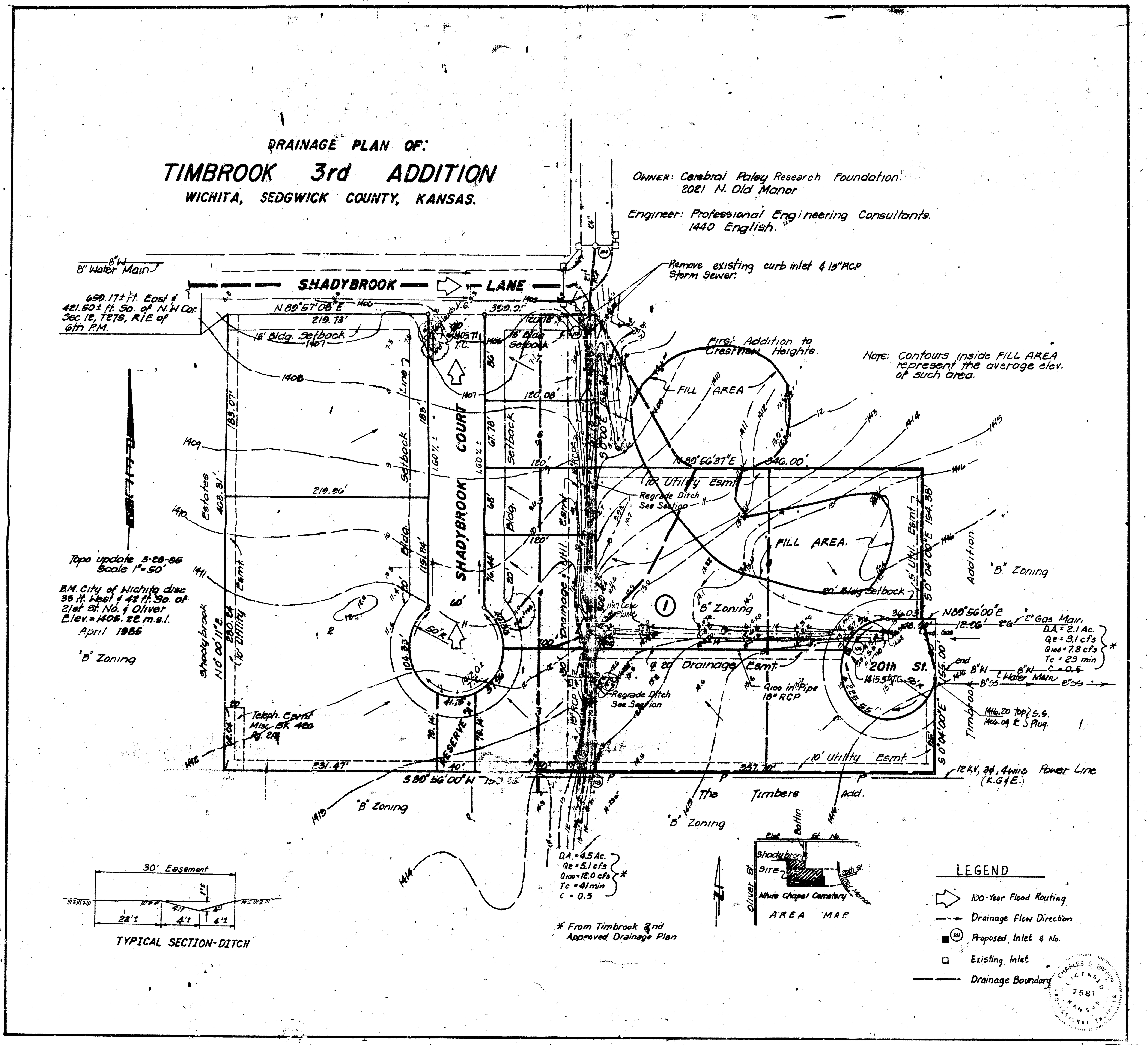
TIMBROOK 3RD ADDITION
(Drainage)



MEMO

PROFESSIONAL ENGINEERING CONSULTANTS

TO: City of Wichita | PROJECT NO. 36-85160-757
PROJECT: Timbrook 3rd Addition
COPIES TO: | ATTN: Mr. Chris Breitenstein, P.E. | DATE: 7/9/85
Louise Olivarez, MAPD | FROM: Charles S. Brown, P.E.
File | REFERENCE: Revised Drainage Plan

PLEASE ADVISE IMMEDIATELY OF ANY MISCONCEPTIONS OR OMISSIONS YOU BELIEVE TO BE CONTAINED HEREIN.

Transmitted herewith are two (2) copies of the Revised Drainage Plan and supporting calculations for the referenced project.

The Final Plat will be submitted on July 19, 1985, for hearing by the Subdivision Committee on August 1, 1985.

If you have any questions, or need any additional information, please advise.

CSB/mkm

RECEIVED
JUL 11 1985
DESIGN DIVISION

Date 7-9-85 Page 3
Project Timbrook 3rd Addition
Item Inlet Sizing

Node	Inlet Type	Design	Q
104	Curb Inlet	Q_{100}	11.5 cfs
103	Catch Basin	Q_2	5.1 cfs
102	" "	Q_2	2.4 cfs
101	" "	Q_2	2.0 cfs
100	(Existing Manhole to remain)		

104 Q = 11.5 cfs Assume 1 COW Type 1A Inlet L=5' h=6"
A = Lh = 5 × 0.5 = 2.5□'
Using Chart 12 attached d_1 = 0.95'
Max. d_1 = Max d + a
= (Curb depth + 0.3') + (2")
= (0.55' + 0.3') + (0.16') = 1.01'
USE 1 CURB INLET L=5'

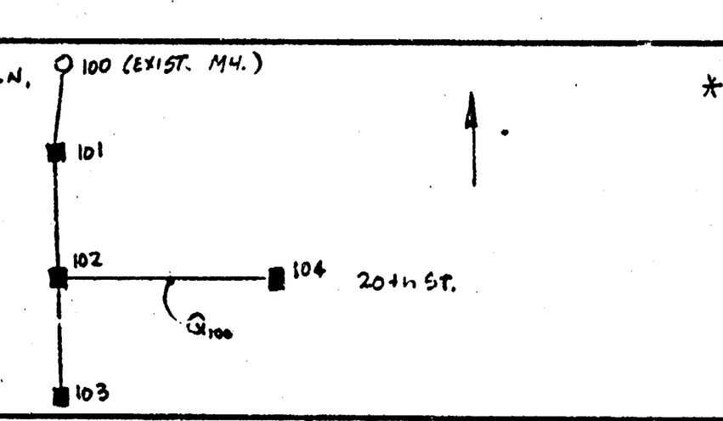
103 Q = 5.1 cfs use depth of water = 0.4'
Using Chart 11 attached P required = 4'
Use 1 COW Std 2'×4' Catch Basin
P Provided = 12'

PROFESSIONAL ENGINEERING CONSULTANTS

HYDROLOGY DATA SHEET

PAGE 1 OF 7
PROJECT: Timbrook 3rd Addition PROJECT NO. 36-85160-757
ITEM: Storm Drainage DATE: 7-9-85
RETURN PERIOD: 2 * COMPUTATIONS BY: CSB REVISIONS BY:

SCHEMATIC DIAGRAM:



* 2 yr in all basins except 104 & 100 yr in subbasin 104

SUB-BASIN (1)	C (2)	AREA (acres) (3)	SLOPE (%) (4)	LENGTH (feet) (5)	T_{co} (minutes) (6)	I_o in/hr (7)	Q_o (cfs) (8)	T_c (minutes) (9)	I in/hr (10)	Q (cfs) (11)	ΣQ (cfs) (12)	PIPE (inches) (13)	SLOPE (%) (14)	VELOCITY (ft/sec) (15)	LENGTH (feet) (16)	T_t (minutes) (17)	$T_c + T_t$ (minutes) (18)
104	0.5	3.3			** 29	6.95	11.5	29	6.95	11.5	11.5	18"	1.2	6.5	275	0.7	29.7
103	0.5	4.5			** 41	2.27	5.1	41	2.27	51	5.1	15"	0.55	4.0	120	0.5	41.5
102	0.5	1.2			15	4.06	2.4	41.5	5.27 (104) 2.25 (102+103)	=7.7 6.4	15.1	21" 18"	0.85 2.00	6.1 8.4	320	0.9	42.4
101	0.5	1.0			15	4.06	2.0	42.4	5.19 (104) 2.21 (102,103,101)	= 8.6 7.4	16.0	21"	1.0	6.6	90'	0.2	42.6 to MH (100)
100	–	(Manhole)															

** From Timbrook 2nd Addition Approved Drainage Plan.

PROFESSIONAL ENGINEERING CONSULTANTS

HYDROLOGY DATA SHEET

PAGE 2 OF 7
PROJECT: Timbrook 3rd Add'n PROJECT NO. 36-85160-757
ITEM: Storm Drainage DATE: 7-9-85
RETURN PERIOD: 100 COMPUTATIONS BY: CSB REVISIONS BY:

SCHEMATIC DIAGRAM:

SUB-BASIN (1)	C (2)	AREA (acres) (3)	SLOPE (%) (4)	LENGTH (feet) (5)	T_{co} (minutes) (6)	I_o in/hr (7)	Q_o (cfs) (8)	T_c (minutes) (9)	I in/hr (10)	Q (cfs) (11)	ΣQ (cfs) (12)	PIPE (inches) (13)	SLOPE (%) (14)	VELOCITY (ft/sec) (15)	LENGTH (feet) (16)	T_t (minutes) (17)	$T_c + T_t$ (minutes) (18)
104	0.5	3.3			29	6.95	11.5	29	6.95	11.5	11.5	18"	1.2	6.5	275	0.7	29.7
103	0.5	4.5			41	5.32	12.0	41	5.32	12.0	12.0	V ditch	1.3%	4.0	120	0.5	41.5
102	0.5	1.2			15	8.35	5.4	41.5	5.27	104 8.7, 103 11.9, 102 3.2	23.8	V ditch	1.3	4.0	370	1.3	42.8
101	0.5	1.0			15	3.98	4.5	42.8	5.15	104 8.5, 103 11.6, 102 3.1, 101 2.6	25.8	V ditch	1.3	4.0	40'	0.2	43.0
100	–	(Manhole)															

Date 7-9-85 Page 4 of 7
Project Timbrook 3rd Addition
Item Inlet Sizing

102 Q = 2.4 cfs use depth of water = 0.4'
Using chart 11 attached, P required = 3'
Use 1 COW Std 2'×4' Catch Basin
P provided = 12'

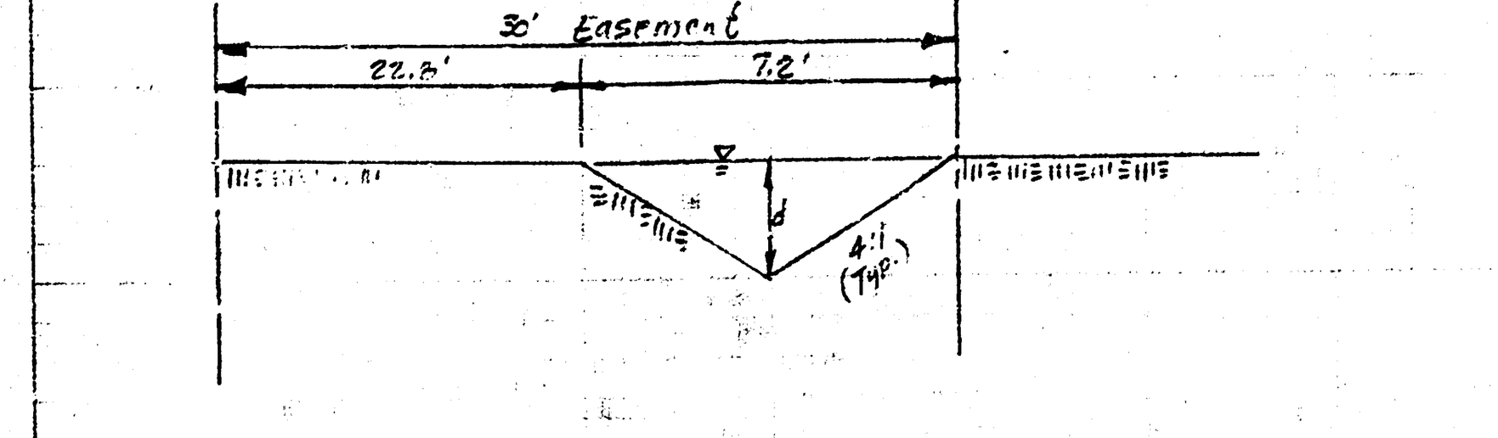
101 Q = 2.0 cfs use depth of water = 0.4'
Using Chart 11 attached, P required = 3'
Use 1 COW Std 2'×4' Catch Basin
P provided = 12'

Date 7-9-85 Page 5 of 7
Project Timbrook 3rd Addition
Item Overflow Ditch Design

Design ditches in back of lots to handle difference between 100 yr. Q & Q in pipe.

$Q_{ditch} = Q_{100} - Q_{pipe}$

Ditch Location	Q_{100}	Q_{pipe}	Q_{ditch}	
103 → 102	12.0 cfs	5.1 cfs	6.9 cfs	
104 → 102	11.5	11.5	0.0	No ditch req'd (Q_{100} in pipe)
102 → 101	23.8	15.1	8.7	
101 → 100	25.8	16.0	9.8	



TYPICAL DITCH SECTION

Use Mannings Eq'n for open channel flow

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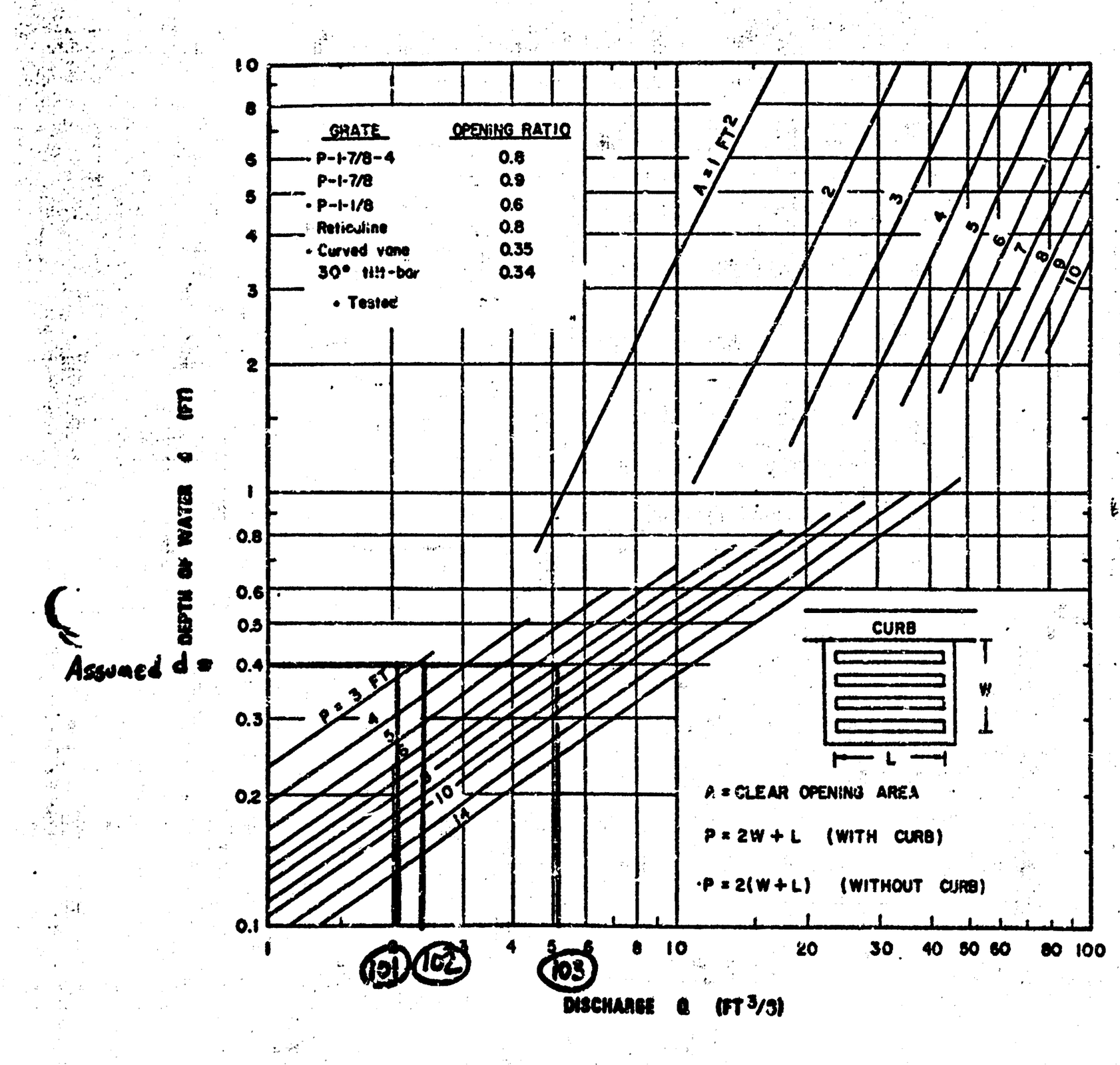

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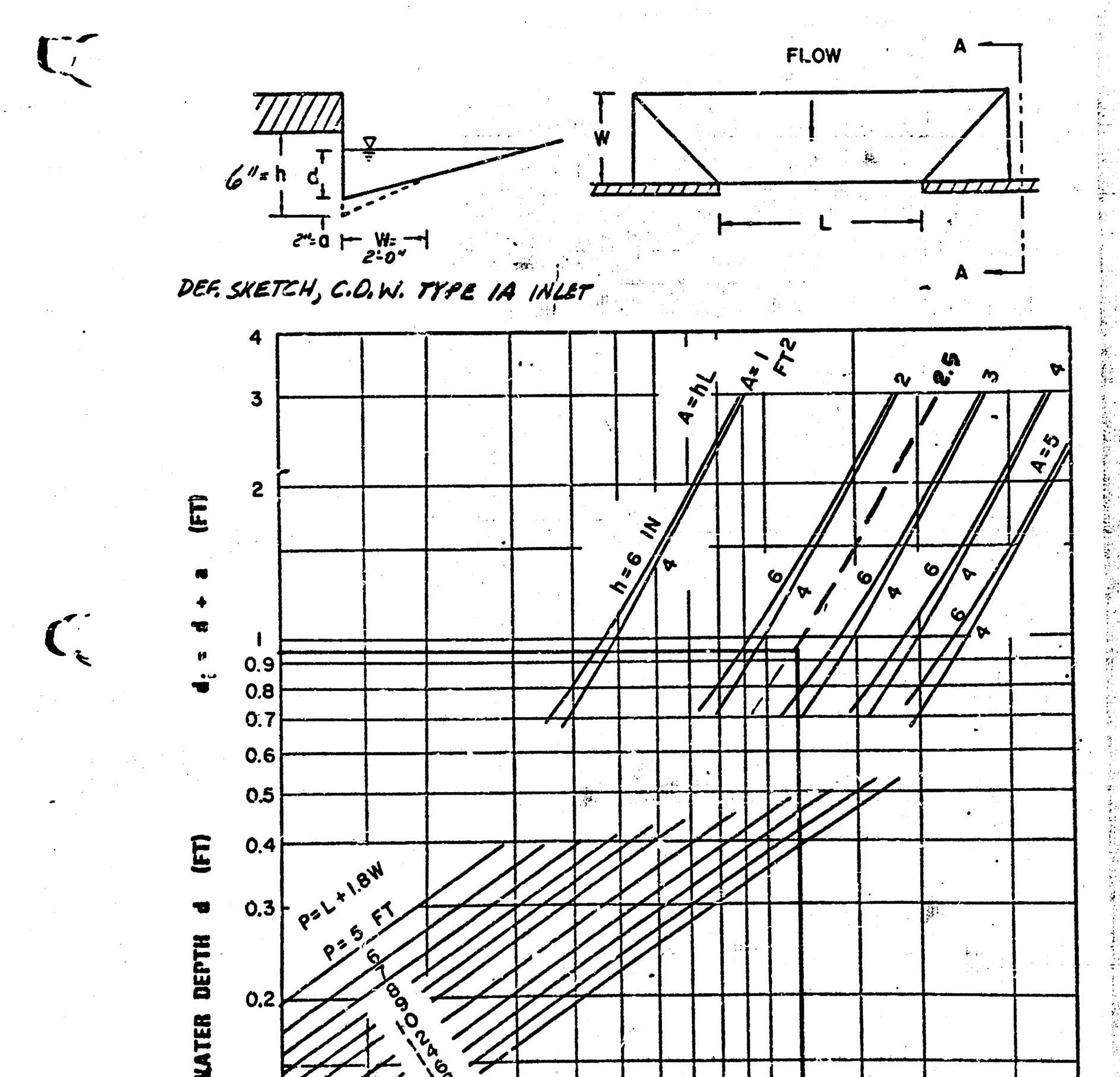

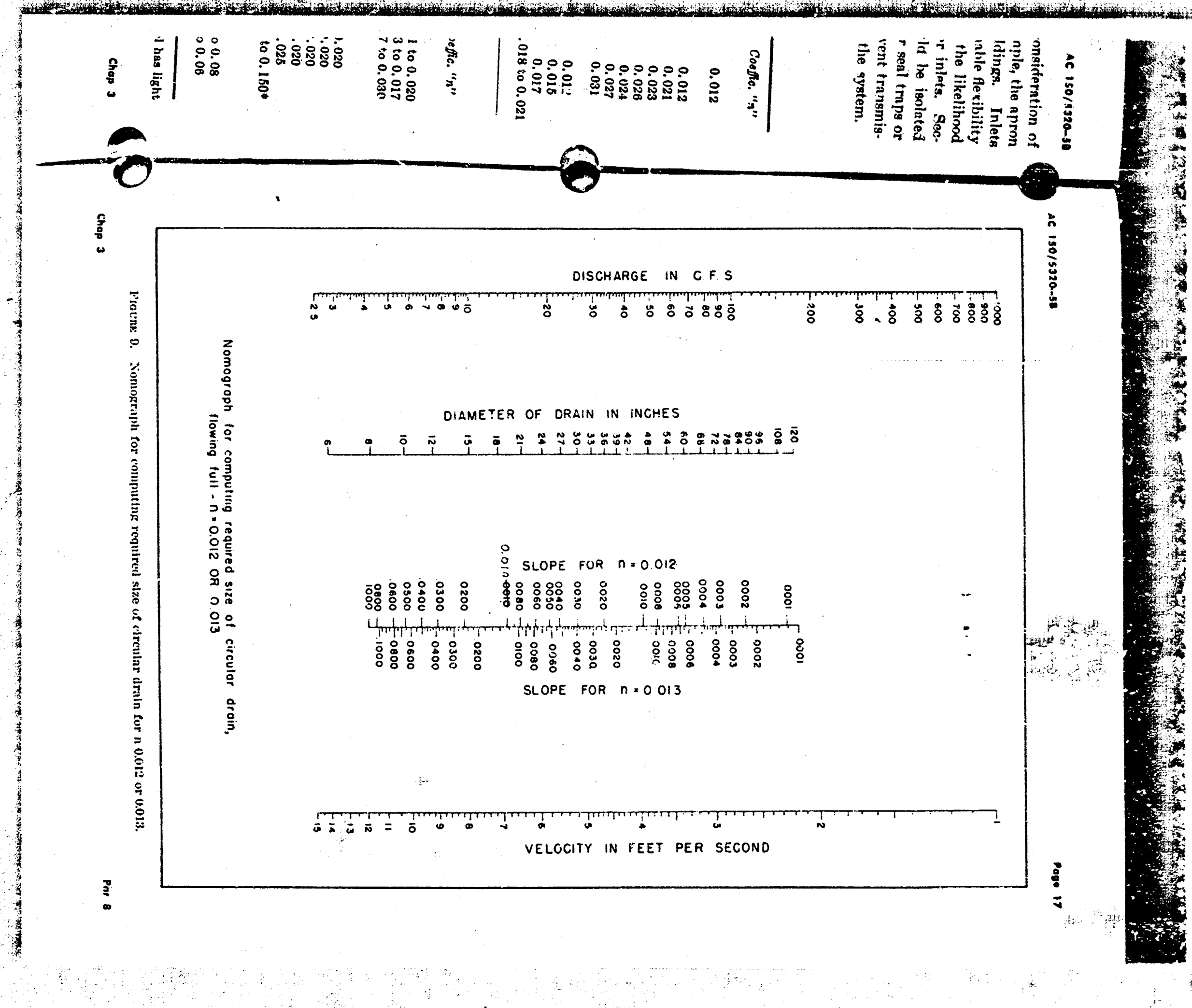

RAINFALL INTENSITY TABLE

for

SEDGWICK COUNTY KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40.

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.67	6.23	8.00	9.34	10.67	12.23	13.79
6	4.35	5.80	7.45	8.70	9.94	11.39	12.84
7	4.09	5.46	7.02	8.19	9.36	10.72	12.09
8	3.88	5.18	6.66	7.77	8.89	10.18	11.48
9	3.71	4.95	6.36	7.43	8.49	9.72	10.96
10	3.56	4.75	6.11	7.13	8.15	9.33	10.52
11	3.43	4.58	5.89	6.87	7.85	8.99	10.14
12	3.32	4.43	5.69	6.64	7.59	8.69	9.80
13	3.21	4.29	5.51	6.43	7.35	8.42	9.50
14	3.12	4.17	5.36	6.25	7.14	8.18	9.23
15	3.04	4.06	5.21	6.08	6.95	7.97	8.98
16	2.96	3.96	5.09	5.93	6.78	7.77	8.76
17	2.90	3.86	4.97	5.79	6.62	7.59	8.55
18	2.83	3.78	4.86	5.67	6.48	7.42	8.37
19	2.77	3.70	4.76	5.55	6.34	7.27	8.19
20	2.72	3.63	4.66	5.44	6.22	7.12	8.03
21	2.67	3.56	4.57	5.34	6.10	6.99	7.88
22	2.62	3.49	4.49	5.24	5.99	6.86	7.74
23	2.57	3.43	4.41	5.15	5.89	6.74	7.60
24	2.53	3.38	4.34	5.07	5.79	6.63	7.48
25	2.49	3.32	4.27	4.99	5.70	6.53	7.36
26	2.45	3.23	4.21	4.91	5.61	6.43	7.25
27	2.42	3.13	4.15	4.84	5.53	6.33	7.14
28	2.38	3.05	4.09	4.77	5.45	6.25	7.04
29	2.35	2.97	4.02	4.68	5.38	6.16	6.95
30	2.32	2.89	3.92	4.56	5.31	6.08	6.79
31	2.29	2.82	3.82	4.44	5.19	6.00	6.62
32	2.26	2.75	3.73	4.33	5.07	5.87	6.45
33	2.24	2.68	3.64	4.23	4.95	5.73	6.30
34	2.19	2.62	3.55	4.13	4.83	5.60	6.16
35	2.14	2.57	3.47	4.04	4.73	5.47	6.02
36	2.09	2.51	3.40	3.95	4.62	5.35	5.89
37	2.05	2.46	3.33	3.87	4.52	5.23	5.76
38	2.00	2.41	3.26	3.79	4.43	5.13	5.64
39	1.96	2.36	3.19	3.71	4.34	5.02	5.53
40	1.92	2.32	3.13	3.64	4.26	4.92	5.42
41	1.89	2.27	3.07	3.57	4.18	4.83	5.32
42	1.85	2.23	3.01	3.51	4.10	4.74	5.22
43	1.82	2.19	2.96	3.44	4.02	4.65	5.13
44	1.78	2.15	2.91	3.38	3.95	4.56	5.03
45	1.75	2.11	2.86	3.32	3.88	4.48	4.95

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
46	1.72	2.08	2.81	3.27	3.82	4.41	4.86
47	1.69	2.04	2.76	3.21	3.75	4.33	4.78
48	1.67	2.01	2.72	3.16	3.69	4.26	4.70
49	1.64	1.98	2.67	3.11	3.63	4.19	4.63
50	1.61	1.95	2.63	3.06	3.58	4.13	4.56
51	1.59	1.92	2.59	3.01	3.52	4.06	4.49
52	1.56	1.89	2.55	2.97	3.47	4.00	4.42
53	1.54	1.86	2.51	2.92	3.42	3.94	4.35
54	1.52	1.84	2.48	2.88	3.37	3.88	4.29
55	1.50	1.81	2.44	2.84	3.32	3.83	4.23
56	1.47	1.79	2.41	2.80	3.27	3.77	4.17
57	1.45	1.76	2.37	2.76	3.23	3.72	4.11
58	1.43	1.74	2.34	2.73	3.19	3.67	4.06
59	1.42	1.72	2.31	2.69	3.14	3.62	4.01
60	1.40	1.69	2.28	2.65	3.10	3.57	3.95
61	1.38	1.67	2.25	2.62	3.06	3.53	3.90
62	1.36	1.65	2.22	2.59	3.02	3.48	3.85
63	1.34	1.63	2.20	2.55	2.99	3.44	3.81
64	1.33	1.61	2.17	2.52	2.95	3.40	3.76
65	1.31	1.59	2.14	2.49	2.92	3.35	3.71
66	1.30	1.57	2.12	2.46	2.88	3.31	3.67
67	1.28	1.56	2.09	2.44	2.85	3.27	3.63
68	1.26	1.54	2.07	2.41	2.81	3.24	3.59
69	1.25	1.52	2.05	2.38	2.78	3.20	3.54
70	1.24	1.50	2.02	2.35	2.75	3.16	3.51
71	1.22	1.49	2.00	2.33	2.72	3.13	3.47
72	1.21	1.47	1.98	2.30	2.69	3.09	3.43
73	1.20	1.46	1.96	2.28	2.66	3.06	3.39
74	1.18	1.44	1.94	2.25	2.63	3.03	3.36
75	1.17	1.43	1.92	2.23	2.61	3.00	3.32
76	1.16	1.41	1.90	2.21	2.58	2.96	3.29
77	1.15	1.40	1.88	2.18	2.55	2.93	3.25
78	1.13	1.38	1.86	2.16	2.53	2.90	3.22
79	1.12	1.37	1.84	2.14	2.50	2.88	3.19
80	1.11	1.36	1.82	2.12	2.48	2.85	3.16
81	1.10	1.34	1.81	2.10	2.46	2.82	3.13
82	1.09	1.33	1.79	2.08	2.43	2.79	3.10
83	1.08	1.32	1.77	2.06	2.41	2.76	3.07
84	1.07	1.31	1.75	2.04	2.39	2.74	3.04
85	1.06	1.30	1.74	2.02	2.37	2.71	3.01
86	1.05	1.28	1.72	2.00	2.34	2.69	2.99
87	1.04	1.27	1.71	1.99	2.32	2.66	2.96
88	1.03	1.26	1.69	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	0.86	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
121	0.80	0.99	1.32	1.54	1.80	2.05	2.29
122	0.80	0.98	1.31	1.53	1.78	2.04	2.27
123	0.79	0.97	1.30	1.52	1.77	2.03	2.26
124	0.79	0.97	1.30	1.51	1.76	2.01	2.24
125	0.78	0.96	1.29	1.50	1.75	2.00	2.23
126	0.78	0.96	1.28	1.49	1.74	1.99	2.22
127	0.77	0.95	1.27	1.48	1.73	1.98	2.20
128							
129							
130							
131							
132							
133							
134							
135							