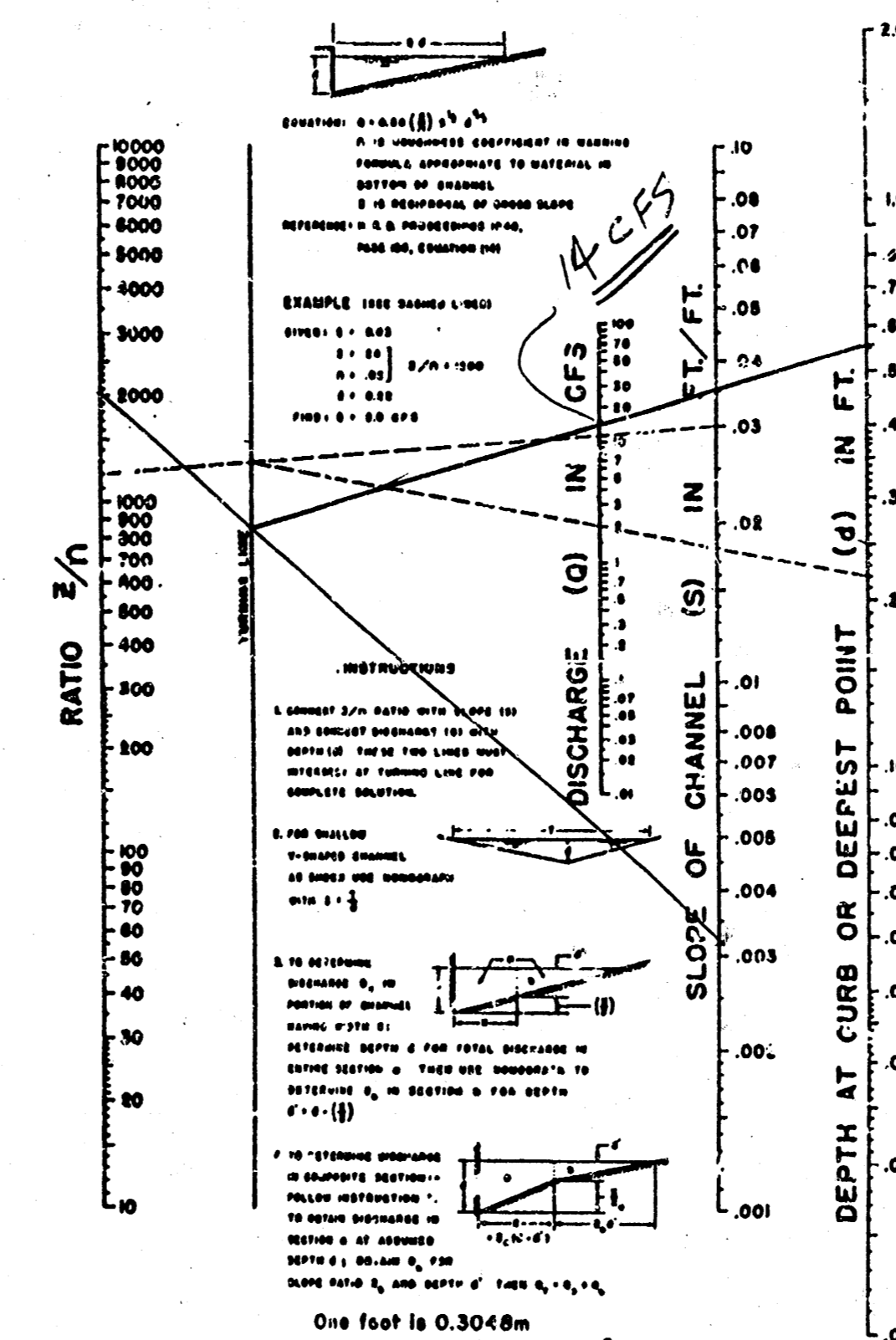


FIG. 5-1 (After FHWA)

Q<sub>CAP</sub> HAUF STREET (HONEY TREE)

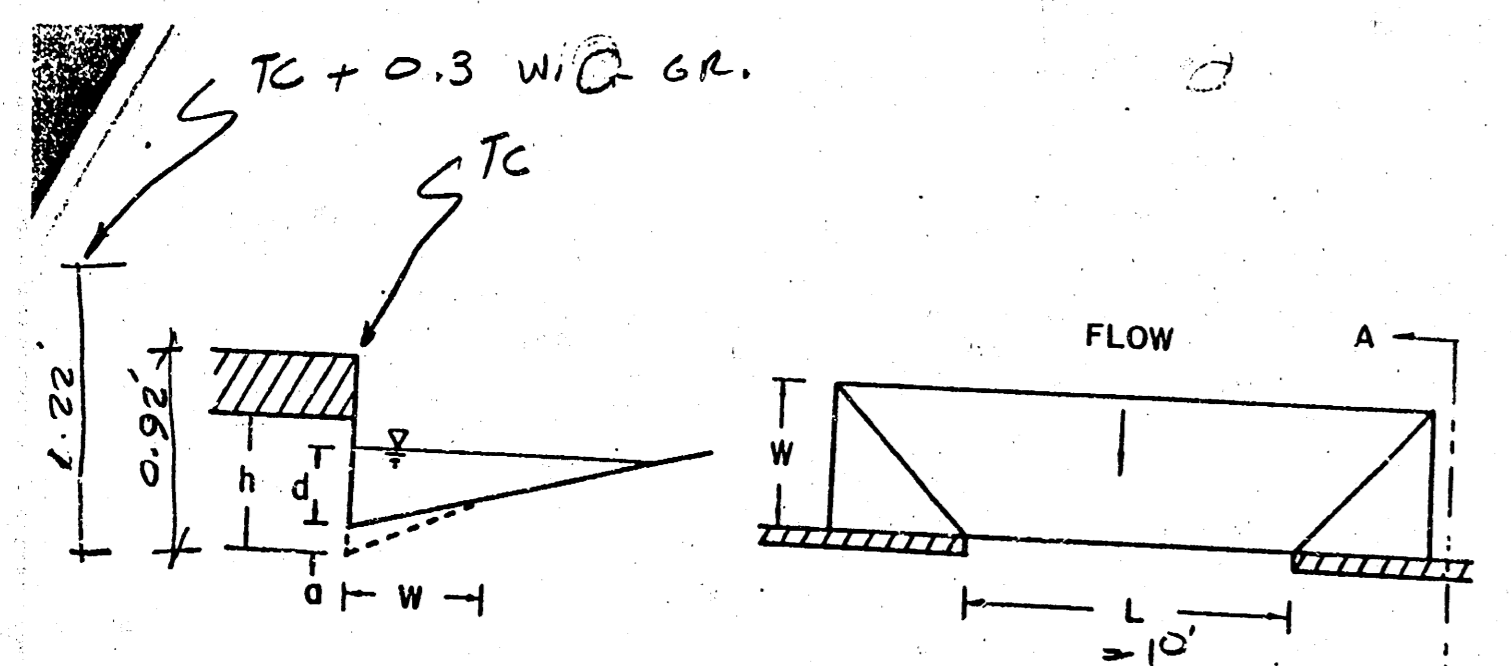
5-10

7.0 INLET SIZE:

NODE	Q <sub>2</sub> CFS	EXIST. INLET L	INLET COND.	Q <sub>MAX</sub> 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	3.7	10'	"	22	"

8.0 PIPE SIZE:

FROM NODE	TO NODE	Q <sub>L</sub> CFS	Σ S <sub>L</sub> CFS	EXISTING PIPE	Q <sub>CAP</sub> CFS	REMARK
100	101	1.9	1.9	15" RCP @ 0.35% 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	3.3+3.4	59.6	42" RCP @ 0.25% SL	54.0	O.K.



SECTION A-A  
 A = 10 x 6 = 50

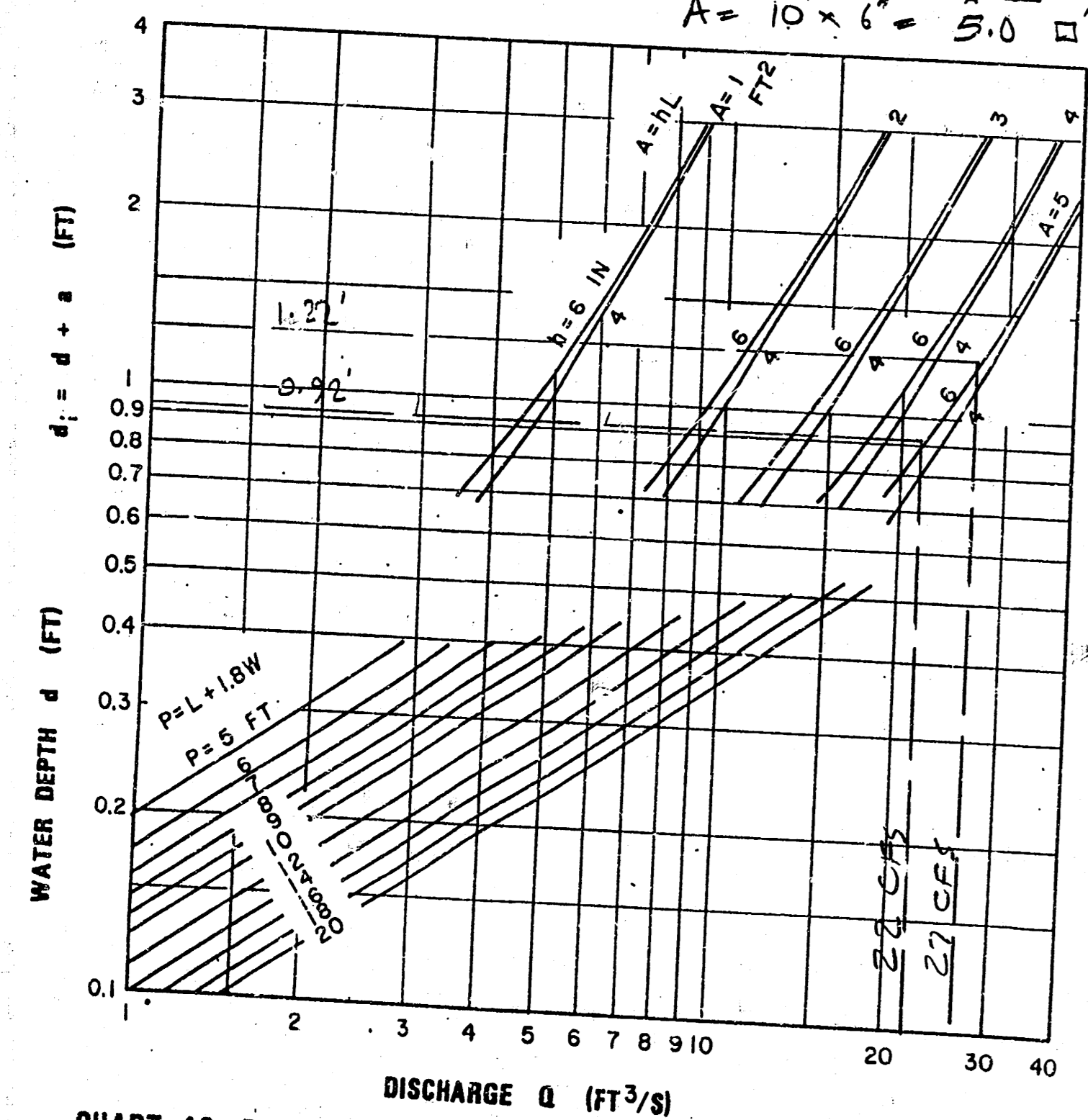
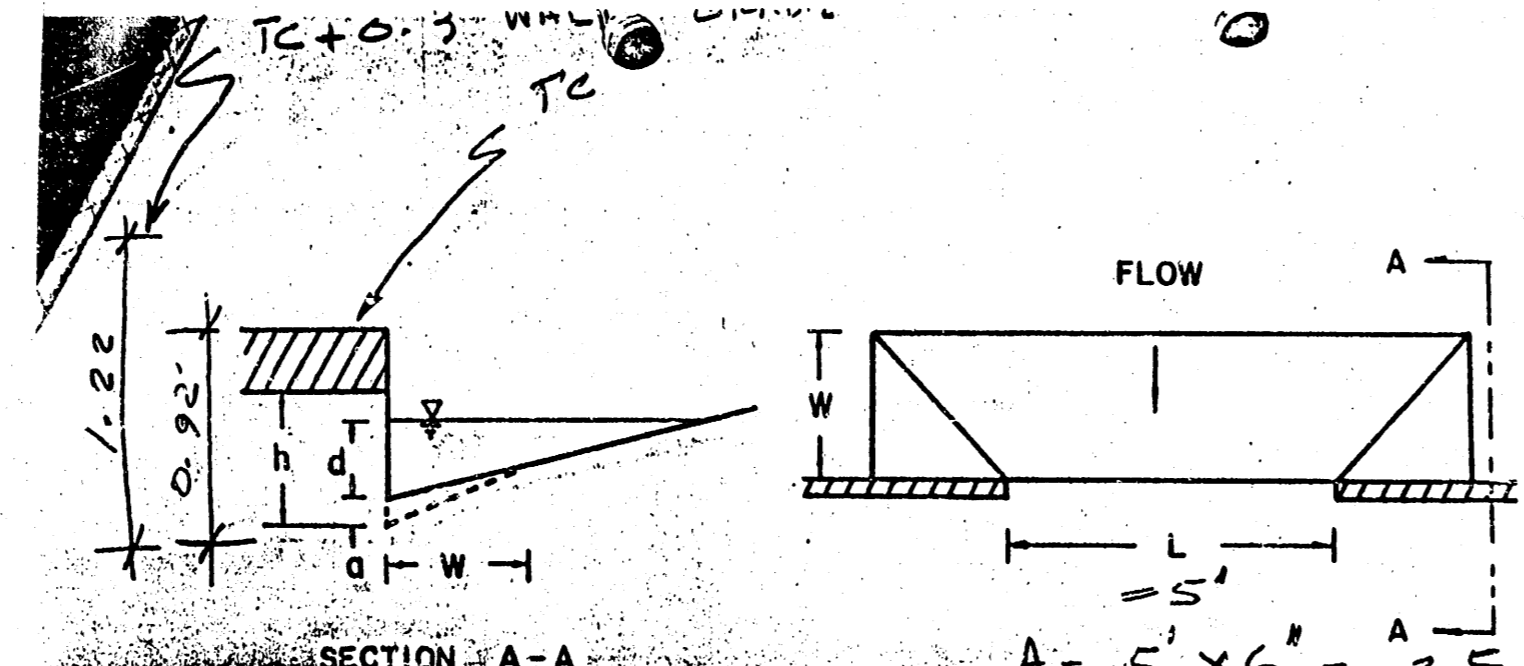


CHART 12. Depressed curb-opening inlet capacity in sump locations.



SECTION A-A  
 A = 5' x 6' = 2.5

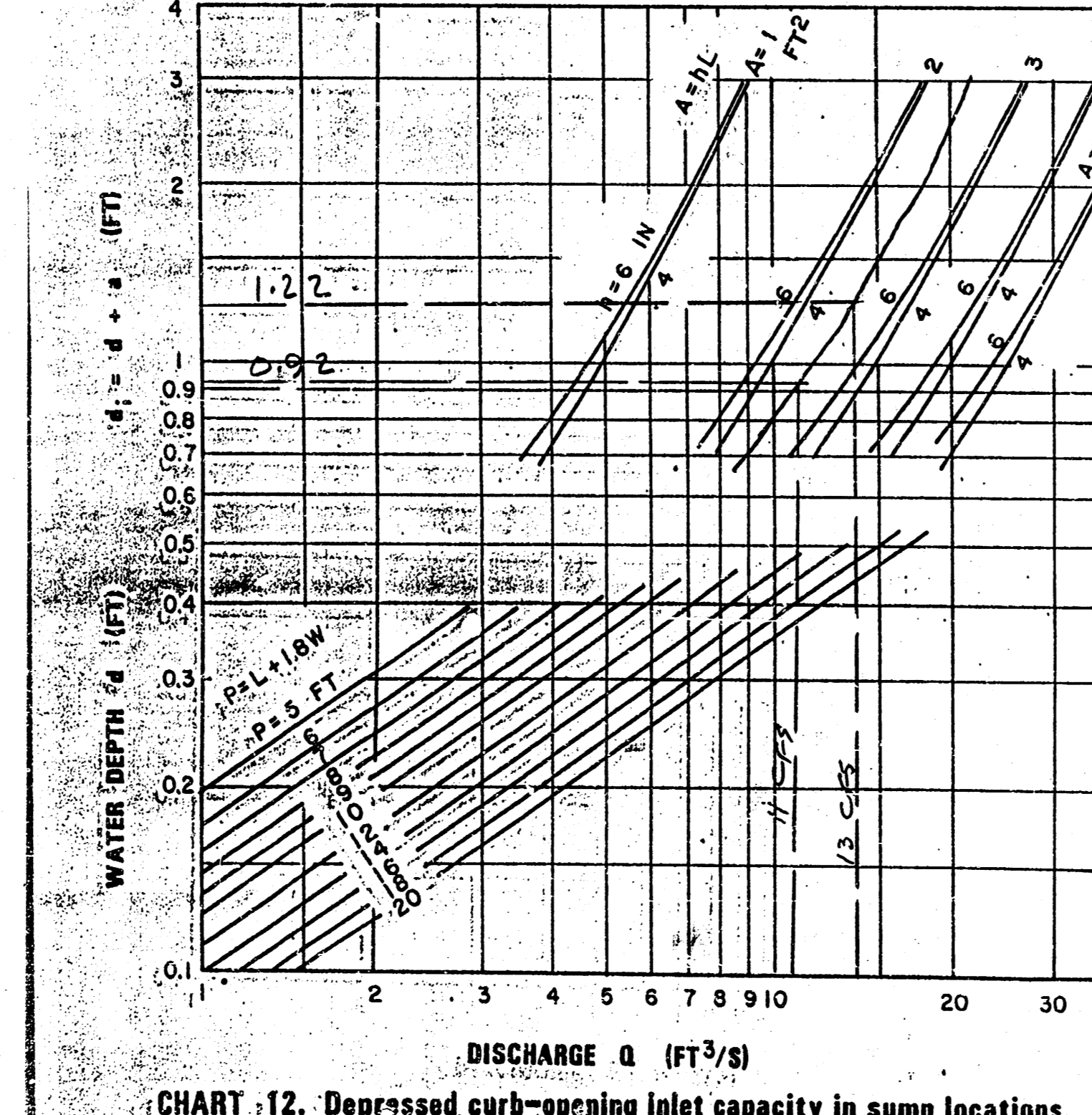
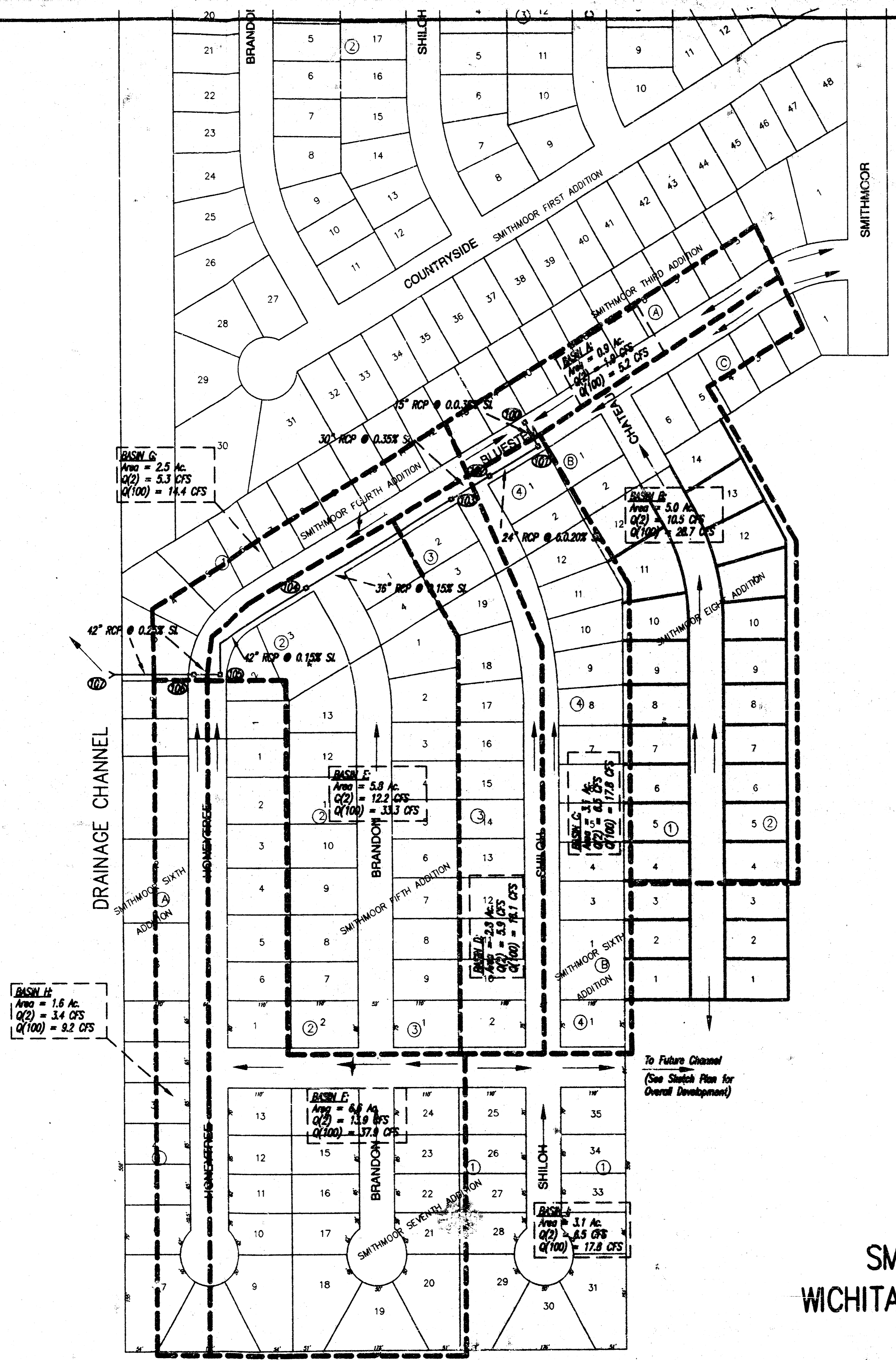
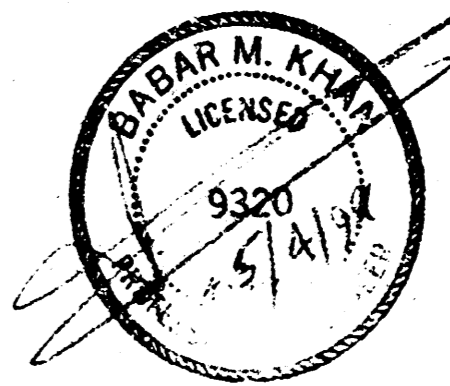


CHART 12. Depressed curb-opening inlet capacity in sump locations.

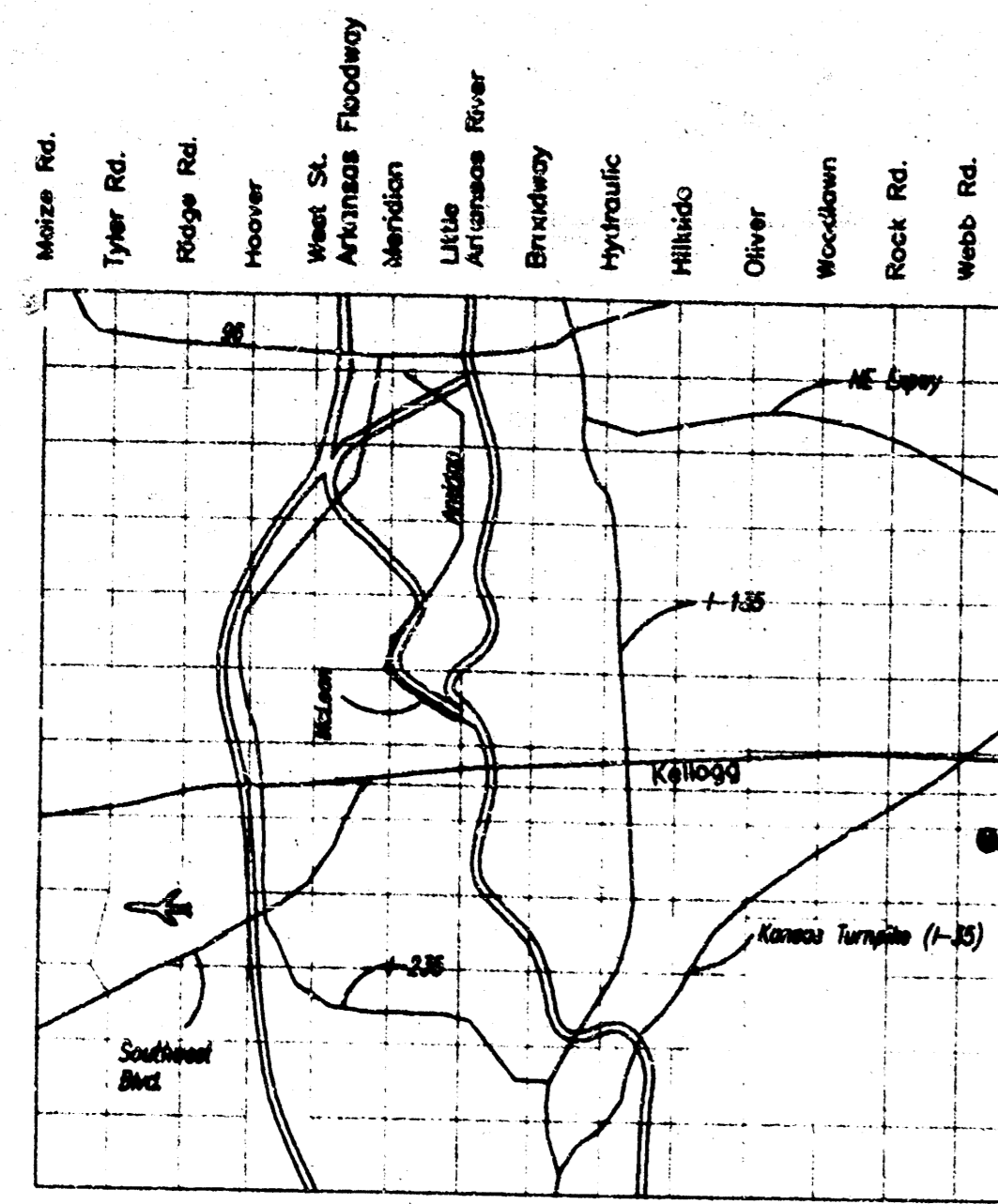


## DRAINAGE PLAN SMITHMOOR EIGHT ADDITION WICHITA, SEDGWICK COUNTY, KANSAS



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

**MUNICIPAL ENGINEERS, P.A.**  
254-LAURA, SUITE 201  
WICHITA, KANSAS 67211  
316-262-3642



SITE LOCATION MAP  
N.T.S.

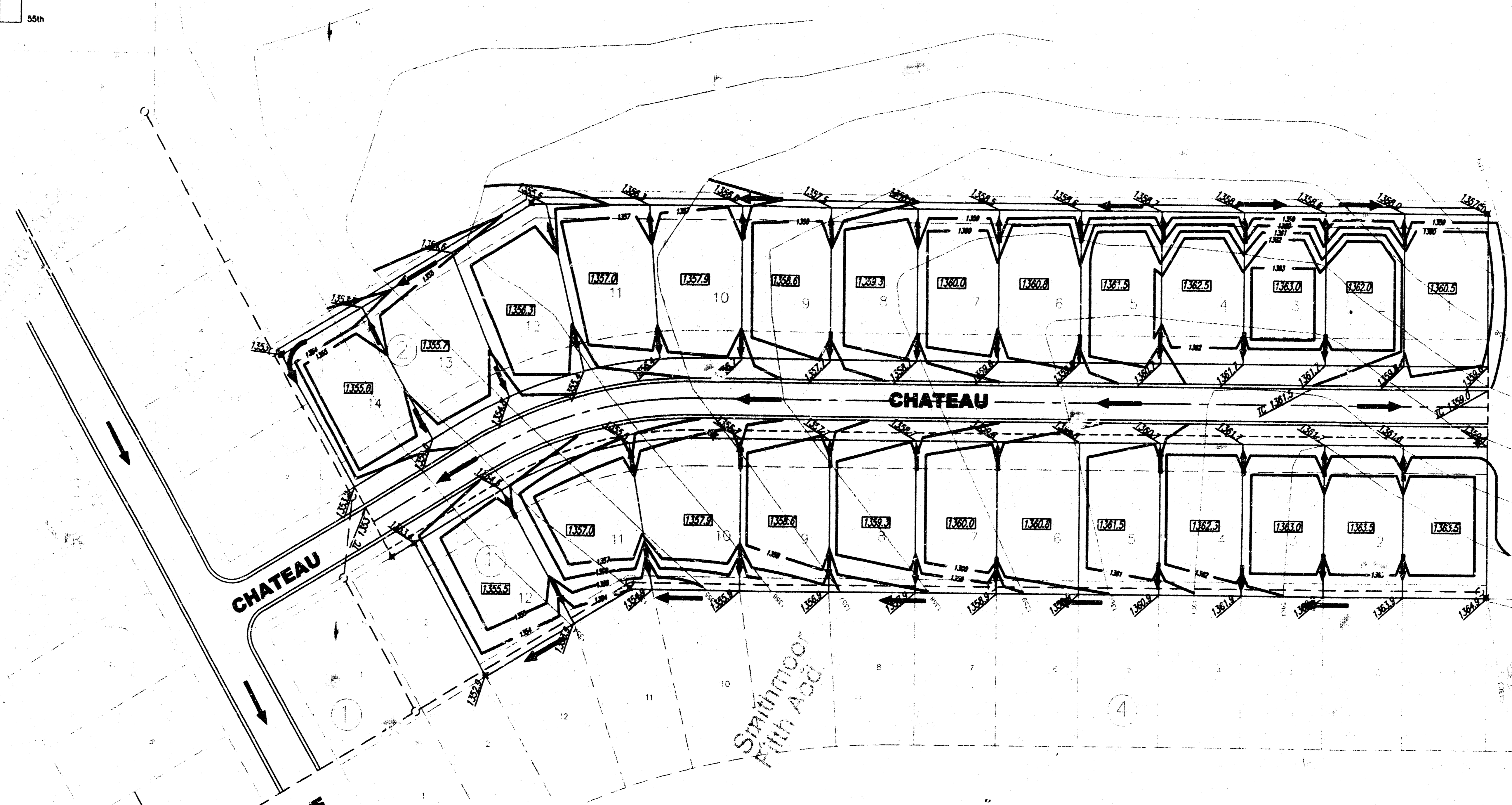
SCALE : 1" = 50'

**Legal Description**

Beginning at the Northeast corner of Lot 12, Block 4, Smithmoor Fifth Addition to Wichita, Sedgwick County, Kansas; thence bearing S 30°17'40" E, along the easterly line of said Smithmoor Fifth Addition, a distance of 127.50 feet; thence continuing along the East line of said Smithmoor Fifth Addition at a bearing of S 00°00'00" W, a distance of 654.81 feet to the Southeast corner of said Smithmoor Fifth Addition; thence bearing N 90°00'00" E, a distance of 278.00 feet; thence bearing N 00°00'00" E, a distance of 732.11 feet; thence bearing N 30°17'40" W, a distance of 221.00 feet to a point on the Southeastery line of Smithmoor Third Addition to Wichita, Sedgwick County, Kansas; thence bearing S 59°42'20" W along the Southeastery line of said Smithmoor Third Addition, a distance of 168.00 feet; thence bearing S 30°17'40" E a distance of 20.00 feet; thence bearing S 59°42'20" E, along the Southeastery line of said Smithmoor Third Addition, a distance of 111.03 feet to the point of beginning.

**Subdivider**  
Smith & Company  
P.O. Box 780585  
Wichita, Kansas 67278

**Surveyor/Engineer**  
Babar M. Khan P.E., L.S.  
Municipal Engineers, P.A.  
254-Laura, Suite 201  
Wichita, Kansas 67211



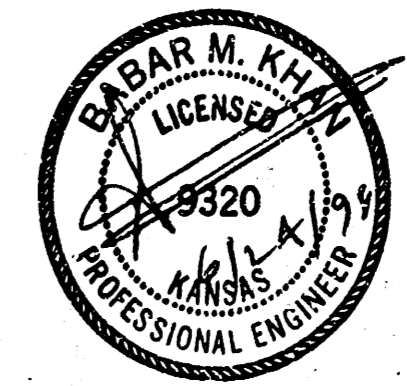
APPROVED  
DRAINAGE PLAN

**LEGEND**

- 1352.5 Finished Ground Elevation (Bottom of Finished Floor)
- 1352.8 Spot Elevation (Finished)

**BENCHMARK:**

BM #1. S. Rim of MH # 43-13-3, Located at SE corner of Lot 1, Block 4, Smithmoor Fifth Addition  
Wichita, Sedgwick County, Kansas.  
Elevation = 1354.64



**LOT GRADING PLAN**  
**SMITHMOOR EIGHT ADDITION**  
**TO**  
**WICHITA, SEDGWICK COUNTY, KANSAS**

**Municipal Engineers, P.A.**  
254-Laura, Suite 201  
Wichita, Kansas 67211  
316-268-3842