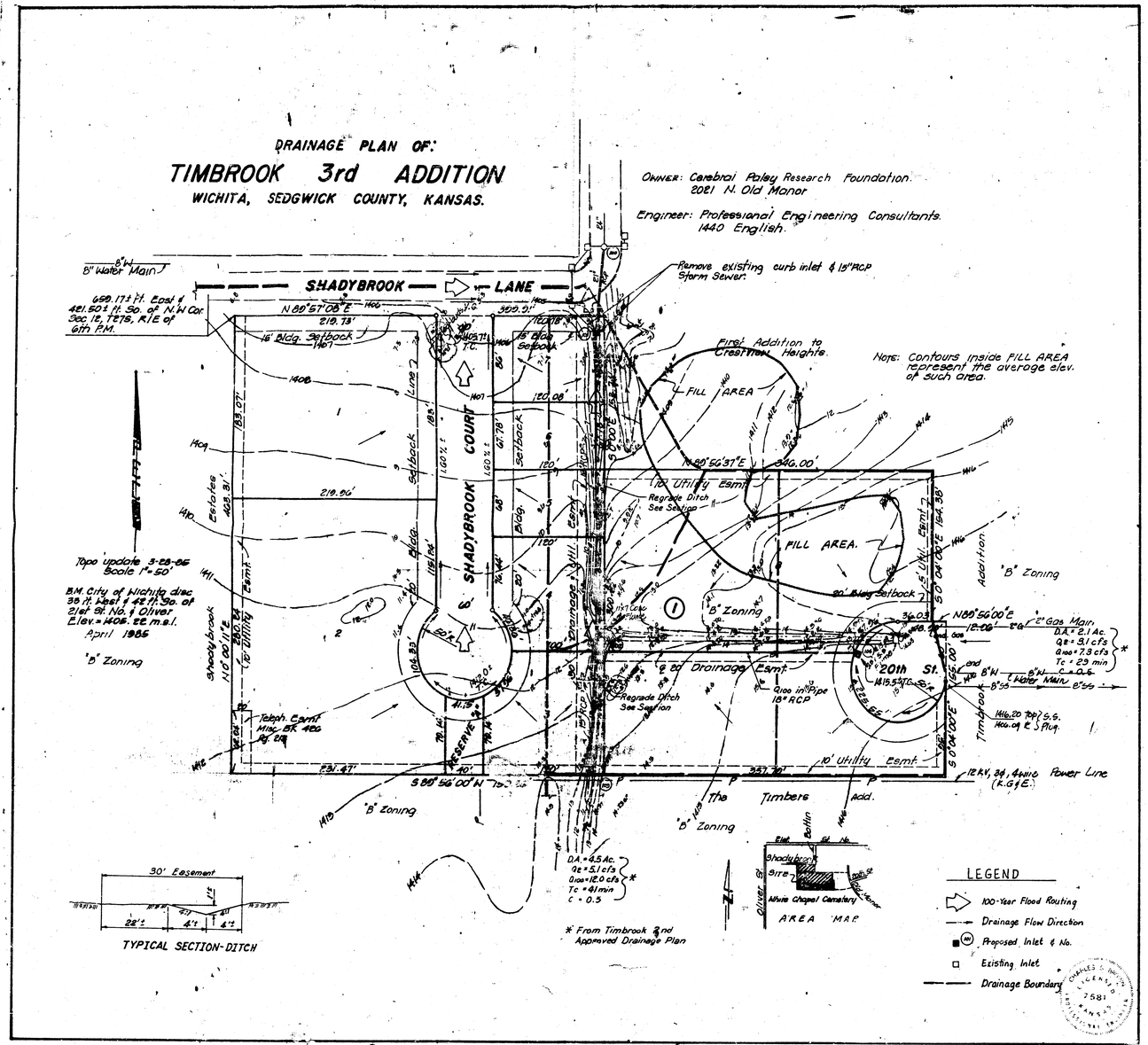


MEMO

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

COPIES TO: Louise Olivarez, MAPD; File

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 4 of 7
Project Timbrook 3rd Addition
Item Inlet Sizing

Node	Inlet Type	Design	Q
104	Curb Inlet	G_{100}	11.5 cfs
103	Catch Basin	G_2	5.1 cfs
102	" "	G_1	2.4 cfs
101	" "	G_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 x 0.5 = 2.5 ft²
Using chart II attached d_1 = 0.95'
Max. d_1 = Max d + a
= (Curb depth + 0.3') + (2")
= (0.55' + 0.3') + (0.167') = 1.01'
USE 1 CURB INLET L=5'

103 Q = 5.1 cfs — use depth of water = 0.4'
Using chart II attached Required = 3"
Use 1 COW Std 2'x4' Catch Basin
P provided = 12'

102 Q = 2.4 cfs — use depth of water = 0.4'
Using chart II attached, Required = 3"
Use 1 COW Std 2'x4' Catch Basin
P provided = 12'

101 Q = 2.0 cfs — use depth of water = 0.4'
Using chart II attached, Required = 3"
Use 1 COW Std 2'x4' Catch Basin
P provided = 12'

HYDROLOGY DATA SHEET

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

SCHEMATIC DIAGRAM: Shadybrook Ln. — Q100 (Exist. MH.) — 101 — 102 — 104 — 20th St. — Q_{100} — 103

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

TRIBUTARY AREA									HYDROLOGY SUMMATION				CONDUIT DATA						
SUB-BASIN (1)	C (2)	AREA (acres) (3)	SLOPE (%) (4)	LENGTH (feet) (5)	t_c (minutes) (6)	i in/hr (7)	Q_p (cfs) (8)	t_p (minutes) (9)	i in/hr (10)	Q (cfs) (11)	Σ Q (cfs) (12)	PIPE (inches) (13)	SLOPE (%) (14)	VELOCITY (ft/sec) (15)	LENGTH (feet) (16)	T_t (minutes) (17)	$T_c + T_t$ (minutes) (18)	$t_c + t_t$ (minutes) (19)
104	0.5	5.9			*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	5.1	5.1	15"	0.55	4.0	120	0.5	41.5	
102	0.5	1.2		15	4.06	2.4	41.5	E-9 (Pre) = 15.7 E-11 (100 Yr) = 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	E-9 (Pre) = 8.6 E-11 (100 Yr) = 2.0			16.0	21"	1.0	6.6	90'	0.2	42.6	
																to MH	(100)	
100	—	(Manhole)																
								*From Timbrook 2nd Addition Approved Drainage Plan.										

HYDROLOGY DATA SHEET

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

SCHEMATIC DIAGRAM:

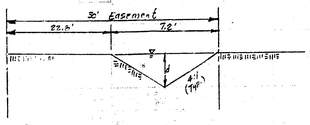
TRIBUTARY AREA									HYDROLOGY SUMMATION				CONDUIT DATA						
SUB-BASIN (1)	C (2)	AREA (acres) (3)	SLOPE (%) (4)	LENGTH (feet) (5)	t_c (minutes) (6)	i in/hr (7)	Q_p (cfs) (8)	t_p (minutes) (9)	i in/hr (10)	Q (cfs) (11)	Σ Q (cfs) (12)	PIPE (inches) (13)	SLOPE (%) (14)	VELOCITY (ft/sec) (15)	LENGTH (feet) (16)	T_t (minutes) (17)	$T_c + T_t$ (minutes) (18)	$t_c + t_t$ (minutes) (19)
104	0.5	5.9			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.a.	1.3½	4.0	120	0.5	41.5	
102	0.5	1.2		15	9.33	5.4	41.5	5.27	12" 4.7 15" 6.9 18" 8.5		23.6	V.a.	1.3	4.0	370	1.3	42.8	
101	0.5	1.0		15	3.98	4.5	42.6	5.15	12" 8.5 15" 11.6 18" 16 24" 26		25.8	V.a.	1.3	4.0	40'	0.2	43.0	
100	—	(Manhole)																

Date 7-9-85 Page 5 of 7
Project Timbrook 3rd Addition
Item Cross-Section 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 (Q100 in pipe)
102 → 101	22.8	15.1	8.7	
101 → 100	25.8	16.0	9.8	



TYPICAL DITCH SECTION

Use Manning's Eqn for open channel flow

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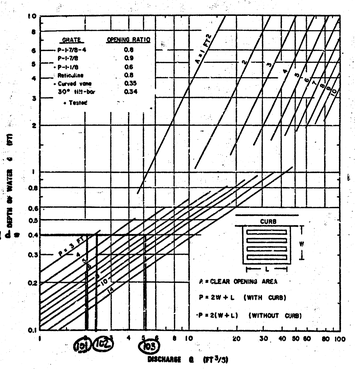

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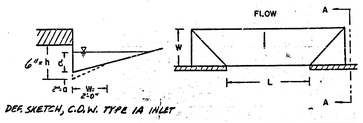
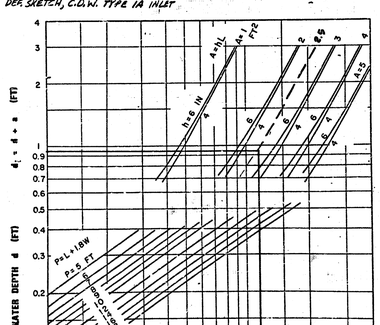
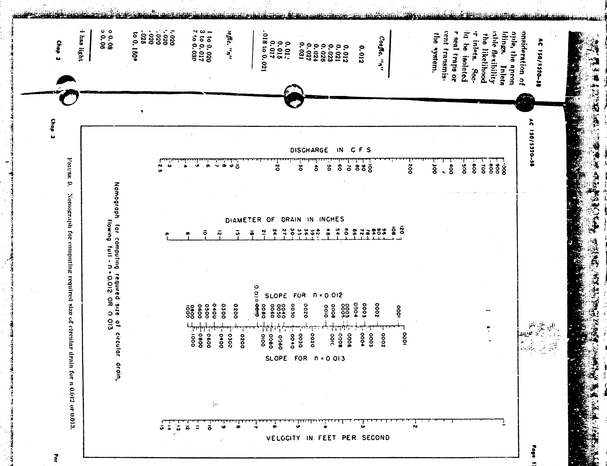


DER. SKETCH, C.O.W. TYPE 1A INLET





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	5.11	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	4.25	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							