PROFESSIONAL ENGINEERING CONSULTANTS
PROFESSIONAL ASSOCIATION

July 17, 1985

Sedgwick County Department of Public Works
1250 South Seneca
Wichita, Kansas 67213-4498

Attention: Mr. Jim Weber

Reference: Pine Bay Estates
Drainage Plat
PEC File No: 36-84032-959

Dear Mr. Weber:

As requested, we are transmitting herewith two (2) sets of calculations for the 100-year storm within the Wichita-Valley Center Floodway's Ponding Area "C".

As you can see, if the entire 100-year storm would be diverted from Ponding Area "C" to the existing lake in Pine Bay Estates, the Design Water Surface (DWS) would be approximately 1249.3 (MSL). This is about 0.8' higher than that calculated for the 25-year storm.

Also, the water depth in the control section of the overflow channel would be approximately 3.4'. This is 0.4' higher than the 25-year storm. Assuming the same section is used, the freeboard would be reduced from 3.0' to 2.6'.

If you have any questions or need any additional information, please call at your convenience.

Very truly yours,

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

Charles S. Brown, P.E.
Project Engineer

cc: Chris Breitenstein, P.E., Flood Control Engineer
Gerald Blood

CSB:kas

1640 EAST ENGLISH
WICHITA, KANSAS 67211
(316) 262-2691

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Project Pine Bay Estates
Item Inflow to Big Ditch Ponding Area "C" (100 yr)

D.A. #1

A = 209 Ac.
C = 0.35
t_c = 7000 (@ 1 fps (avg) = 117 min.
I_{100} = 2.35

Q_{100} = 0.35 × 2.35 × 209
= 172 cfs

D.A #2

D.A. = 121 Ac.
C = (99.4 Ac @ 0.35) + (21.6 Ac @ 0.3) = 0.34
t_c = 102 min
I_{100} = 2.61
Q_{100} = 0.34 × 2.61 × 121
= 107 cfs

D.A #3

D.A = 130 Ac.
C = 0.35
t_c = 117 min.
I_{100} = 2.35
Q_{100} = 0.35 × 2.35 × 130
= 107 cfs

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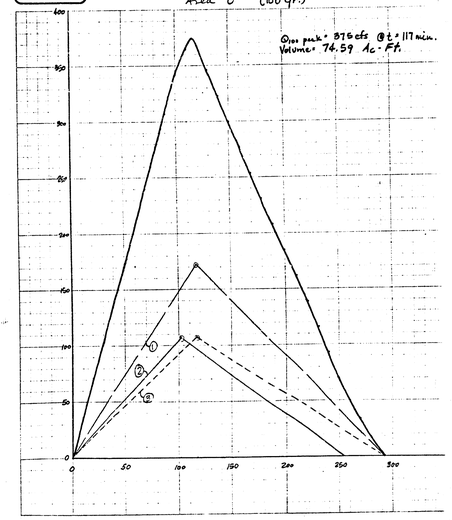
Project Pine Bay Estates
Item Inflow Hydrograph to Floodway Ponding Area "C" (100 yr.)



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Project Pine Bay Estates
Item Inflow Hydrograph Ponding Area "C" (100 yr

Time hr.	DA #1	DA #2	DA #3	Total
0	0	0	0	0
10	15	11	10	36
20	30	22	19	71
30	44	32	27	103
40	60	42	37	139
50	73	52	46	171
60	89	62	55	206
70	103	72	64	239
80	117	83	73	273
90	132	93	82	307
100	146	104	92	342
110	162	101	101	364
120	169	96	105	368
130	166	87	99	346
140	160	80	93	323
150	140	73	87	300
160	130	66	81	277
170	120	59	76	256
180	110	52	69	231
190	100	45	63	208
200	90	38	57	185
210	80	31	51	162
220	70	24	45	139
230	60	17	39	116
240	50	10	33	93
250	40	3	26	69
260	30	0	20	50
270	20	0	14	34
280	10	0	7	17
290	2	0	1	3
300	0	0	0	0

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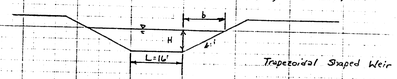
Project Pine Bay Estates
Item Design Water Surfaces (100-yr.)

1. Check DWS_{no} in lake

Static Pool 1246.20 MSL
Internal Drainage = $\frac{9.7 \text{ Ac-Ft}}{34.5 \text{ Ac.}}$ = 0.28'
100-yr. Rainfall Directly on Lake = 7.9" = 0.66'
Drainage from Ponding Area "C" = $\frac{74.59 \text{ Ac-Ft}}{34.5 \text{ Ac}}$ = 2.16'
(External Drainage)

DWS_{100} 1249.30 MSL

2. Check DWS_{100} in channel (emptying into lake)



Trapezoidal Shaped Weir

$Q = cLH^{3/2} + CzH^{3/2}$ where $Q = 375$ cfs
$c = 3.0$
$L = 16'$
$H =$ unknown
$C = 3.0$
$z = H/1 = 4.0$

$375 = (3.0 \times 16 \times H^{3/2}) + (8.0 \times 4.0 \times H^{3/2})$
$375 = 48\ H^{3/2} + 12.H^{3/2}$
$375 = 60\ H^{3/2}$
$H^{3/2} = 375/60 = 6.25$
$H = 6.25^{2/3}$
$H = 3.39'$

Channel Provides 3' Freeboard - 25-yr
" 2.61' " - 100-yr