

December 3, 1984

City of Wichita
Dept. of Engineering
City Hall - Seventh Floor
455 N. Main St.
Wichita, Ks. 67202

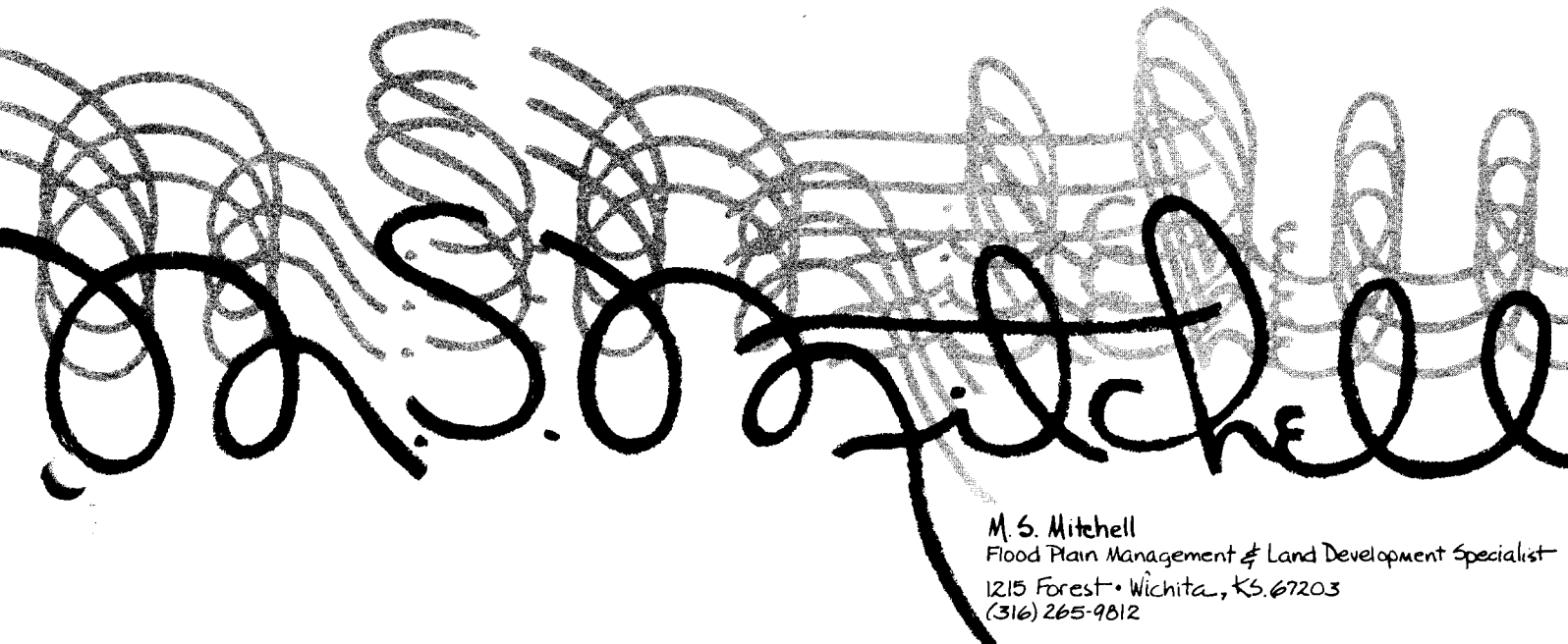
Att'n: Mr. Don Schneider, P.E.

Subject: Proposed Encroachment
in Platted Floodway -Walnut
Creek Addition

Dear Don:

This report describes my analysis of the effect of a proposed swimming pool and tennis court encroachment in the platted floodway of subject addition. The developer retained the services of Planning Development Services to design those facilities along with other improvements and amenities to be located within the platted floodway. Because the pool-courts encroachment will require a significant change in the grading plan approved along with the subdivision plat, PDS asked that I analyze its effect on the 100 year flood profile which I had calculated for PEC as a condition of approval of the Walnut Creek and Whistling Walk Estates 4th Additions. PDS provided a proposed Grading Plan showing the location and elevation of the encroachment together with a modified geometric model and cross-section H to accommodate the proposed fill. Another feature of the PDS amenities plan is the connection of two abandoned Cowskin Creek meanders to form a small lake.

(con't.)



M. S. Mitchell
Flood Plain Management & Land Development Specialist
1215 Forest • Wichita, KS. 67203
(316) 265-9812

When I did the Floodway analysis for the plats, I did not show the Cowskin meanders on Sections H or J because, by themselves, they did not contribute to the effective flow capacity of Cowskin Creek for the 100 yr. flood discharge - and I wanted the developer to have the freedom to fill or modify all, or portions, of them without having to prove that such action would not raise the 100 year frequency flood. Now that they are to be connected I have made the HEC-2 program calculations for two conditions at Sections H; one with the pool-courts fill as an encroachment but no lake excavation (Plan 5A), and the other with the ~~maximum~~ lake width considered (Plan 5B). The calculations are begun at Section G where there is no change from the plat encroachment plan (Plan 4A), run thru Section H for each case described above and tie in to Section I (no effect of lake considered).

In the process of locating the proposed pool-courts encroachment on the model and sections I discovered that Section H of the plat sections showed the Cowskin Creek channel to be plotted exactly 100 feet west (right bank side) of its actual location. The correction was made and new calculations made for Sections G thru I with only minor differences in the 100 year profile. During preliminary discussions of the pool-courts plan the County DPW staff suggested that the developer consider raising the pool-courts fill to just above the 10 year frequency flood and permit inundation by less frequent floods. To evaluate that suggestion I ran a HEC-2 profile for the 10 year flood (lake not considered) using the discharge (6570 cfs) from the Flood Insurance Study. This exercise indicated that at Section H there would be only 2.5 feet difference between the two floods and I recommended that the fill be placed to provide three feet of freeboard above the 100 year flood.

The HEC-2 program calculations for the Flood Insurance Study discharge of 15050 cfs show that within the accuracy accepted for such studies there is no effect on the 100 yr. flood profile by adding the pool-courts fill in the platted floodway whether or not the lake is considered to add to the effective flow capacity of Cowskin Creek. Exhibits attached to this letter are:

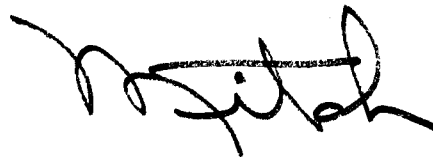
- Exhibit 1 - Geometric Model submitted for Walnut Creek Add.
- 2 - HEC-2 calculation sheet 2 for Walnut Creek Add.
- 3 - Coordinates for correcting Section H.

(con't.)

- Exhibit 4 - Section Properties for correcting Section H.
- 5 - HEC-2 calculations for correcting Section H.
- 6 - HEC-2 calculations for 10-year flood profile
(2 pages).
- 7 - Plan of Walnut Creek Addition showing
Section H, proposed pool-courts encroach-
ment and lake.
- 8 - Enlarged plan for pool, tennis courts and
lake.
- 9 - Coordinates for Section H Encroachment
Plans 5A and 5B.
- 10 - Section Properties for Section H, Plans 5A & 5B.
- 11 - HEC-2 calculations for Sections G, H & I,
Plan 5A.
- 12 - HEC-2 calculations for Sections G, H & I,
Plan 5B.

Please review the letter and exhibits and call me if you have any questions or want additional materials to support the requested approval. If you are going to require prior or concurrent written approval of the County DPW or Division of Water Resources - Kansas State Board of Agriculture, please advise by letter so that I can prepare additional exhibits and transmittals without further delay.

Yours truly,

A handwritten signature in black ink, appearing to be 'M. Smith', written in a cursive style.

enclosures

MSM/e

BACKWATER COMPUTATION WORK SHEET

Project: Cowskin Creek - Encroachment Plan 4A
119th Street West to 15th Street (Walnut Valley and
Whistling Walk Estates 4th Additions)

Page 3 of 4

Computed by: MSM Date Mar 1983

Checked by: MSM Date Mar 1983

Q = 15050 cfs = 100 Yr FIS n = .035

File or Sec. No.	Reach Length	Est. W.S. Elev.	Area	2/3 r	K	$\frac{K^2}{10.3}$	Sp	h _f	K _{VA} 510 ²	α	V	$\frac{\alpha V^2}{2g}$	h _{sv}	h _o	H	Comp. Elev.
Sec F	436	1336.2	2896		474.0		1.00098	.38		1.27	5.20	.53	0	0	.38	1336.13
Sec G		1336.5	1751	2.31	17.2				165							
			1548	4.54	298.4				11086							
			1950	2.94	243.4				3793							
	199		3673		559.0	516.5	.00085	.17	15044	1.16	4.10	.30	.23	.02	.42	1336.55
Sec H		1337.0	288	1.85	22.6				139							
			1436	4.71	287.2				11483							
			4638	3.26	600.6				10171							
	679		6362		912.3	735.6	.00042	.29	21794	1.16	2.37	.10	.20	.02	.52	1337.07
Sec I		1337.1	0	0	0				0							
			1598	4.05	274.8				9124							
			3450	2.30	386.9				3212							
	254		5048		611.7	702.0	.00037	.10	11337	1.26	2.98	.17	.07	.02	.05	1337.12
Sec J		1337.2	0	0	0				0							
			1423	3.90	257.6				4760							
			4579	3.16	614.3				11058							
	212		6002		250.0	130.7	.00042	.07	17715	1.02	2.50	.10	.07	.01	.17	1337.29

Walnut Valley & Whistling Walk Estates 4th. Additions
 Encroachment Plan 4A & Natural Sections
 CORRECTION FOR LOCATION OF CHANNEL ON SECTION H

SECTION H

Left overbank

37.
 37.
 10180.
 37.
 10195.
 33.5
 10195.
 35.5
 10180.
 0.
 2.
Lob
Area 37.5
 CLF
 37.5
 19.WP
 2.5
 2.5
 0.67
 1.847650423 R2/3

SECTION H

Channel

1.
 37.
 37.
 10195.
 37.
 10335.
 31.5
 10335.
 23.5
 10270.
 21.
 10265.
 21.
 10255.
 33.5
 10195.
 0.
 2.
Ch
Area 1436.25
 142.WP
 10.11443662
 10.11443662
 0.67
 4.713146478 R2/3

SECTION H

Right overbank

37.
 37.
 10335.
 37.
 11310.
 31.9
 11310.
 31.5
 10335.
 0.
 2.
Rob
Area 5167.5
 5167.5
 975.WP
 5.3
 5.3
 0.67
 3.056784571 R2/3

CONSKIN CREEK - 119th to 13th
 Section Properties - Encroachment Plan 4A Correction

Section ID	W.S. Elev.	Area	W.P.	P	P ^{2/3}	K × 10 ⁻³	%KT	Q _{us}	Q _{ds}	\bar{Q}	l	$l\bar{Q}$	$\Sigma \frac{l\bar{Q}}{Q} = L$
From Encroachment Plan 4A													
G	1336.5												
Lob		175	50	3.5	2.31	17.2	3	462	1695	1079	170	183,356	} 199
Ch		1548	162	9.55	4.54	298.4	53	8034	8976	8505	190	1,615,959	
Rob		1950	390	5	2.94	243.4	44	6554	4379	5466	220	1,202,606	
		3673				559.0						3,001,921	

Corrected X-Section

H	1337.0												
Lob		27.5	15	2.5	1.85	2.9	0.3	46	462	254	760	193,079	} 674
Ch		1436	142	10.11	4.71	287.2	30	4495	8034	6264	840	5,262,055	
Rob		5168	975	5.3	3.06	671.4	69.7	10,509	6554	8532	650	4,692,379	
						961.5						10,147,513	

I	1337.1	0	0	0	0	0	0	0	46	23	270	6210	} 254
		1598	198	8.07	4.05	274.8	45	6761	4495	5628	260	1,463,280	
		3450	995	3.47	2.30	336.9	55	8289	10,509	9398	250	2,349,750	
												3,819,240	

Encroachment Plan 5

H	1337.0	VOID - See Plan 5A & 5B											
Lob		0	0	0	0	0	0	0	462	231	760	175,560	} 687
Ch		1666	177	9.41	4.49	317.6	39	5901	8034	6968	840	5,852,730	
Rob		3790	715	5.3	3.06	492.4	61	9149	6554	7851	550	4,318,365	
												10,346,595	

Plan 4A Section

I	1337.1												
Ch		1598	198	8.07	4.05	274.8	45	6761	5901	6331	260	1,646,060	} 254
Rob		3450	995	3.47	2.30	336.9	55	8289	9149	2919	250	2,179,750	
												3,825,810	

COWSKIN CREEK

Walnut Valley and Whistling Walk Estates 4th Additions

ENCROACHMENT PLANS 5A & 5B for Tennis Courts and Swimming Pool

SECTION H

CHANNEL
Plan 5A & B

Elev	1.
	37.
	37.
	10180.
	37.
	10370.
	31.5
	10370.
	31.5
	10335.
	23.5
	10270.
	21.
	10265.
	21.
	10255.
	33.5
	10195.
	35.5
	10180.
	0.
	2.
Area	1666.25
	1666.25
	+
	CLR
	1666.
	+
	192. WP
	=
	8.677083333 R
	8.677083333
	YX
	0.67
	=
	4.253147308 R2/3
	CLR

RIGHT OVERBANK
Plan 5A

Elev	1.
	37.
	37.
	10555.
	37.
	11310.
	31.9
	11310.
	31.
	10840.
	32.
	10630.
	31.5
	10555.
	0.
	2.
Area	4157.25
	4157.
	CLR
	+
	755. WP
	=
	5.505960265 R
	5.505960265
	YX
	0.67
	=
	3.135870783 R2/3

RIGHT OVERBANK
Plan 5B

Elev	1.
	37.
	37.
	10555.
	37.
	11310.
	31.9
	11310.
	31.
	10840.
	20.
	10310.
	20.
	10660.
	32.
	10630.
	31.5
	10555.
	0.
	2.
Area	6227.25
	6227.
	CLR
	+
	759. WP
	=
	8.204216074 R
	8.204216074
	YX
	0.67
	=
	4.096423512 R2/3
	CLR

Cowskin Creek - 119th to 13th

Section Properties - Encroachment Plans 5A & B

Section ID ^{W.S. Elev} Area W.P. R R² Kx10⁻³ %KT Qus Qds \bar{q} λ $\lambda \bar{q}$ $\sum \frac{Q}{\bar{q}} = L$

From Encroachment Plan 4A

G	1336.5												
Lob	175	50	3.5	2.31	17.2	3	462	1695	1079	170	183,356	} 199	
Ch	1548	162	9.55	4.54	298.4	53	8034	8976	8505	190	1,615,959		
Rob	1950	390	5.0	2.94	243.4	44	6554	4379	5466	220	1,202,606		
	3673				559.0						3,001,921		

From Encroachment Plan 5B

H	1337.0											
Lob	0	0	0	0	0	0	0	462	231	760	175,560	} 662
Ch	1666	192	8.68	4.25	300.6	22	3268	8034	5651	840	4,746,287	
Rob	6227	759	8.20	4.10	1084.0	78	11,782	6554	9168	550	5,042,500	
											9,964,747	

From Encroachment Plan 4A

I	1337.1											
Lob	0	0	0	0	0	0	0	0	0	0	0	} 753
Ch	1598	198	8.07	4.05	274.8	45	6761	3268	5015	260	1,303,770	
Rob	3450	995	3.47	2.30	336.9	55	8289	11,782	10,035	250	2,508,875	
											3,812,645	

From Encroachment Plan 5A

H	1337.0											
Lob	0	0	0	0	0	0	0	462	231	760	175,560	} 678
Ch	1666	192	8.68	4.25	300.6	35	5293	6761	6027	840	5,062,575	
Rob	4157	755	5.51	3.14	554.2	65	9757	8289	9023	550	4,962,717	
					854.8						10,200,853	

I	1337.1											
Lob	0	0	0	0	0	0	0	0	0	0	0	} 254
Ch	1598	198	8.07	4.05	274.8	45	6761	5293	6027	260	1,567,020	
Rob	3450	995	3.47	2.30	336.9	55	8289	9757	9023	250	2,255,750	
											3,822,770	