Pawnee Mesa file

MEMO

PROFESSIONAL ENGINEERING CONSULTANTS

TO: Ad Hoc Drainage Committee
File

PROJECT NO.

PROJECT: Drainage Criteria

COPIES TO: Wichita Area Consultants

ATTN:

DATE: September 10, 1979

FROM: W.H. Keltner

REFERENCE: Meeting at Professional Engineering Consultants Converence Room on September 6, 1979

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

Those in attendance:

Max Hubble - Cambell and Castle
Kenny Hill - Reiss and Goodness
Ken Bengston - VDHS
Bill Keltner - PEC, P.A.

Two major items were discussed.

A. The first, was what general approach to setting of criteria was the Wichita-Sedgwick County area should be taken. It was decided that those parties interested in contributing to the proposed standards should prepare basic design criteria that their office now uses, and present same at the next scheduled committee meeting. For the purposes of segregating the data, the following categories were suggested:

1. Hydrology
2. Storm Drainage Conduits - Hydraulics
3. Catch Basins/Inlets
4. Open Channels
5. Detention/Retention

It was agreed, as a basis for initiating the collection of data, that items 1, 2, and 3 would be reviewed at the next meeting. Items 4 and 5 would be considered at future meetings.

B. The second item was an open discussion of the feelings of the Wichita area consultants over the scheduled appearance of an influential Wichita area developer before the City Commission next Tuesday (September 11, 1979) regarding reduced design standards for drainage improvements in new sub-divisions. The major concern was the apparent thrust of Technical criteria for a particular project into the policital negotiation area. Mr. Hubble provided some valuable background information regarding the particular developers intent, and his firms delicate position in the proceedings. It was decided that Keltner

would attempt to prepare a short statement for possible presentation to the Wichita City Commission. This statement would be reviewed by the area Consultants on Monday September 10, 1979, and, if presented to the City would be "signed" by all consultants concurring with its content.

The next meeting was set for 7:00 P.M. at the Professional Engineering Consultants office (1440 East English) on Thursday, Setpember 13, 1979.

A written summary of all committee meetings will be forwarded to the following:

Professional Engineering Consultants, P.A.
1440 East English
Wichita, Kansas 67211 262-2091

Campbell and Castle, P.A.
4801 Irving
Wichita, Kansas 67209 942-8144

Delameter Freund & Associates, P.A.
Century Plaza Building
Wichita, Kansas 67202 263-6121

Moehring and Associates
432 South Hydraulic
Wichtia, Kansas 67211 263-8291

Poe and Associates, Inc.
1720 East Morris
Wichita, Kansas 67211 262-1497

Wilson and Company Engineers and Architect
218 North Waco
Wichita, Kansas 67202 264-9175

VanDoren-Hazard-Stallings Architect Engineers
260 North Rock Road
Wichita, Kansas 67206 686-7303

K.O. Taylor Consulting Engineer
1542 South St. Francis
Wichita, Kansas 67211 264-0341

Reiss and Goodness Engineers
2160 West 21st Street
Wichita, Kansas 67204 832-0213

M.S. Mitchell
1215 Forrest
Wichita, Kansas 67203 265-9812

Engineering Testing Company
535 North Washington
Wichita, Kansas 67211 265-8553

All of the above firms are encouraged to participate in the committee meetings, to provide review comments, and finally to support the agreed on procedures and criteria.

STORM WATER MANAGEMENT SYSTEMS IN DEVELOPING URBAN AREAS ARE ESSENTIAL FOR SEVERAL REASONS. LIFE AND PROPERTY NEED TO BE PROTECTED FROM THE RARE SEVERE STORM. PEOPLE ARE UNWILLING TO TOLERATE THE INCONVENIENCE, WHERE IT CAN BE AVOIDED, OF THE USUAL STORM. LOWER STREET MAINTENANCE COSTS ARE A BENEFIT OF POSITIVE DRAINAGE.

USE OF STREETS FOR DRAINAGE AND FOR TRAFFIC ARE COMPATIBLE UP TO A POINT, BEYOND WHICH DRAINAGE MUST BE SUBSURVIENT TO TRAFFIC NEEDS.

FROM AN ECONOMIC STANDPOINT THE DESIGN CRITERIA CAN BE BASED ON THE COST OF THE STORM SEWER SYSTEM AS TO THE DIRECT AND INDIRECT COSTS OF DAMAGE AND INCONVENIENCE TO PROPERTY OVER A LONG PERIOD OF YEARS.

DESIGN STORMS USED BY THE CITY OF WICHITA ARE BASED ON LAND USE

THE DESIGN FREQUENCY STORM IS TWO (2) YEARS FOR RESIDENTIAL AREAS, FIVE (5) YEARS FOR COMMERCIAL AND INDUSTRIAL AREAS AND TEN (10) YEARS FOR CBD.

USE SLIDE USE SLIDE USE SLIDE USE SLIDE USE SLIDE

STORM WATER FROM THESE STORMS IS CARRIED ON THE PAVEMENT TO THE CAPACITY OF THE PAVEMENT, AT THAT POINT IT IS TAKEN UNDERGROUND IN A STORM WATER SEWER.

THE CITY'S CRITERIA REQUIRES THAT THE ONE HUNDRED (100) YEAR DESIGN STORM BE KEPT ON PUBLIC PROPERTY. MAINTAINING FLOOD WATER WITHIN PUBLIC RIGHT-OF-WAY WHERE OBSTRUCTIONS CAN BE CONTROLLED WOULD BE LESS HAZARDOUS TO LIFE AND CAUSE LESS PROPERTY DAMAGE.

ADEQUATE HANDLING OF SURFACE WATER IS A CRITICAL PART OF RESIDENTIAL STREET DESIGN. THE CURRENT REGULATIONS FOR SUBDIVISION WILL SIGNIFICANTLY IMPROVE THE PERFORMANCE OF STREETS AND INCREASE THEIR SERVICE LIFE.

DISCUSS: VALLEY GUTTERS

CONCRETE GUTTERS

SNOW AND ICE

SUBGRADE FAILURE

THE CURRENT SUBDIVISION REGULATION REQUIRES A MINIMUM SLOPE OF .32% ON RESIDENTIAL STREETS. THIS IS A SLOPE (MINIMUM) OF 4" IN ONE HUNDRED (100) FEET. THIS IS A KEY FACTOR IN PAVEMENT DESIGN. A SLOPE OF 4" IN ONE HUNDRED (100) FEET IS CONSIDERED THE MINIMUM TO AVOID SHALLOW PONDS IN THE GUTTERS AT THE TIME OF CONSTRUCTION.

ANY SLOPE GREATER THAN 4" PER ONE HUNDRED (100) FEET WILL PROVIDE MORE POSITIVE DRAINAGE. ANY SLOPE LESS THAN 4"/100 FT. IS A MOVE TO THE DIRECTION OF TROUBLE WITH THE RUNOFF FROM STORMS AND LAWNS AT FLAT SLOPES VERY LITTLE DIRT OR ICE WILL OBSTRUCT THE GUTTERS AND BACK UP WATER. ONE OF THE MOST COMMON CITIZEN COMPLAINTS IS PONDING OF WATER IN GUTTERS ALONG THE CURB AND PARTICULARLY IN DRIVE APPROACHES.

STORM WATER RUNOFF DESIGN IS SUBJECT TO MANY VARIABLES. NO TWO STORMS ARE EXACTLY ALIKE, AND NO TWO DRAINAGE BASINS ARE ALIKE, THEREFORE DESIGN CANNOT BE PRECISE. A COMPARISON OF CITIES IN THE MIDWEST INDICATES THAT WICHITA IS LIBERAL IN ITS DESIGN OF STORM WATER SYSTEMS AND PAVEMENT SLOPES.

PAGE 36

THE MANUAL PUBLISHED BY THE URBAN LAND INSTITUTE, THE ASCE, AND THE NATIONAL ASSOCIATION OF HOME BUILDERS CALLED RES. STORM WATER MANAGEMENT ETC.

LEGAL IMPLICATIONS OF DRAINAGE

file

10 September 1979

Pawnee Mesa

Mr. Ray Bruggeman, P.E.
Director of Public Works
City of Wichita
City Hall
455 North Main St.
Wichita, Kansas 67202

Re: Drainage Criteria

Dear Mr. Bruggeman:

As you are aware, the licensed design consultants of this City have an Ad Hoc committee working on basic design criteria for storm drainage, which will soon be presented to the City and County Departments of Public Works for review and negotiation. It is our hope that this data will more fully define the procedures and information now in use, and provide for shorter time intervals involving preparation and review of the drainage concept and drainage plans during the platting process. Perhaps, once this criteria is agreed on, appropriate design standards and procedures for all future improvements in the Wichita, Sedgwick County Area can be presented to the governing bodies for concurrance and adoption. Only when all design groups, whether they be Engineers in private practice, or those in public agencies, are utilizing the same basic design standards, can balanced and uniform improvements be assured in the developing subdivisions of this community.

In this regard, the Wichita area design consultants are concerned with the attempted political negotiation of technical drainage criteria by a local developer for his residential subdivision, now in the process of review by City Staff.

Recent news accounts have indicated that street grades in the proposed Pawnee Mesa subdivision have been requested to be reduced below the present accepted minimum of 0.32%. We have also noted that the developer of this particular area desires that no underground drainage conduits be required. We would like to point out that not only do these two requests combine to provide for increased depths of storm water runoff in the streets, they could very well serve to institute one more pocket of sub-standard drainage in our community, which, at some time in the future, the citizens at large would be requested to correct.

-continued-

We firmly believe that the present minimum street grade standards should not be reduced, that for areas ten (10) acres or larger an appropriate size storm should be transported by flow in a designed conveyance system to an acceptable receiving stream, and further that the major storm should be routed through all planned developments within public right-of-way in a manner that provides each future lot owner uniform access to, and use of, his property.

Please be advised that to these ends we will be pleased to assist and support you in any way possible, and that representatives from several of our firms will be present at the City Commission meeting during discussion regarding the Pawnee Mesa subdivision on Tuesday, September 11, 1979.

This statement is concurred with by the following design consultants:

Professional Engineering Consultants, P.A.
by W.H. Keltner, Vice President
1440 East English
Wichita, Kansas 67211

Moehring and Associates
423 South Hydraulic
Wichita, Kansas 67211

VanDoren-Hazard-Stallings Architect-Engineers
260 North Rock Road
Wichita, Kansas 67206

WICHITA—SEDGWICK COUNTY
W.SC
METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4421

September 12, 1979

Mr. Edmund Learned
Attorney-at-Law
300 W. Douglas
Wichita, Kansas 67202

Re: S/D 79-20 - Final plat of Pawnee Mesa Addition - Appeal of drainage requirements

Dear Mr. Learned:

On September 11, 1979, the Board of City Commissioners considered your appeal of the drainage standards being required for Pawnee Mesa Addition. The action of the Commission was: "Uphold the current City drainage policy and require the applicant to comply with the drainage requirements prior to the plat being brought before the City Commission for final approval."

Therefore, it will be necessary for you to continue to work with the City Engineer's office to arrive at a drainage plan which complies with the established drainage criteria. At such time as we have received word from the City Engineer's office that a drainage plan has been approved and after all other conditions of plat approval as specified in our letters of August 10 and August 31 have been satisfactorily completed, we will forward the plat of Pawnee Mesa to the City Commission for final approval.

Please call if you have any questions regarding this matter.

Sincerely yours,

Louise Olivares

Louise Olivares
Senior Planner

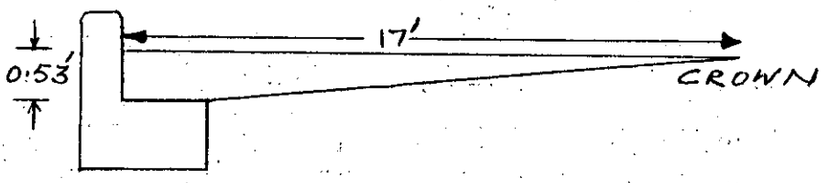
LO:bh

cc: Willard W. Garvey, President, Builders, Inc., 300 W. Douglas, 67202
Lawrence Wells, Architect, 254 Laura, 67211
Campbell and Castle, Engineers, P.O. Box 9262, 67277
Dean Sellers, City Engineering

FILE NO. PROJECT 7849 | BELL & CASTLE, P.A. ENGINEERS | CLIENT Builders Inc | DATE 10-4-79 BY KAPIL CHKD SH OF

STORM WATER CARRYING CAPACITY OF STREETS FOR TWO YEAR AND HUNDRED YEAR STORMS.

A. TWO YEAR STORM.



Wetted Area $= 2\left(\frac{1}{2} \times 0.53 \times 17\right) = 9\ ft^2$ ✓

Wetted Perimeter $= 2(0.53 + 17) = 35.06\ ft$ ✓

Hydraulic Radius $= \frac{9}{35.06} = 0.2567$ ✓

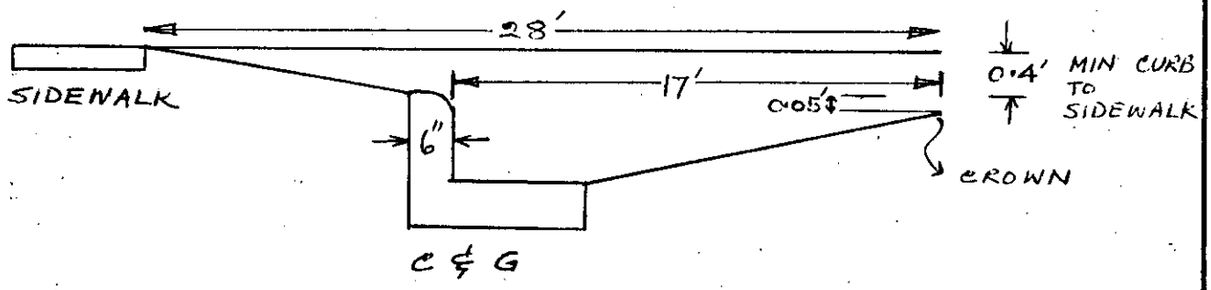
$$\text{Velocity} = \frac{1.486}{0.016}(0.2567)^{2/3} S^{1/2}$$

$$V = 37.496\, S^{1/2}$$ ✓

$$Q_2 = V \cdot A = 37.496\, S^{1/2} * 9$$

$$\boxed{Q_2 = 337\, S^{1/2}}$$ ✓

B. ONE HUNDRED YEAR STORM



$$\text{Welted Area} = 2\left[\left(\frac{28+17.5}{2} * 0.4\right) + \left(\frac{17.5+17}{2} \times 0.05\right) + \left(0.53 \times \frac{17}{2}\right)\right]$$

$$= 28.07 \text{ ft}^2$$

$$\text{Welted Perimeter} = 2(10.5 + 0.5 + 0.58 + 17)$$

$$= 57.16$$

$$\text{Hydraulic Radius} = \frac{28.07}{57.16} = 0.491$$

$$\text{Velocity} = \frac{1.486}{0.016} \times (0.491)^{2/3} A^{1/2}$$

Should use a combined n for paved st & grassed R/W. $n \approx .021$

$$V = \frac{57.789}{40.05} A^{1/2}$$

$$Q_{100} = V \cdot A$$

$$Q_{100} = \frac{57.789}{40.05} A^{1/2} * 28.07$$

$$\boxed{Q_{100} = \frac{1622}{1236} A^{1/2}}$$

Use $n = .03$ and no reduction factor

$$Q_{100} = 900 \times S^{1/2}$$

at $S = .32\%$ $Q_{100} \approx 51$ cfs

APPLICATION OF REDUCTION FACTORS TO Q_2 AND Q_{100}

SLOPE	RF	Q_2'	Q_{100}'
0.0032	0.42	8.0 ✓	38.6
0.0040	0.50	10.7 ✓	52.5
0.0045	0.575	13.0 ✓	62.7

(1) IN THIS DESIGN REPORT Q_2' AND Q_{100}' ARE USED TO REPRESENT Q_2 AND Q_{100} WITH R.F. MODIFICATION.

(2) ONLY Q_2' IS USED FOR FLOW UPTO CROWN

(3) Q_{100} IS USED FOR DETERMINING FLOW WITHIN RIGHT OF WAY AND IS USED FOR DESIGN.

$$\frac{270 \times a}{43560} \times 0.5 \times 4.06 = .8$$

a = 635 ft

$\cong$ 640 ft. ✓

Maximum length before which water can travel on street of 0.32% slope = 640 ft.

Therefore provide storm sewer inlets every 640 ft or increase the slope of the street to accomodate 2 yr storm.

$\frac{640 \times 270}{43560} = 4 A_c$ O.K.

$Q_2 = 4 \times .5 \times 4.06 = 8.1$ cfs.

FILE NO.
PROJECT 7849

I.L. & CASTLE, P.A. ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL-CHKD
SH OF

AREA # 2 & 3 6.7Ac $Q_2 = 13.7$ $Q_{100} = 30.2$

PIPE	DIA inch	LENGTH Ft.	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft	Qcap.
	24"			.004	out	138.5	
4-out	33"	140	31	.005			37.4
					4	139.2	
						139.1	
	24"			.003		139.3	
3-4	33"	35	25	.004	3	139.9	33.4
	21"			.0032		140.0	
2-3	24"	115	10	.0027	2	140.2	11.8
	15"			.005		140.75	
1-2	18"	35	10	.012	1	140.6	11.5

100yr flow?

FILE NO.
PROJECT 7849

...L & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL-CHKD
SH OF

AREA # 4 8.2 Ac Q_2 = 16.7 cfs Q_{100} = 36.8 cfs

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft	C&C Qcap.	COW Cap.
					out	138.5		
8-out	30" 36	155	36.4	.002 .0045			44.7	18.3
					8	139.2 138.8		
7-8	24" 36	35	30	.0035 .0036	7	139.4 139.5	40.0	13.0
6-7	24 ✓	560	8.5	.002 ✓	6	140.6	10.1	10.1
5-6	15" 12	35	7	.005 .04	5	142.0 141.6	7.1	4.6

FILE NO.
PROJECT 7849

ELL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL-CHKD
SH OF

AREA # 5 12.7Ac $Q_2 = 25.8$ $Q_{100} = 57.0$

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft	Qcap.
				.004	out-	138.5	20.1
15-out	30	30	54	.0024	15	138.6	c
				.003			
14-15	15	35	7	.02	14	139.3	9.1
				.0042		141.1	
13-15	27	540	18	.0047	13	141.1	21.2
				.003			
12-13	15	35	3.3	.005	12	141.8	4.6
				.002			
11-13	27 24"	470	12.8	.0028 .0038	11	142.2	16.4
	15"			.003			
10-11	12	35	3.5	.018	10	142.9	4.8
29 lots							
				.012			
9-11	15	45	6.5	.014	9	142.9	7.6

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LL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA #6 7.4 Ac $Q_2 = 15.1$ $Q_{100} = 33.4$

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					out	139.0
20-out	36	140	34.2	.004	20	139.7
19-20	36 24"	35	34.2	.004 .0025	19	139.9
18-19 18-20	21 15	35	8	.0034 .003	18	140.7
17-19	21" 27	550	8.5	.0025 .001	17	140.5
16-17	15" 12	35	3.7	.004 .018	16	141.2

FILE NO.
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LL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA #7 & 8 DA = 10.8 Ac Q_2 = 22 cfs Q_{100} = 48.7

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
				.0029	out	139.2
27-out	36 30"	140	50	.0035	27	139.7
26-27	36	35	39	.0048	26	139.9
25-26	27	35	25	.0095	25	140.3
24-25	24	290	9	.0024	24	141
23-24	12	35	4	.02	23	141.7
22-26	21	360	9	.0044	22	141.5
21-22	12	35	3.7	.02	21	142.2

FILE NO.
PROJECT 7849

L & CASTLE, P.A. ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA # 9, 10 & 11 DA = 19.6 Ac Q_2 = 39.8 Q_{100} = 88

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					OUT	139.5
37-out	27 24	36	(39)	.024		
					37	140.5
32-37	27 24	35	30	0.02	32	142.2
36-out	36 30	30	(44)	.006	36	139.7
35-36	30	40	33	.01	35	140.1
31-35	27	255	18	.0048	31	141.4
30-31	12	40	4.5	.022	30	142.2
29-31	21	230	9	.0044	29	142.4
28-29	12	35	4.5	.022	28	143.8
34-36	21	290	9	.0044	34	141.0
33-34	12	35	4.5	.03	33	142.1

FILE NO.
PROJECT 7849

...LL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA #12 & 13 DA = 12.84C $Q_2 = 26$ $Q_{100} = 57.6$

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					out	139.2
44-out	42	140	57.2	.0044		
					44	139.8
43-44	42	55	45	.0029	43	140
42-43	21	40	17	.016	42	140.7
41-43	21	450	8.5	.004	41	142
40-41	15	35	4.0	.005	40	142.5
39-43	21	450	8.5	.004		142
38-39	15	35	4	.005		142.5

FILE NO.
PROJECT 7849

ELL & CASTLE. P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA #14 DA = 8.1 Ac Q_2 = 16.5 Q_{100} = 36.5

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
49-out	36	140	35	.0042	out	139
					49	139.6
48-49	36	55	35	.0036	48	139.8
47-48	18	35	18	.04	47	141.3
46-48	24	530	8.5	.002	46	140.9
45-46	12	35	4	.018	45	141.5

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ELL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA # 15 DA = 10 Ac Q_2 = 20 Q_{100} = 44.5

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
55-out	30	30	40	.014	out	138.5
					55	138.9
54-55	27	45	20	.006	54	139.2
53-54	27	320	17.5	.0046	53	140.7
52-53	12	35	4	.018	52	141.4
51-53	24	600	8	.002	51	141.9
50-51	12	35	4	.018	50	142.7

FILE NO.
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ELL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA # 16 & 17 DA = 14.9Ac Q_2 = 30.2 Q_{100} = 66.8

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					out	138.5
62-out	42	140	57	.0046		
					62	139.2
61-62	30	40	18	.0028	61	139.4
60-61	24	40	9	.0022	60	139.6
59-62	30	580	17.5	.0027	59	140.8
58-59	15	35	4	.005	58	141
57-59	21	580	8.5	.003	57	142.6
56-57	12	35	4	.018	56	143.3

FILE NO. PROJECT 7849

ELL & CASTLE, P.A. ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA # 18 DA = 11.4 Q_2 = 23 Q_{100} = 51.2

PIPE	DIA inch	LENGTH Ft	DISCHARGE CFS	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					out	138.5
70-out	42	30	42	.003	70	138.6
69-70	30	35	24	.005	69	138.8
68-69	30	400	24	.005	68	140.8
67-68	12	35	4	.018	67	141.5
66-68	27	420	17	.0044	66	141.7
65-66	12	35	4	.018	65	142.4
64-65	24	630	9	.002	64	143.0
63-64	12	35	4	.018	63	143.7

FILE NO.
PROJECT 7849

ELL & CASTLE. P.A.
ENGINEERS

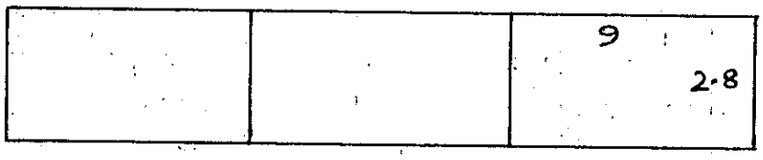
CLIENT Builders Inc

DATE 10-4-79
BY KAPIL CHKD
SH OF

AREA #19 DA = 3.7Ac Q_2 = 7.5 Q_{100} = 16.5 cfs

PIPE	DIA inch	LENGTH Ft	DISCHARGE cfs	SLOPE Ft/Ft	NODE	FLOW LINE ELEVATION Ft
					out	138.5
72-out	27" 30"	140	21	.004	72	139.1
71-72	24" 30"	35	12	.004	71	139.3

BOX STRUCTURE AT FIELDCREST



Wetted Perimeter $= \{2(9+2\cdot8)\}3 = 70\cdot8$ ft

Wetted Area $= 3(9\times2\cdot8) = 75\cdot6$ ft^2

Radius (hydraulic) $= 1\cdot067797$

Velocity $= \frac{232 \text{ cfs}}{75\cdot6 \text{ ft}^2} = 3\cdot06$ fps

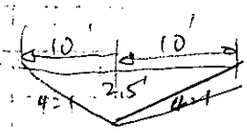
$$232 = \frac{1\cdot486}{0\cdot022} \times (1\cdot067797)^{2/3} \times A^{1/2}$$

$\therefore A = 0\cdot19\%$.

NOTE : n is chosen as 0·022 which extremely conservative value for box structure made of concrete.

$$H_W = 138\cdot5 + 3\cdot75 + 0\cdot15 + 0\cdot09 + 0\cdot11$$

$$= 142\cdot6 \text{ ft.}$$



Swale

$A = 25$ ft^2

$P = 20$

$Q = \frac{1.486}{.03}\left(\frac{25}{20}\right)^{2/3} 25 \times (S)^{1/2}$

$= 1437\, S^{1/2}$

S, %	.1	.2	.3	.4	.5
Q, cfs	45	64	79	91	102

BUILDERS, INC.

1000 PARKLANE / WICHITA, KANSAS 67218

October 11, 1979

Mr. Yash Desai
Public Works Department - Engineering
City Hall
455 N. Main Street
Wichita, Kansas 67202

Dear Yash:

I enjoyed our meeting yesterday afternoon and felt that we made good progress on achieving an acceptable drainage plan for Pawnee Mesa plat. Hope you were similarly encouraged. I made a note of some 14 points that were discussed that will require modification of the plan as submitted to you. They are listed below. Campbell and Castle Engineering will perform the necessary study to make these changes. Our target is to have the changes completed and back to you by Friday , October 19. If you, Paul Johnston, or your respective staff have additional comments which should be taken into account in modifying the plan, please let me know by return mail. Otherwise we will assume that these modifications will result in a drainage plan acceptable to the City staff.

The 14 points are as follows:

1. Drainage ditch on west side of 107th Street West should be designed to drain properly. There was concern expressed that the discharge pipes from the pond could interfere with proper ditch drainage.

2. Discharge pipes from pond should be positioned so that water is discharged into the natural drainage channel on the east side of 107th Street.

3. The following elevations were agreed to:
   top of dike 143.75
   Spillway 143.25 (although we recommend 142.75 due to potential backup of water in streets if spillway is at higher elevation)
   flood stage 142.25
   minimum pad elevations for houses within 3 tiers of lots from pond or drainage reserve: 145.5

4. The pipe shown discharging to the channel across Lot 6 Block G should be repositioned to discharge downstream rather than upstream.

5. All easements containing storm sewers should be labeled "drainage easement" rather than "utility easement".

6. The plan should indicate a barricade structure at the north end of Aztec Street across the upper end of the drainage channel.

7. Velocities in the drainage channel should be verified to assure a minimum of 2 feet/second.

8. No street grades should be less than .32%.

9. Headwall structures should be shown in the channel wherever discharge velocity exceeds 5 feet/second for a 2 year frequency storm.

10. Maximum allowable velocity for 100 year storm is 10 feet/second.

11. Provide list of pipe lengths by size and number of inlets. Inlets are assumed to handle 4 c.f.s. on a 2 year storm, 8 c.f.s. on a 100 year storm.

12. Replace 12 inch pipes with 15 inch, the minimum allowable.

13. Investigate the comparative cost of large pipes versus constructing swales and reducing pipe size on last 100 feet of pipes.

14. Pipe grades and cover should be based on alignment of top of pipes.

Please feel free to call if you have any questions.

Best Regards,

Alexander L. Dean
Manager, Land Development

cc: Paul Johnston, Flood Control office City Hall
Robert Castle, Campbell and Castle Engineering
Lawrence Wells

AD/lkm

CAMPBELL & CASTLE. P.A. ENGINEERS

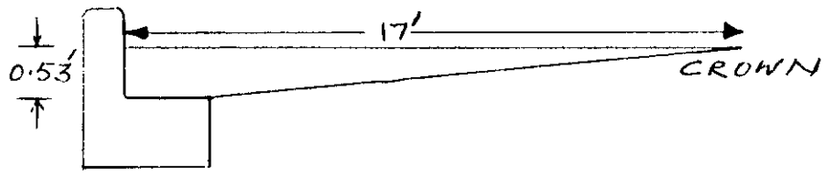
FILE NO.
PROJECT 7849.

CLIENT Builders Inc

DATE 10-29-79
BY KAPIL CHKD
SH OF

STORM WATER CARRYING CAPACITY OF STREETS FOR TWO YEAR AND HUNDRED YEAR STORMS.

A. TWO YEAR STORM.



Wetted Area $= 2\left(\frac{1}{2} \times 0.53 \times 17\right) = 9\ ft^2$

Wetted Perimeter $= 2(0.53 + 17) = 35.06\ ft$

Hydraulic Radius $= \frac{9}{35.06} = 0.2567$

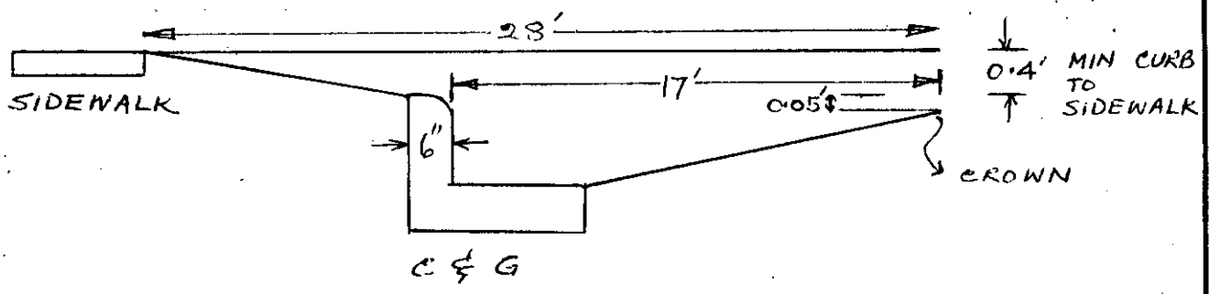
Velocity $= \frac{1.486}{0.016}(0.2567)^{2/3} S^{1/2}$

$V = 37.496\, S^{1/2}$

$Q_2 = V \cdot A = 37.496\, S^{1/2} * 9$

$$\boxed{Q_2 = 337\, S^{1/2}}$$

B. ONE HUNDRED YEAR STORM



$$\text{Welted Area} = 2\left[\left(\frac{28+17.5}{2} * 0.4\right) + \left(\frac{17.5+17}{2} \times 0.05\right) + \left(0.53 \times \frac{17}{2}\right)\right]$$

$$= 28.07 \text{ ft}^2$$

$$\text{Welted Perimeter} = 2(10.5 + 0.5 + 0.58 + 17)$$

$$= 57.16$$

$$\text{Hydraulic Radius} = \frac{28.07}{57.16} = 0.491$$

$$\text{Velocity} = \frac{1.486}{0.03} \times (0.491)^{2/3} \Delta^{1/2}$$

$$V = 30.82 \Delta^{1/2}$$

$$Q_{100} = V \cdot A$$

$$Q_{100} = 30.82 \Delta^{1/2} * 28.07$$

$$\boxed{Q_{100} = 865 \Delta^{1/2}}$$ INCLUSIVE OF REDUCTION FACTOR

$Q_{100} = 49$ cfs @ $\Delta = 0.0032$

FILE NO.
PROJECT 7849

CAMPBELL & CASTLE, P.A.
ENGINEERS

CLIENT Builders Inc

DATE 10-4-79
BY KAPIL SH
CHKD
OF

APPLICATION OF REDUCTION FACTORS TO Q_2

SLOPE	RF	Q_2'	
0.0032	0.42	8.0	each gutter 4 cfs. O.K.
0.0040	0.50	10.7	
0.0045	0.575	13.0	

(1) IN THIS DESIGN REPORT Q_2' IS USED TO REPRESENT Q_2 WITH R F MODIFICATION.

(2) ONLY Q_2' IS USED FOR FLOW UPTO CROWN

$$\frac{270 \times Q}{43560} \times 0.5 \times 4.06 = 8$$

$$Q = 635 \text{ ft}$$
$$\cong 640 \text{ ft}.$$

Maximum length before which water can travel on street of 0.32% slope = 640 ft.

Therefore provide storm sewer inlets every 640 ft or increase the slope of the street to accomodate 2 yr. storm.

TABLE REPRESENTING LINEAR FEET OF DIFFERENT PIPE DIAMETERS, NUMBER OF INLETS AND MANHOLE REQUIREMENTS FOR DIFFERENT SUB AREAS AND COST ESTIMATE

Pipe Diameters	Sub Areas 2,3	4	5	6	7,8	9,10,11	12,13	14	15	16,17	18	19	Total	Cost Per Unit	Extension
15"		40	105	35	70	110	35	35	70	105	105		710 ✓	25.00	17,750.00
18"	35	~~595~~ 35	~~75~~ 40	35		550	35	40		670		35	~~2035~~ 1475	27.00	54,945.00
21"		600		550	685		1020	670	580	45	680		~~4230~~ 4830	31.00	131,130.00
24"	150		470	40					480	45			1185 ✓	33.00	39,105.00
27"		~~315~~ 35	360	~~280~~ 140		255	45	~~320~~ 180	~~115~~ 75	650		140	2340 ~~1880~~	39.00	91,260.00
30"			160			~~40~~				300	~~1085~~ 765	~~175~~	1760 ~~1225~~	42.00	73,920.00
33"			~~60~~ 30		~~315~~ 175		~~320~~ 180			~~280~~			~~975~~ 385	44.00	42,900.00
36"	140	140				~~120~~ 40							~~260~~ 320	45.50	11,830.00
42" use HERCP 34x53 or CMPA						40				140	160		340		
Inlets	4	7	~~11~~ 8	6	~~9~~ 7	~~17~~ 10	~~10~~ 7	~~6~~ 5	~~8~~ 6	11	10	3	~~102~~ 84	1800.00	183,600.00
Manholes		2	1	1	2	1	4	1	1	2	2		17	2000.00	34,000.00
Headwall (42")										1			1		
Outlet Pipe 27" RCP under Rita													480'		
TOTAL COST															$680,440.00

CAMPBELL & GASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT : Builders, Inc.

DATE
BY SH

CHKD OF

AREA 2 & 3

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
4 - OUT	31	36	.0023	140 ✓	4.5	OUT	138.5	V = 4.5 fps
						4	138.9	1
3 - 4	25	24	.014	35 ✓	8.2	4	139.9	
						3	140.4	1
2 - 3	10	24	.0023	115 ✓	3.3	3	140.4	
						2	140.7	1
1 - 2	10	18	.0095	35 ✓	5.4	2	141.2	
						1	141.4	1

CAMPBELL & CASTLE, P.A.
ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD
OF

AREA 4

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
9-OUT	37	~~Two 27"~~ Parallel 36"	0.0038	140	4.8	OUT	138.5	V= 5.2 FPS
						9	139.1	2
8-9	21	27"	0.0048	35	9.6	9	139.1	
						8	139.3	2
7-8	8.5	~~18~~ 21"	0.003	~~260~~ 600	4.7	8	140.0	
						7	141.8	1
6-7	7	18	0.0042	35	5.6	7	141.8	
						6	142.0	1
5-6	4.9	15	0.006	40	4.0	6	142.2	
						5	142.5	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849 PROJECT | CLIENT Builders, Inc. | DATE BY SH | CHKD OF

AREA 5

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
18-OUT	54	Two 1 33	0.0027	30	4.6	OUT 18	138.5 138.6	V=4.3 FPS 2 /
17-18	12	~~18~~	0.018	~~35~~	7	18 17	139.9 140.6	~~2~~
16-18	24	30	0.0035	160	6.1	18 16	138.9 139.5	1
15-16	3	15		35	2.5	16 15	139.5 139.8	1
14-16	18	27	0.0035	360	4.6	16 14	139.2 140.5	1
13-14	3	15		35	2.5	14 13	141.5 141.8	1
12-14	13	24	0.0034	470	4.2	14 12	140.8 142.4	1
11-12	3.5	15	0.003	35	2.8	12 11	143.2 143.4	1
10-12	6.5	18	0.0038	40	3.7	12 10	142.9 143.1	1

CAMPBELL & CASTLE, P.A.
ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD
OF

AREA 6

or 1 27" w/ swale to handle dif between 2yr & 100yr

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
23-OUT	34.2	Two 27	0.0032	140	4.4	OUT 23	138.8 139.3	V=3.8 1
22-23	16	24	0.0051	40	5.2	23 22	139.6 138.8	1
21-23	12	18	0.013	35	6.6	23 21	140.1 140.6	2
20-22	8.5	21	0.0028	550	3.5	22 20	140.1 141.7	1
19-20	4	15	0.004	35	3.4	20 19	142.2 142.4	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD
OF

AREA 7 & 8

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
30-OUT	50	Two 33 One	0.0024	140	4.3	OUT 30	139.1 139.4	V = 4.5 FPS 1/2
29-30	31	33	0.0036	35	3.9	30 29	139.4 139.5	1/2
28-29	10	21	0.004	35	4.2	29 28	140.5 140.7	1
27-28	8	21	0.0025	290	3.3	28 27	140.7 141.5	1
26-27	3.5	15	0.003	35	2.8	27 26	142.0 142.1	1
25-29	8	21	0.0025	360	3.3	29 25	140.5 141.4	1
24-25	3.5	15		35	2.8	25 24	141.9 142.2	1

One 30" w/ swale

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO: 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD OF

AREA 9, 10, 11

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
41 - OUT	23.8	~~30~~	0.0036	~~40~~	4.9	OUT 41	139.6 139.8	~~2~~ 1
40-41	7	15	0.016	35	6.6	41 40	141.1 141.7	2
39 - OUT	59.3	Two on 36 42	0.0021	40	4.3	OUT 39	139.6 139.7	V=3.9 FPS ~~2~~ 1
37-39	30	36	0.0021	40	4.3	39 37	139.8 139.9	2 1
36-37	16	18	0.022	20	9	37 36	141.3 141.8	~~2~~ 1
35-36	4	18	0.003	190	2.6	36 35	141.8 142.4	1
34-37	18	27	0.0036	255	4.6	37 34	140.0 141.0	1
33-34	4.5	15	0.0048	40	3.7	34 33	141.2 141.4	1
32-34	6	18	0.0032	320	4.9	34 32	141.2 142.3	1
31-32	3	15	0.0022	35	2.5	32 31	142.6 142.7	1
38-39	16	18	0.024	20	9	39 38	140.7 141.2	~~2~~ 1

CAMPBELL & CASTLE, P.A.
ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD
OF

AREA 12 & 13

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
48-OUT	55	Two 33	.0028	140	4.6	OUT	139.1	V=4.4 fps
						48	139.5	1/2
46-48	16	27	.0028	45	4.1	48	140.0	
						46	140.2	2
47-48	39	33	.0055	40	6.4	48	139.5	
						47	139.8	2
45-47	8	21	.0025	460	3.4	47	140.8	
						45	142.0	1
44-45	4	18	.0016	35	2.3	45	142.3	
						44	142.4	1
43-47	8	21	.0025	560	3.4	47	140.8	
						43	142.2	1
42-43	4	15	.0038	35	3.2	43	142.7	
						42	14-2.9	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH

CHKD OF

AREA 14

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
53-OUT	35	Two one 27	.0034	140	4.5	OUT 53	138.8 139.0	V=4.4FPS 2
52-53	16	27	.0028	40	4.1	53 52	139.0 139.2	1
51-53	8	18	.006	40	4.6	53 51	139.8 140.1	1
50-52	8	21	.0025	670	3.4	52 50	139.7 141.4	1
49-50	4	15	.0038	35	3.2	50 49	141.9 142.1	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD OF

AREA 15

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
59-OUT	40	Two one 27	.0042	40	5.0	OUT 59	138.5 138.7	V-5 FPS 2 /
58-59	15	27	.0024	35	3.7	59 58	138.7 138.8	2 /
57-58	12	24	.0029	480	3.8	58 57	139.1 140.5	1
56-57	4	15	.004	35	3.2	57 56	141.3 141.5	1
55-57	8	21	.0026	580	3.3	57 55	141.6 143.2	1
54-55	4	15	.004	35	3.2	55 54	143.7 143.9	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD OF

AREA 16 & 17

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
68-OUT	56.8	Two 33" 42"	.0014	140	4.9	OUT 68	138.5 138.7	V=6.5 Ft/S Headwall required 2
66-68	8	21	.0026	45	3.4	68 66	139.7 139.9	1
67-68	16	24	.005	45	5.1	68 67	139.5 139.8	1
65-68	22	30	.003	300	4.5	68 65	139.0 139.9	1
64-65	4	15	.004	35	3.2	65 64	141.2 141.4	1
63-65	14	27	.0029	650	3.4	65 63	139.3 141.2	1
62-63	4	15	.004	35	3.2	63 62	142.2 142.4	1
61-63	6	18	.0033	670	3.4	63 61	142.0 144.2	1
60-61	3	15	.004	35	3.2	61 60	144.5 144.7	1

CAMPBELL & CASTLE, P.A. ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD OF

AREA 18

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
76-OUT	43	Two one 30' 42	.0028	160	4.5	OUT 76	138.5 140.0	V=5 fps 2
75-76	30	30	.0055	35	6.2	76 75	140 140.2	2
74-75	18	30	.0019	410	3.7	75 74	140.2 141.0	1
73-74	2	15	.004	35	3.2	74 73	141.5 141.7	1
72-74	16	30	.0016	320		74 72	141.0 141.5	1
71-72	4	15	.004	35	3.2	72 71	142.7 142.9	1
70-72	8	21	.0025	680	3.3	72 70	141.8 143.5	1
69-70	4	15	.004	35	3.2	70 69	144.0 144.2	1

CAMPBELL & CASTLE, P.A.
ENGINEERS

FILE NO. 7849
PROJECT

CLIENT Builders, Inc.

DATE
BY SH
CHKD
OF

AREA 19

PIPE	DISCHARGE CFS	DIA Inch	SLOPE Ft/Ft	LENGTH Ft	VELOCITY Fps	NODE	FLOW LINE ELEVATION Ft	INLETS REQUIRED
78-OUT	21	~~30~~ 27	.003 .004	140	4.3	OUT 78	138.5 139.1	V=4.3fps 2
77-78	12	~~30~~ 18	.004 6	35	2.5	78 77	139.1 139.3	1

CAMPBELL & CASTLE. P.A. ENGINEERS

FILE NO. PROJECT | CLIENT | DATE BY SH | CHKD OF

100 YR STORM

Provide Velocity = 2.5'/s

Q = 232 cfs

Area Required = $92.8\ ft^2$

Let Water Depth = d

$\frac{d}{2}(2\times26.8 + 6d) = 92.8$

d = 2.67'

P = 43.69'

A = 92.94

R = 2.127

$\frac{1.486}{0.03} \times (2.127)^{2/3} A^{1/2} * 92.94 = 232$

$7615.9\ A^{1/2} = 232$

A = 0.0009

2 YR STORM

= 2.1'/s

= 121 cfs

= 57.6

= b

$\frac{b}{2}(2\times26.8 + 6b) = 57.6$

b = 1.8

P = 38.18

A = 57.96

R = 1.518

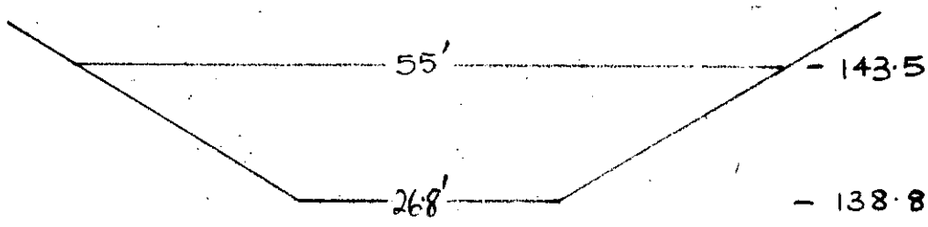
$\frac{1.486}{0.03} \times (1.518)^{2/3} A^{1/2} * 57.96 = 121$

$3792.6\ A^{1/2} = 121$

= 0.0010

Provide slope = 0.0010

= 0.10%



DRAINAGE CHANNEL

xxxxx

October 24, 1979

Builders, Inc.
1000 Parklane
Wichita, Kansas 67218

Attn: Mr. Alexander Dean, Manager, Land Development

Subject: Pawnee Mesa Addn. - S/D 79-20

Dear Mr. Dean:

Reference is made to my copy of your letter sent to Yash Desai on October 11, 1979 regarding subject Addition. In response to the items in your correspondence of that date, I comment as follows?

1) Downstream grade elevations are required to insure that the outfall pipes from the pond do not interfere with the west roadside drainage and are able to drain east.

2) The top of the dike shall be at 144.75 to provide a minimum two foot of freeboard rather than the one foot mentioned.

3) Text of the plat shall show minimum pad elevation to be 146.

4) If existing pipes crossing 107th Street West at north edge of proposed pond are to remain, what is the plan to get the water from the street into the ditch.

5) When discharge velocities exceed 5 feet/second into the proposed channel, protection in the form of a flume or riprap shall be provided with the headwall to protect the slopes.

6) Where is the water surface profile for the proposed channel?

We are in agreement with the remaining points made in your letter. If you have any questions, please advise.

Yours truly,

Paul Johnston,
Flood Control Engineer
Flood Control and Landfill Division

PJ/glm

cc: Yash Desai
Robert Castle, Campbell & Castle
Lawrence Wells
Jack Galbraith/MAPD
Pawnee Mesa Addn. Plat File

WICH

Van Doren Hazard Stallings
Architects • Engineers • Planners
250 Rockborough Building
260 North Rock Road
Wichita, Kansas 67206
316/686-7303

DATE 12-5-79 JOB NO. 79-229-AO

PROJECT Pawnee Mesa

TO Mr. Dean Sellers

FROM Kenneth H. Bengtson

REFERENCE

confirmation memo

COPIES TO:

Alex Dean
Yash Desai
Mike Lindebak
Louise Olivarez
Ray Bruggeman
Jack Galbraith

Per our meeting of December 3, 1979 we will be proceeding with a revised final plat for Pawnee Mesa. The drainage plan, which will be submitted prior to the submission of the revised final plat, is intended to drain east and will not be limited to the 105 cfs runoff. The revised roadway configuration would designate May and Shefford (north of May) as collectors with a 66' right-of-way. Mike Lindebak will discuss with Steve Lackey and Louise Olivarez regarding the possibility of reducing the realigned Parkridge to 64' right-of-way and using valley gutters at intersections where needed.

Kenneth H Bengtson

RECEIVED
DEC 6 1979
Engineering Division

WICHITA — SEDGWICK COUNTY
W-SC
METROPOLITAN AREA PLANNING COMMISSION
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

March 15, 1979

Mr. Willard W. Garvey
President, Builders, Inc.
300 West Douglas
Wichita, Kansas 67202

Subject: Proposed plat of Pawnee Mesa Addition. Generally located at the northwest corner of Pawnee and 107th Street West

Dear Mr. Garvey:

The City Manager has forwarded the above plat to our office for review. Our staff discussed a preliminary sketch on this property submitted by Lauren Hogan last November and advised him of several major problems of design, probable high cost of extending sewer and water, annexation, no available storm sewer and the probable requirement of on site retention of storm water. At that time we recommended that he contact Public Works as to drainage and the extension of sewer, and the Water Department relative to problems of extending water. We also recommended redesign of the plat.

The sketch as now submitted is essentially the same as the one reviewed before and the following are our comments:

The overall design of the plat should again be reviewed by your engineer or land planner. The street on the east (107th) is not a major street, but is a designated collector. The basic problem with the design of the plat is that there are three other streets that will function as collectors. The east-west street on the north, indicated as May, and the north-south street on the west (Zuni) will both serve as collectors and should be 66' in right-of-way width. Collectors, if possible, should be designed with a minimum number of lots facing directly onto the street. Both of these streets are designed in such a way as one entire side has lots that must face directly onto the street. The other street that will serve as a collector is Aztec the diagonal which most other streets intersect with. It would be desirable to minimize the number of four way intersections that the street produces. This number of collectors will result in excessive cost to the public. A number of design techniques are available to overcome this. We would be pleased to review alternatives submitted by your engineer.

Although it is mentioned that lots are proposed for duplexes and multiple family, none of those proposed areas are indicated. They should be clearly noted on the plat. It will be necessary that a zone change ap-

and the entire plat needs to be redesigned. We are enclosing a marked copy of the plat to your engineer. The plat should be redesigned in sketch form and resubmitted to our office for review prior to the submission of the plat in preliminary form. After you have had an opportunity to review our comments with your engineer, if you have any questions, please call.

Sincerely,

Jack H. Galbraith
Chief Planner

JHG:bh

cc: Campbell and Castle, P.O. Box 9262, 67277
Builders, Inc., c/o Ruth Mercer, Host, Inc., 1000 Park Lane, 67218
Amortibanc Investment Company, Inc., 300 W. Douglas, 67202
Eugene H. Denton, City Manager
John Wynkoop, Director of Water Department
Dick Linn, City Engineer

Preliminary plat

SUBDIVISION COMMI
METROPOLITAN AREA
PLANNING COMMISSION

SUBDIVISION REPORT

S/D NO. 79-20 Name Pawnee Mesa Addition
Date Application Rec'd. 2-16-79 Preliminary Approval _____
Scheduled S/D Meeting 5-3-79

DESCRIPTION

General Location An area north of Pawnee Street and west of 107th St. West

Owner Builders, Inc., c/o Ruth Mercer, Host, Inc.
Surveyor/Engineer Campbell and Castle, P.A., Engineers
Address P.O.Box 9262, Wichita, Kansas Phone 942-8144

1. Gross Acreage of Plat 159 acres
2. Number of Lots:
   Residential 597
   Commercial 1
   Industrial _____
   Other _____
   Total Number of Lots 598
3. Minimum Lot Frontage 70 ft.
4. Minimum Lot Area 7700 ft.
5. Existing Zoning Rural R-1
6. Proposed Zoning "AA", "A", "LC" and "LC"
7. Lineal Feet of New Streets:
   a. 64 R/W 24,200 ft.
   b. _____ R/W _____ ft.
   c. _____ R/W _____ ft.
   d. _____ R/W _____ ft.
   e. _____ R/W _____ ft.
   TOTAL 24,200 ft.
8. Sidewalk adjacent to all streets? _____ yes X no
9. Public Water Supply No (Yes-No), Name _____
10. Public Sanitary Sewers No (Yes-No), Name _____
11. Health Department Approval (where applicable) _____ (Yes-No)
12. City of Wichita _____: Three-Mile Area X

STAFF COMMENTS:

A. Subject property is located in an area not having adequate drainage facilities for development and is not immediately annexable. Therefore, in order for the property to be developed with the urban size lots and combination single family and duplex uses as proposed, approval of a zone change from R-1 Suburban Residential to the AA Single-family residential and approval of a conditional use case to permit duplex development is required. Approval of the plat is subject to approval of these applications and no final plat shall be submitted until the applicant has filed such applications for consideration by the Planning Commission.

B. It should be noted that the applicant is proposing duplex zoning on Lots 7-18, Block V; Lots 1-12, Block W; Lots 40-50, Lots 9-16, and Lots 1-8 and Lots 84-87 all in Block F; Lots 1-12, Block I; Lots 1-6, Block J;and Lots 13-20, Block H. The applicant proposes LC - Light Commercial zoning on Lot 13, Block W.

C. The street rights-of-way for the two collector Streets, Zuni and May, shall be increased to the required 66 feet in width.

D. Prior to submission of a final plat, the applicant and/or his engineer shall contact Roberta Mendenhall of the Department of Public Works regarding the appropriate street names to be indicated on the plat.

E. Prior to submission of a final plat, the applicant's engineer shall submit a drainage plan for subject plat to the City Engineer for review and approval. A letter approving said plan shall be obtained from the City Engineer and shall be submitted to the Planning Department.

T9-F-303 The applicant shall guarantee all drainage improvements required with the plat.

(Over) See Don on San Saw

G. The portions of the open drainage areas labeled as "drainage and utility easement" shall be relabled as a Reserve and the purpose for which the reserve is intended, i.e., drainage, utilities, etc., shall be indicated in the plattor's text of the final plat.

H. A restrictive covenant and/or a homeowners association agreement which provides for the maintenance of the Reserves shall be submitted to the Planning Department for review.

I. It is recommended that the area, Lot 13, Block W being proposed for light commercial use, be redesigned for residential lots or for multiple family development. There is ample existing undeveloped light commercial property within 1/2 mile of subject property at a major street intersection.

J. The applicant shall guarantee the paving of all streets.

K. The applicant shall make satisfactory arrangements and guarantees for extension of sanitary sewer and City water from the City of Wichita to serve subject property. The applicant shall be advised that the City has now revised its water service policy and the extension of water mains to serve the plat shall be entirely at the applicant's expense.

L. Sidewalks are required adjacent to both sides of all streets and guarantees for the sidewalk construction will be required with the issuance of building permits on each lot.

M. The applicant shall install or guarantee the installation of all utilities and facilities which are applicable and described in Article 8 of the MAPC Subdivision Regulations. The applicant should be prepared to discuss with the Subdivision Committee the manner in which it is proposed to provide for such utilities and facilities, e.g., petition, actual construction, monetary guarantee, etc.

N. Requirements for a final plat (see pages 20-25, Part 4, Article 5 of the MAPC Subdivision Regulations).

Final plat

SUBDIVISION REPORT

SUBDIVISION COMMITTEE
METROPOLITAN AREA
PLANNING COMMISSION

S/D NO. 79-20 Name Pawnee Mesa Addition
Date Application Rec'd. 2-16-79 Preliminary Approval 5-3-79
Scheduled S/D Meeting 8-9-79

DESCRIPTION

General Location An area north of Pawnee Street and west of 107th St. West

Owner Builders, Inc., c/o Ruth Mercer, Host, Inc.
Surveyor/Engineer Campbell and Castle, P.A., Engineers
Address P.O.Box 9262, Wichita, Ks. Phone 942-8144

1. Gross Acreage of Plat 159 acres
2. Number of Lots:
   Residential 564
   Commercial 1
   Industrial
   Other
   Total Number of Lots 565
3. Minimum Lot Frontage 55 ft.
4. Minimum Lot Area 7000 ft.
5. Existing Zoning R-1
6. Proposed Zoning "AA" and "LC"
7. Lineal Feet of New Streets:
   a. 64 R/W 20,000 ft.
   b. 66 R/W 5,000 ft.
   c. R/W ft.
   d. R/W ft.
   e. R/W ft.
   TOTAL 25,000 ft.
8. Sidewalk adjacent to all streets? yes X no
9. Public Water Supply No (Yes-No), Name
10. Public Sanitary Sewers No (Yes-No), Name
11. Health Department Approval (where applicable) (Yes-No)
12. City of Wichita : Three-Mile Area X

STAFF COMMENTS:

NOTE: This final plat involves some changes in the proposed interior street system adjacent to 107th Street West (Lark Lane). Some relotting has occurred in several of the blocks.

A. Approval of this plat as currently submitted shall be subject to approval of the applicant's request for AA and LC county zoning.

B. The representative from the City Engineer's office should be prepared to comment on the status of the applicant's drainage plan. When approval is obtained, a letter from the City Engineer shall be submitted to the Planning Department.

C. The applicant shall guarantee all drainage improvements required with the plat.

D. A restrictive covenant and/or a homeowners' association agreement which provides for the maintenance of the Reserves shall be submitted to the Planning Department for review and for recording with the plat.

E. The applicant shall guarantee the paving of all streets.

F. The applicant shall make satisfactory arrangements and guarantees for extension of sanitary sewer and City water from the City of Wichita to serve subject property. The applicant shall be advised that the City has now revised its water service policy and the extension of water mains to serve the plat shall be entirely at the applicant's expense.

G. Sidewalks will be required in accordance with the sidewalk policy in effect at the time this plat is forwarded to the City Commission for approval.

T9-303

H. Recording of the plat within 30 days after approval by the Board of City Commissioners.

WICHITA—SEDGWICK COUNTY
W-SC
METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

May 4, 1979

Max Hubbell
Campbell and Castle, P.A.
P.O.Box 9262
Wichita, Ks. 67277

Re: S/D 79-20 - Preliminary plat of Pawnee Mesa Addition

Dear Mr. Hubbell:

At the regular meeting of the Subdivision Committee of the Metropolitan Area Planning Commission, May 3, 1979, the above captioned plat was considered. The action of the Committee was to approve the preliminary and authorize preparation of the final plat, subject to the following:

A. Subject property is located in an area not having adequate drainage facilities for development and is not immediately annexable. Therefore, in order for the property to be developed with the urban size lots, and combination single family and duplex uses as proposed, approval of a zone change from "R-1" Suburban Residential to the AA Single-family residential and approval of a conditional use case to permit duplex development is required. Approval of the plat is subject to approval of these applications and no final plat shall be submitted until the applicant has filed such applications for consideration by the Planning Commission.

B. The Planning staff recommends that Lot 13, Block W, which the applicant proposes for light commercial use, be redesigned for residential lots or for multiple family development. However, if the applicant still wants light commercial zoning, an appropriate zone change should be filed along with the zone change applications requested in item "A" above.

C. The street rights-of-way for the two collector streets, Zuni and May, shall be increased to the required 66 feet in width.

D. Prior to submission of a final plat, the applicant and/or his engineer shall contact Roberta Mendenhall of the Department of Public Works regarding the appropriate street names to be indicated on the plat.

E. Prior to submission of a final plat, the applicant's engineer shall submit a drainage plan for subject plat to the City Engineer for review and approval. A letter approving said plan shall be obtained from the City Engineer and shall be submitted to the Planning Department. It the approved drainage plan requires a substantial re-design, then a revised preliminary plat shall be submitted.

F. The applicant shall guarantee all drainage improvements required with the plat.

G. The portions of the open drainage areas labeled as "drainage and utility easement" shall be relabeled as a Reserve and the purpose for which the reserve is intended, i.e., drainage, utilities, etc., shall be indicated in the plattor's text of the final plat.

H. A restrictive covenant and/or a homeowners association agreement which provides for the maintenance of the Reserves shall be submitted to the Planning Department for review.

I. One additional street connecting this plat with the property to the west shall be shown on the final plat.

J. The applicant shall guarantee the paving of all streets to City of Wichita standards.

K. The applicant shall make satisfactory arrangements and guarantees for extension of sanitary sewer and City water from the City of Wichita to serve subject property. The applicant shall be advised that the City has now revised its water service policy and the extension of water mains to serve the plat shall be entirely at the applicant's expense.

L. Sidewalks are required adjacent to both sides of all streets and guarantees for the sidewalk construction will be required with the issuance of building permits on each lot.

M. The applicant shall install or guarantee the installation of all utilities and facilities which are applicable and described in Article 8 of the MAPC Subdivision Regulations. The applicant should be prepared to discuss with the Subdivision Committee the manner in which it is proposed to provide for such utilities and facilities, e.g., petition, actual construction, monetary guarantee, etc.

N. Requirements for a final plat (see pages 20-25, Part 4, Article 5 of the MAPC Subdivision Regulations).

6. Additional easements as requested by K.G. and E. and shown on the engineer's "marked copy" of the preliminary plat shall be shown on the final plat.

If the owner intends to request annexation, as was expressed at the May 3rd meeting, the Planning Department should be contacted about coordinating the filing of the zone changes and the annexation request. Perhaps City zone changes will need to be filed instead of County zone changes.

Enclosed herewith is the "marked" copy of the preliminary plat for your information and files.

If you should have any questions, please call.

Sincerely yours,

L.O

Louise Olivarez
Junior Planner

LO:bh

cc: Lawrence Wells, Architect, 254 Laura, 67211
Willard W. Garvey, Pres., Builders, Inc., 300 W. Douglas, 67202
Dean Sellers, Assistant City Engineer

CAMPBELL & CASTLE, P.A.
ENGINEERS
PHONE (316) 942-8144 • 4801 WEST IRVING
P. O. BOX 9262
WICHITA, KANSAS 67277

May 18, 1979

City of Wichita
Engineering Department
455 North Main
Wichita, Kansas 67202

Attn: Yash Desai

Re: Pawnee Mesa West Addition
File No. 7849

Gentlemen:

We are enclosing three copies of the drainage plan for Pawnee Mesa West Addition for your approval.

Very truly yours,

CAMPBELL & CASTLE, P.A.

Max Hubbell

MH/ic
Enclosures

cc: Lawrence Wells
Builders, Inc., Ruth Mercer

Pawnee Mesa

July 16, 1979

Dimensions

Plat Area 158.2 Acres 6891192 sqft .247 sq mi
Drainage Area 150 Acres 6534000 sqft .234 sq mi

Area Breakdown

Commercial 5 Acres 217800 sqft .008 sq mi
85% impervious CN = 98

Residential 145 Acres 6316200 sqft .226 sq mi
25% impervious CN = 87.5 weighted

type	%	CN	product
Residential	51%	87	4437
Duplex	14%	86	1204
drainage	4%	80	320
Streets + Drives	17%	98	1666
Open (Easements)	14%	80	1120
	100	87.5	8747

Existing Runoff

Type "D" Soils
5.9" Rainfall 6 hr 100 yr frequency Soil Conservation Service
Adv Existing Slope .29 % High 1485 − Low 1392 = 93/3200
Area CN = 80 S = 2.5
P = 5.9
Q = 3.69 Table 2-1
l = 3200
V = .4 Fig 3-1 based on cultivated land

July 16, 1979

EXISTING CONT.

$T_T = 3200/.4 = 8000$ sec $= 2.22$ hr.

$L = \frac{(3200)^{.8}(25+1)^{.7}}{1900-(.29)^{.5}} = \frac{636.97 \times 2.4}{1900 \times .54} = 1.5$

$T_c = 1.5/.6 = 2.5$ hr.

$q_p = 122$

$q_o = 122(3.69)(.234) = 105.34$ cfs

COMMERCIAL

BLOCK W

AREA $435' \times 510' = 221850$ sq ft 5.09 acres $.008$ sq. mi.

85% impervious

AVG. SLOPE 1% CN = 95 S = .526

P = 5.9

Q = 5.31 Tbl 2-1

$l = 650'$

V = 2.0 fps

$T_T = 650/2.0 = 325$ sec $= .09$ hr use 0

$L = \frac{(650)^{.8}(.526)^{.7}}{1900-(1)^{.5}} = \frac{(177.96)(1.34)}{1900} = .126$

Lag factor Fig 3-5 .775 <65% impervious

$.126 \times .775 = L_i = .1$

$T_c = .1/.6 = .16$ hr. use .2

$q_p = 796$ Tbl 5-3 SAT 1

$q_o = 796(5.31)(.008) = 33.8$ cfs

T_T to open channel through 36" SS @ .005 for 1300 ft

V = 40 fps $1300/40 = 32.5$ sec

T open channel 6.25 sec

T_T from BLK W 657.5 sec $\div 3600 = .18$ hr

TOTAL T_T $.18 + .09 = .27$ hr.

Residential AREA 145 Acres 6316200 sqft .226 Sq mi

25% impervious CN = 87.5 S = 1.43

l = 3670 Longest Run 50% hydraulic improvement

AVG Drainage AREA SLOPE 2% P = 5.9 Q = 4.77

Type	% of DRAINAGE AREA	l	slope %	Velocity	time
lot	70	100'	2	1	100 sec
easement	10	20'	5	1.65	12.12 sec
gutter, street	17	1050	.5	1	1050 sec
open waterway	03	2500	.15	4	625 sec

AVG. WATERWAY SLOPE .327% T_T = 1787.12

$T_T = .5$ hr.

$$L = \frac{(3670)^{.8}(1.43+1)^{.7}}{1900\,(2)^{.5}} = \frac{(710.78)(1.86)}{(1900)(1.41)} = .49$$

Lag factor .77 fig 3-4 .885 Eq 3-5

$L_1 = .49(.77)(.885) = .33$

$T_c = .33/.6 = .56$ use .5

Residential	11.0	11.5	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.5	14	14.5	15	16
CSM/in	12	20	25	30	38	58	101	169	252	327	374	385	366	329	285	241	169	103	59	44	36	27
x 4.77 x .226																						
= cfs₁	12.9	21.6	27	32	41	62.5	108.8	182.2	271.7	352.5	403.2	415	394.6	354.7	307.2	259.8	182.2	111	63.6	47.4	38.8	29.1
for Commercial	23	47	208	509	796	641	424	245	170	138	121	104	85	75	71	68	56	49	40	34	29	24
X 5.31 X .008																						
= cfs₂	.1	2	8.8	21.6	33.8	27.2	18	10.4	7.2	5.9	5.1	4.4	3.6	3.2	3	2.9	2.4	2.1	1.7	1.4	1.2	1
cfs₁ + cfs₂																						
= Total cfs	13	23.6	35.8	53.6	74.8	89.7	126.8	192.4	278.9	358.4	408.3	419.4	398.2	357.9	310.2	262.7	184.6	113.1	65.3	48.8	40	29.2

Storage July 16, 1979

$Q_o = 10534$ $Q_i = 4194$

$\frac{Q_o}{Q_i} = .25$ Fig 7-2 $V_s/V_r = .445$

$V_r = 4.78$ = Q weighted

$V_s = .44 (4.78) = 2.1$

$\frac{2.1 (150)}{12} = 25.1$ acre feet of storage

7-30-79

Pawnee Mesa

Notes on drainage

Hydrology Data:

1. Quantities being considered? DA = ?
   I_{100} = ?
   Q_{100} = ?

2. Type & size of Structure proposed at drainage reserve & Tiddlerest?

3. 20' storm sewer easements are required between:

Block	Lots	Block	Lots
O	12 & 13	F	67 & 68
O	16 & 17	F	5 & 6
O	22 & 23	F	48 & 49
O	26 & 27		

4. Type of drainage proposed bet lots 53 & 54 Blok F :, ditch, swale etc? (provide section of same)

5. Amount of storage area being provided in Block F for pond?

6. Requires inflow-outflow hydrograph

7. When is drainage at NW & SW corners of area going?

8. Three feet req'd bet. flood stage & dike: proposed needs to be raised 1.5' as shown in section A-A

9. Minimum pad elevations will probably be req'd on properties adjacent to pond.

10. Access will be necessary on both sides a drainage reserve (15') therefore requiring ditch be redesigned

11. Slopework on proposed ditches at 4:1 versus the 3:1 shown.

12. Question concerning bottom of ditch at section B-B of 28'2" — provide calculations

13. Drainage easement should be shown as a reserve, same to be maintained by homeowners association

cc Lyon 7-31-79

file

Statement

Item E of Subdivision Committee Report on the preliminary plat of ~~the~~ Pawnee Mesa states that "the applicant's engineer shall ~~submit~~ a drainage plan for subject plat to the City Engineer for review and approval. ~~Article~~ Section 8-102 of the Wichita - Sedgwick County MAPC Subdivision Regulations ~~requires~~ designates the City Engineer the appropriate engineer ~~to [illegible]~~ responsible for setting standards and specifications for ~~the~~ drainage improvements. ~~To this date~~

A satisfactory drainage plan should show ~~street grade~~ sufficient information such as street grades ~~and~~ and flow arrows showing direction of drainage. It shall also ~~show~~ be accompanied by calculations ~~etc. and~~ for the two year frequency and the 100 year frequency storm runoff encroachment in the ~~pavement~~ street. As was earlier presented by the Director of Planning (Show Slide) two year storm runoff encroachment is the dark blue area and the 100 year storm runoff encroachment shall not ~~exceed~~ overtop the light blue area, along the street. ~~Anytime~~ Once the quantity of water in the street exceeds ~~the~~ this dark blue line, ~~safe~~ the use of street for its primary function of safe ~~movement of traffic is~~ movement of traffic ~~encroachment~~ will be interfered with. Use of streets for drainage and traffic are compatible up to a point, beyond which drainage is, and must be, subservient to traffic needs. In order to provide such safe ~~traffic~~ movement of traffic, storm sewers are designed to keep the water level in the street below this (slide)

Dark Blue Line. ~~Storm~~ Excessive storm water flowing in the street ~~impedes the~~ causes, primarily, two ~~sociological~~ objectionable sociological conditions: ~~Primarily~~, the splash due to flowing water in the street will ~~reduce~~ obscure vision and cause the vehicles to crowd adjacent lanes thus creating a traffic hazard that could lead to the rash of small accidents. Secondly the splash due to both flowing and ponded water will create adverse sociological impact to the pedestrians. Also the pedestrians will be required to cross ponded water while ~~attempting~~ walking from their ~~car~~ vehicle to the house.

Good drainage design also provides direct traffic benefits and lower street maintenance costs. Proper drainage design should have as one of the prime objectives the protection of street paving and its subgrade from unnecessary deterioration. The storm sewer ~~arterial storm drainage~~ system is necessary to eliminate inconvenience, frequently recurring minor damage, high street maintenance, and to help create an orderly urban system with significant sociological benefits.

~~A good major drainage~~ channel systems like this plat

The channel system in this plat will satisfactorily provide requirements of the major drainage system to cater for the 100-year storm. ~~Most of the A plat with provision for major runoff is designed~~ Provision for major runoff is provided in a plat to eliminate major damage and loss of life.

However, calculations submitted do not satisfactorily indicate that the 100-yr storm will be carried within the street right of way thus indicating ~~protection~~ design of insufficient major drainage system. This could ~~create~~ be hazardous to life and create major property damage. Submitted analysis also shows that the curb will be overtopped at several places in the street during 2-year frequency runoff ^period thus obscuring ~~sight~~ vision and hampering smooth movement of traffic. The required minimum street grade of 0.32% as per subdivision regulation (Section 7-201(e), page 34) is not provided. ~~thus causing water~~ This will cause ^storm water ~~to~~ and lawn water to pond in the street gutter and spread across the traffic lane ^which will result in ~~causing~~ damage to the pavement, deterioration of the subgrade, ~~and~~ occurrence of "pot holes," and serious inconvenience during winter ~~ice~~ ^icy conditions. This will only increase the street maintenance cost. (Repeat of 13th Street at Woodlawn Ave. condition). In other words the drainage plan submitted shows ~~streets~~ use of streets primarily for drainage, quite contrary to their primary ~~use~~ function for the movement of traffic. As a result of ponded water and curb cuts to discharge water across ~~the~~ ^too narrow drainage dedications between ~~private homes~~, lots thus creating possible law suits against the City by pedestrians ^must in ~~trying~~ attempting to cross such ponded areas.

Present Table showing ~~cost~~ storm water sewer criteri of five other cities in the Midwest. Denver is the only other city which is as liberal as Wichita compared to Tulsa where 5-year frequency storm sewer requirement ~~has to be satisfied~~ to Oklahoma City where ~~5~~ 10-year frequency storm sewer requiremen has to be satisfied. Incidently these requirements are also part of the city ordinances for the Cities of Tulsa and Oklahoma City.

Present plats where other reasonable developers have provided satisfactory drainage plans, particularly the Storm water Sewer No. 147 (Westlink Village Village subdivision approved and under development 18th plat), Mention about four other ~~plats~~, such as: Rainbow Lakes West Third ~~and~~ Rainbow Lakes West Fourth, Westlink Village 17th and Westlink Village 19th where ~~a~~ certain areas for ~~the~~ ponding is dedicated besides the cost of constructing the storm sewer system that discharges into the proposed detention ponds. Show storm sewer system cost reduction due to provision of ponds such as ~~$485,000~~ for Westlink Village 14th Addition subdivision ~~plat~~ compared to $350,000 for Westlink Village 18th subdivision.

WICHITA—SEDGWICK COUNTY
W-SC
METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

August 10, 1979

Max Hubbell
Campbell and Castle, P.A.
P.O.Box 9262
Wichita, Ks. 67277

Re: S/D 79-20 - Final plat of Pawnee Mesa Addition

Dear Mr. Hubbell:

At the regular meeting of the Subdivision Committee of the Metropolitan Area Planning Commission, August 9, 1979, the above-captioned plat was considered. The action of the Committee was to recommend that this plat be approved, subject to:

A. Prior to this plat being reviewed by the Planning Commission, the applicant must obtain approval of his drainage plan by the City Engineer's office and the Flood Control office. If approval cannot be obtained, this plat will need to be rescheduled before the Subdivision Committee.

B. Approval of this plat as currently submitted shall be subject to approval of the applicant's request for "AA" and "LC" county zoning.

C. The applicant shall guarantee all drainage improvements required with the plat.

D. A restrictive covenant and/or a homeowners' association agreement which provides for the maintenance of the Reserves shall be submitted to the Planning Department for review and for recording with the plat.

E. The applicant shall guarantee the paving of all streets to City of Wichita standards.

F. The applicant shall make satisfactory arrangements and guarantees for extension of sanitary sewer and City water from the City of Wichita to serve subject property. The applicant shall be advised that the City has now revised its water service policy and the extension of water mains to serve the plat shall be entirely at the applicant's expense.

G. Sidewalks will be required in accordance with the sidewalk policy in effect at the time this plat is forwarded to the City Commission for approval.

H. The large diagonal drainage easement shall be relabeled as a drainage reserve.

I. The applicant shall contact the City Engineer's office about the appropriate right-of-way to show for Lark Lane.

J. The following street name changes shall be noted on the final plat tracing:

Anya to become Uma; Ute to become May; and
Mars to become Inca.

K. The applicant shall contact the County Fire Department about placement of hydrants.

L. Additional utility easements as shown on the engineer's marked copy of the plat shall be shown on the final plat tracing.

M. Recording of the plat within 30 days after approval by the Board of City Commissioners.

Enclosed with the applicant's copy of this letter is a list of the five methods which have been adopted as being acceptable for guaranteeing improvements required in the approval of plats. Forms for the bond and irrevocable letter of credit are available from this office.

The enclosed "marked" copy of the final plat is for your information and files.

This matter will be forwarded to the Planning Commission for its consideration on Thursday, August 16, 1979 at 1:30 p.m. If you should have any questions concerning this matter, please call.

Sincerely,

Louise Olivarez

Louise Olivarez
Senior Planner

LO:bh

cc: Lawrence Wells, Architect, 254 Laura, 67211
Willard W. Garvey, President, Builders, Inc. 300 W. Douglas, 67202
Edmund Learned, Attorney-at-Law, 300 W. Douglas, 67202
Dean Sellers, Assistant City Attorney

4:00 Wed

80

WILLARD W. GARVEY
300 WEST DOUGLAS
WICHITA, KANSAS 67202

20 August 1979

Mr. Eugene H. Denton
City Manager
City Hall
455 North Main
Wichita, KS 67202

Re: Pawnee Mesa Addition

Gene, now in August, six months after my 13 February letter to you (enclosed), your test project is blocked by your engineer Yash Desai and we are unable to build the 600 houses.

Yash Desai last week unilaterally imposed "hundred-year flood requirements" -- unwritten, unauthorized and unreasonable -- that confiscate nearly 20% of the property. This is unacceptable. Can you salvage some common sense? Will you please resolve this prior to August 23?

With best wishes,

Willard Garvey

WILLARD W. GARVEY

jl

Encl: 13 Feb ltr (to Gene Denton)
15 Mar ltr (from Galbraith, 3 pg requirement -- complied with)
4 May ltr (from Olivarez, 15 requirements -- complied with)
17 Aug ltr (from Olivarez, "drainage problems")

cy: Dist 0

Paul Johnson, Desai

Bardelini
685-9371
Alex Dean,

Bond Wells Bailey

MEMORANDUM

FROM: ALEX DEAN DATE: AUGUST 22, 197

SUBJECT: Pawnee Mesa Plat Review

TOPIC	City Staff Position	Our Position
1. 100-year flood as a standard	On-site impoundment of once-in-100 year rainfall (5.9" in 6 hours)	Unreasonable, confiscator requirement — 1% ris of flood is not a policy adopted by MAPC. Must relate risk of floo to economic life of hous
2. Downstream capacity and pond discharge rate	Discharge 50 c.f.s., the capacity of existing culvert at NE corner of subdivision (or 105 c.f.s. if obtain easement from downstream property owners).	Discharge 105 c.f.s. without easement, a this is calculated runoff from site in undeveloped state.
3. Design of pond	5:1 Sideslopes, though will permit 4:1 — necessary for city maintenance machinery.	3:1 slopes are adequa Homeowner's assn. wil maintain the property.
4. Design of drainage easement	4:1 sideslopes with 8 ft. bottom and 15 ft. wide berm on both sides to permit access by city maintenance vehicles.	3:1 sideslopes sufficien to be maintained by homeowners' assn.
5. Storm sewers	Design to maintain 2-year frequency rainfall within the curb-line. 100-year flood may cover road right-of-way only (recent indication: ~~that~~ can cover up to 20 feet of front yards as well).	Reject 100-year flood standard. Streets and street rights-of-way are adequate to handle normal rainfalls without storm sewers.
6. Pond discharge period.	Retention pond must empty within 24 hours of a storm.	This requirement supposes that one rare rainfall will be followed the next day by an equally rare event.

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6. Pond discharge period.	Retention pond must empty within 24 hours of a storm.	This requirement supposes that one rare rainfall will be followed the next day by an equally rare event.

7. North side of Blake adjacent to Lot 1, Block 16 (multi-family zoning).

F. This revised final plat allows for the extension of a collector street (Shefford) from this plat into the residentially zoned property to the north (approximately 65 acres). In light of the relatively small area of future residential development to be served by this proposed collector extension, it is staff's recommendation that the proposed street extension be modified to allow for a standard 64-foot residential street, rather than a 66 foot collector. If this modification is not made, the applicant shall guarantee a sidewalk adjacent to both sides of the proposed collector extension that is within this plat.

G. On the final plat tracing, the M.A.P.C. signature block shall be corrected to read: William J. Goebel, Chairman.

H. Recording of the plat within 30 days after approval by the Board of City Commissioners.

Revised final plat

SUBDIVISION REPORT

SUBDIVISION COMMITTEE
METROPOLITAN AREA
PLANNING COMMISSION

S/D NO. 79-20 Name Pawnee Mesa Addition
Date Application Rec'd. 2-16-79 Preliminary Approval 8-23-79
Scheduled S/D Meeting

DESCRIPTION

General Location North of Pawnee in an area west of 107th St. West (Lark Lane)
Owner Builders, Inc.
Surveyor/Engineer Van Doren-Hazard-Stallings
Address 260 N. Rock Road, 67206 Phone 686-7303

1. Gross Acreage of Plat 159 acres
2. Number of Lots:
   - Residential 543
   - Commercial 2
   - Industrial
   - Other
   - Total Number of Lots 545
3. Minimum Lot Frontage 55 ft.
4. Minimum Lot Area .7000 ft.
5. Existing Zoning "R-1"
6. Proposed Zoning "AA" with Conditional Use
7. Lineal Feet of New Streets:
   - a. 66 R/W 5875 ft.
   - b. 64 R/W 19,050 ft.
   - c. R/W ft.
   - d. R/W ft.
   - e. R/W ft.
   - TOTAL 24,925 ft.
8. Sidewalk adjacent to all streets? yes no
9. Public Water Supply No (Yes-No), Name
10. Public Sanitary Sewers No (Yes-No), Name
11. Health Department Approval (where applicable) (Yes-No)
12. City of Wichita : Three-Mile Area X

STAFF COMMENTS:

NOTE: This revised final plat involves numerous changes in the proposed interior street system. Considerable relotting has occurred in several of the blocks.

A. The representative from City Public Works should be prepared to comment on the applicant's drainage plan and state what drainage improvements are required to be guaranteed with this plat.

B. The applicant's associated zone change (SCZ-0437) requesting "R-1" to "AA" has been approved subject to platting. Also, the applicant's Conditional Use case (CU-223) requesting establishment of duplex family dwellings and multiple family dwellings on property approved for "AA" has been approved by the Board of County Commissioners.

C. The applicant shall guarantee the paving of all streets.

D. The applicant shall make satisfactory arrangements and guarantees for extension of sanitary sewer and City water from the City of Wichita to serve subject property. The applicant shall be advised that the City has now revised its water service policy and the extension of water mains to serve the plat shall be entirely at the applicant's expense.

E. The applicant shall guarantee the construction of a sidewalk at the following locations:

1. Both sides of Parkridge (collector).
2. Both sides of Ute (collector).
3. One side of Rita (greater than 48 dwelling units).
4. South side of Blake adjacent to Lot 1, Block 15 (multi-family zoning).
5. East side of Fieldcrest adjacent to Lot 1, Block 15 (multi-family zoning).
6. South and east sides of Haskell adjacent to Lot 1, Block 16 (multi-family zoning).

T9-303

(Over)

file

BUILDERS, INC.

1000 PARKLANE / WICHITA, KANSAS 67218

August 30, 1979

Gene Denton
City Manager
Wichita, Kansas

Re: Pawnee Mesa

Gene, confirming our several phone visits, will you please obtain approval by your staff of our drainage plan prior to the MAPC meeting?

We believe this plan will accomodate the "100 year flood" within the street right of way -- and therefor no policy revisions by the City Commission are required.

Confiscated without compensation are 26 lots and a flood impounding area-- for which we must now have a Home Owners Association. Can you find any other subdivision in this city which equals this ridiculous "standard"?

Do you agree the above constitutes discrimination and damage enough without a million dollar storm sewer and other excessive and unreasonable requirements by your staff?

Who do you, in turn, hold personally accountable if approval is withheld -- Dean Sellers?

Best Wishes,

Willard Garvey

Willard Garvey

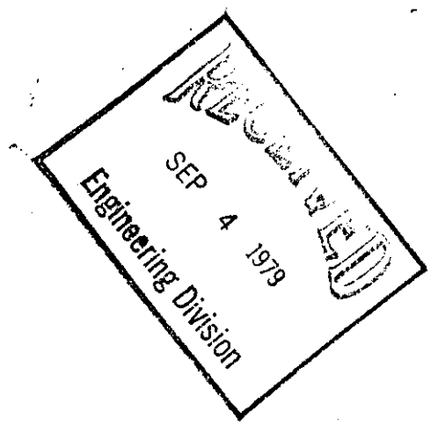
WF

file

WICHITA SEDGWICK COUNTY

W-SC

METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL – TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561



August 31, 1979

Edmund Learned, Attorney-at-Law
300 W. Douglas
Wichita, Kansas 67202

Re: S/D 79-20 - Final plat of Pawnee Mesa Addition

Dear Mr. Learned:

At the regular meeting of the Metropolitan Area Planning Commission on Thursday, August 30, 1979, the above-captioned plat was considered. The action of the Planning Commission was to recommend that the plat be approved as recommended by the Subdivision Committee subject to the conditions stated in our letter of August 10, 1979, except that item A was changed to read as follows:

A. Approval of this plat will be subject to approval of a drainage plan based on City of Wichita drainage policy requirements.

In addition to complying with those conditions, the following items will be required for completion of the platting process:

1. Submission of the fully completed and signed tracing of the subdivision to the Metropolitan Area Planning Department.

2. Submission of a title report by an abstract or title insurance company or an attorney's opinion that fee title is vested in the plattor.

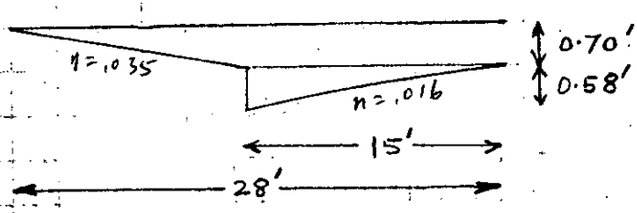
3. Certification that all taxes due and payable for 1978 and prior years have been paid.

It is our understanding that you wish to appeal requirement "A" to the Board of City Commissioners. Please provide us with a letter requesting this appeal. Based on your telephone conversation with Jack Galbraith this morning, we have tentatively scheduled this matter for the City Commission agenda of September 11, 1979.

STREET CAPACITIES OF THE SUB AREAS IN THE PAWNEE MESA ADDITION
FOR 2 YEAR AND 100 YEAR STORMS RECURRENCE INTERVAL TIME

Area Number	Area (acres)	Length of Travel (ft)	Height of Most Remote Point Above Outlet (ft)	Time of Concentration (min)	Rainfall Intensity 100 Yr. Storm (in/yr)	Rainfall Intensity 2 Yr. Storm (in/hr)	Expected Storm Flow Rate 100 Yr. Storm Q = cia (cfs)	Street Carrying Capacity (cfs)	Expected Storm Flow Rate 2 Hr. Storm Q = cia (cfs)	Reduction factor	Street Carrying Capacity (cfs)	Allowed St. Cap.
1												
2	2.3	500	2.75	15.0 ✓	8.98	4.06 ✓	10.3	157.2	4.7 ✓	.45	20.4	9.2
3	4.6	725	3.09	15.0 ✓	8.98	4.06 ✓	20.7 (31.0)	101.0	9.3 ✓	.19	13.4	2.5
4	8.7	1245	3.87	18.0 ✓	8.37	3.78 ✓	36.4	101.0	14.0 / 16.4 ✓	.29	16.7 / 13.4	4.8
5	15.1	1480	4.22	20.5 ✓	7.96	3.60 ✓	60.1	101.0	27.2 ✓	.19	13.4	2.5
6	7.9	1205	3.80	16.5 ✓	8.67	3.91 ✓	34.2	128.0	15.4 ✓	.19	17.0	2.5
7	6.2	990	3.49	15.0 ✓	8.98	4.06 ✓	27.8 (49.4)	101.0	12.6 ✓	.19	13.4	2.5
8	4.8	780	3.17	15.0 ✓	8.98	4.06 ✓	21.6	101.0	9.7 / 22.3 ✓	.19	13.4	2.5
9	3.8	620	2.93	15.0 ✓	8.98	4.06 ✓	17.1	101.0	7.7 ✓	.30	17.0 / 13.4	5.1
10	9.8	1000	3.50	15.0 ✓	8.98	4.06 ✓	44.0 (83.1)	152.7	19.9 ✓	.43	20.2	8.7
11	4.9	875	5.10	15.0 ✓	8.98	4.06 ✓	22.0	101.0	9.9 / 37.5 ✓	.38	19.1 / 13.4	7.2
12	5.5	970	4.03	15.0 ✓	8.98	4.06 ✓	24.7 (57.2)	101.0	11.2 ✓	.25	15.6 / 13.4	3.9
13	7.5	1230	4.59	16.5 ✓	8.67	3.91 ✓	32.5	128.0	15.2 / 26.4 ✓	.30	17.0	5.1
14	8.2	1480	6.00	18.0 ✓	8.37	3.78 ✓	34.5	131.0	16.6 ✓	.31	17.4	5.4
15	10.1	1710	5.90	21.0 ✓	7.88	3.56 ✓	39.8	138.0	18.0 ✓	.35	18.4	6.4
16	10.9	1880	5.75	~~28.0~~ 24	7.04	~~3.05~~ 3.38	38.4 (56.8)	177.7	22.1 ✓	.59	23.6	13.9
17	4.1	740	6.45	15.0	8.98	4.06 ✓	18.4	131.0	8.3 / 30.4 ✓	.66	17.4	11.5
18	11.6	2130	6.75	26.0 ✓	7.25	3.23 ✓	42.1	185.2	23.5 ✓	.65	24.6	16.0
19	4.6	400	2.60	15.0 ✓	8.98	4.06 ✓	20.7	101.0	9.3 ✓	.15	13.4	2.5

STREET CAPACITY FOR 100 YEAR STORM



curb height = 0.58'

Elevation difference between curb and sidewalk = 0.7'

Area available for 100 year storm (A)

$$= 2\left[\frac{1}{2} \times 0.58 \times 15 + \left(\frac{15+28}{2}\right) 0.7\right]$$

$$= 38 \text{ ft}^2$$

Wetted Perimeter (P)

$$= 2(15 + 0.58 + 14)$$
$$= 59.2 \text{ ft}$$

Mean Hydraulic Radius (R) $= \frac{38}{59.2} = 0.64$

$n = 0.016$ → should use a combined n

$$V = \frac{1.486}{0.016} (0.64)^{2/3} S^{1/2}$$

$$V = 68.97 S^{1/2}$$

$$Q = 2620 S^{1/2}$$

STREET CAPACITY FOR 2 YEAR STORM

Not standard St. section

Curb height = 0.58'

Crown height = ~~0.58'~~ $[(15'-1') \times 3/8" + 1/8"]/12 = .45'$

Area available for storm flow (A) = $\frac{1}{2} \times 0.58 \times 15$

= 8.75 ft^2

Wetted Perimeter (P) = 2 (15' + 0.58')

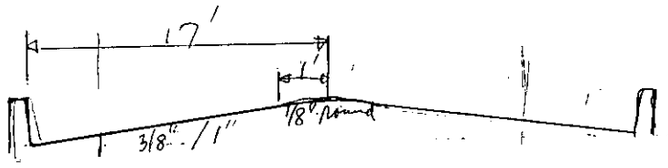
= 31.17 ft.

Hydraulic Mean Radius (R) = $\frac{8.75}{31.17} = 0.280$

$$V = \frac{1.486}{0.016} \times (0.280)^{2/3} \times S^{1/2}$$

$$V = 39.8\ S^{1/2}$$

$$Q = 348\ A\ S^{1/2}$$



Curb height = .58'

Crown height = $[(17-1)\,3/8" + 1/8"]/12 = .51'$

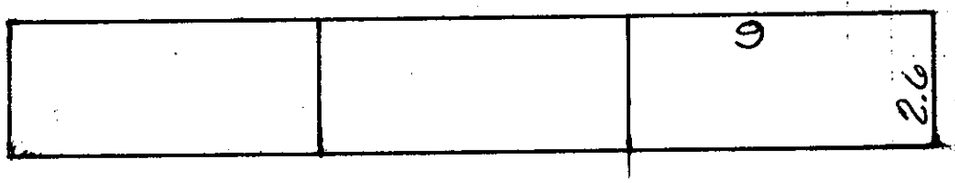
Area / Gutter = $.5 \times 17/2 = 4.25$

Wetted Perimeter = $4.25/17.58 = .24$

$V = 35.9\ S^{1/2}$

$Q = 152.4\ S^{1/2}$

Structure At Fieldcrest



$W.P. = (9+26) \times 2 \times 3 = 69.6$ Ln Ft

$A = 2.6 \times 9 \times 3 = 70.2$ Sq Ft

$R = \frac{A}{W.P.} = \frac{70.2}{69.6} = 1.0086$

$R^{2/3} = (1.1158)^{2/3} = 1.00574$

$V = \frac{Q}{A} = \frac{232}{70.2} = 3.30$

$H_v = \frac{V^2}{2g} = \frac{(3.30)^2}{64.4} = 0.17$

$H_e = k_e \frac{V^2}{2g} = 0.4 \times 0.17 = 0.07$

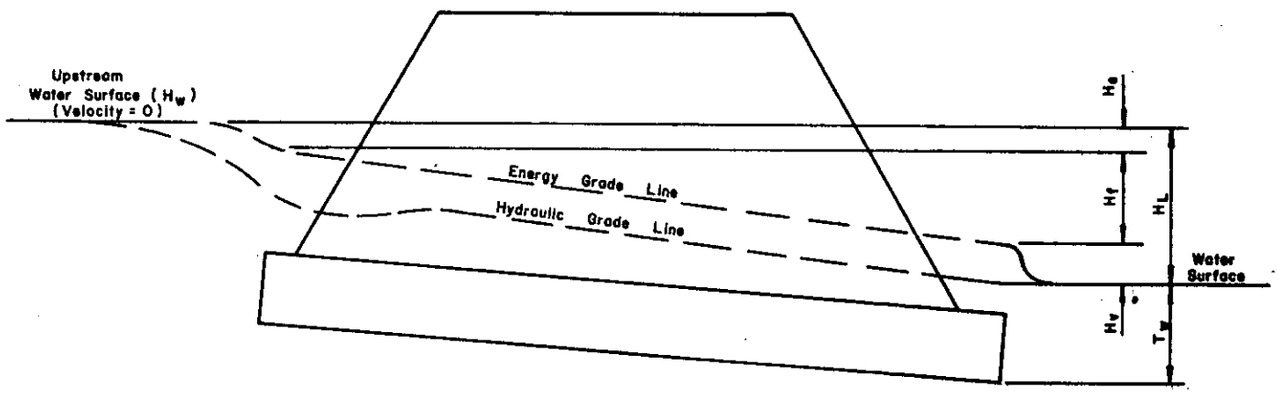
$H_f = \frac{29\, n^2 L}{R^{4.33}} \frac{V^2}{2g} = \left(\frac{29(0.012)^2 90}{1.00574}\right)(0.17)$

$= \frac{2610\,(0.000144)}{1.00574}\,(0.17) = 0.06$

$H_w = \text{Elev. Outlet} + T_w + H_v + H_f + H_e$

$= 138.9 + 3.35 + 0.17 + 0.06 + 0.07 = 142.55$

HEADLOSS , OUTLET CONTROL



H_w = Elevation. outlet + T_w + H_v + H_f + H_e

FIGURE 3F-7-1-A

3F-7-1-2 Velocity Head Loss (Hv):

The following formula may be used to compute Hv

$Hv = \frac{V^2}{2g}$ in feet

Where: g = acceleration due to gravity (32.2 ft/sec^2)

v = velocity in feet per second through the barrel $\frac{Q}{A}$

3F-7-1-1

Entrance Head Loss (He): The following formula may be used to compute entrance head loss

$$He = ke \frac{V^2}{2g} \text{ in feet}$$

Where: g = acceleration due to gravity (32.2 f/sec^2)

v = velocity in feet per second through barrel = $\frac{Q}{A}$

Ke = loss coefficient (see table below)

Inlet Type	Ke
Pipe, Concrete	
Projecting from fill (socket end)	0.2
Headwall	0.5
Type I end section	0.5
Type III end section	0.2
Side or drop tapered headwall	0.2
Pipe, Corrugated Metal	
Projecting from fill	0.9
Headwall	0.5
Type I end section	0.5
Type III end section	0.2
Side or drop tapered headwall	0.2
Box, Reinforced Concrete	
Straight Wings	0.7
45° wings	0.4
45° wings (with crown radius)	0.2
Side or drop tapered	0.2

3F-7-1-3

Friction Head Loss (Hf)

The following formula may be used to compute Hf:

$$Hf = \frac{29\ n^2\ L}{R^{1.33}} \frac{V^2}{2g}$$

Where: g = acceleration due to gravity (32.2 ft/sec^2)

v = velocity in feet per second through barrel $\frac{Q}{A}$

n = Mannings n from the following table

L = length of the culvert in feet

R = hydraulic radius in feet

RCB	Pipe
$R = \frac{HS}{2(H+S)}$	$R = D/4$

Type of Barrel	Mannings n
Smooth (concrete)	0.012
Corrugated (2 2/3" x 1/2" corrugations)	0.024
Corrugated (3" x 1" corrugations)	0.027
Corrugated (6" x 2" corrugations)	variable, see HEC No. 5

Channel (70) Upper End

142.5 − 140.0 = 2.5

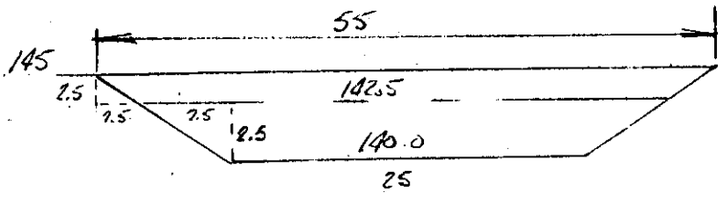
25 × 2.5 = 62.5

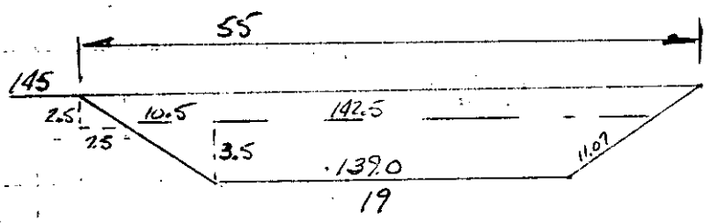
7.5 × 2.5 = 18.75

62.5 + 18.75 = 81.25

955 × 81.25 = 77,593.75

77,593.75 / 43,560





11.07 × 2 = 22.14

22.14 + 19 = 41.14

103.25 − 2.5 = 41.14

$(2.5)^{4/3} = 1.85$

19 × 3.5 = 66.5

3.5 × 10.5 = 36.75

36.75 + 66.5 = 103.25

103.25 + 81.25 = 184.5

184.5 / 2 = 92.25

92.25 × 955 = 88,098.75 ft ÷ 43560 = 2.02 Ac Ft

20.12	Ac Ft	Pond
3.3	Ac Ft	90 Channel
2.02	Ac Ft	70 Channel
25.44	Ac Ft	Total

FILE NO. 784 BELL & CASTLE, P.A. ENGINEERS CLIENT Builders Inc. DATE BY RMH SH 1 CHKD OF 2

PROJECT Rumee Mesa Drainage

Flood stage

360 - 18 = 342
595 - 18 = 577 x
197,334

145 x 166 = 24,070

145 x 145 = 21,025 ÷ 2 = 10,512.5

66 x 66 = 4356 ÷ 2 = 2178

+ 197,334
+ 24,070
+ 10,512.5
- 2,178
229,740.5 ÷ 43,560 = 5.27 Acs

Conservation stage

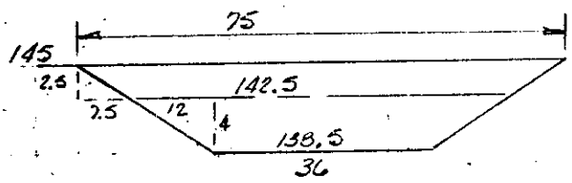
318 x 553 = 175,854

+ 175,854
+ 24,070
+ 10,512.5
- 2,178
208,260.5 ÷ 43,560 = 4.78 Acs

5.27
4.78
10.05 ÷ 2 = 5.03 Acs

5.03 Acs x 4 = 20.12

Channel (90 ft)



2.5 x 2 = 5
12 x 2 = 24
75 - 15 - 24 = 36

36 x 4 = 144
12 x 4 = 48
144 + 48 = 192 Sq Ft

192 x 750 = 144,000 Cu Ft
144,000 ÷ 43560 = 3.3 Ac Ft

ELL & CASTLE. P.A. ENGINEERS

FILE NO. | CLIENT | DATE BY SH | CHKD OF

PROJECT

EXPECTED RUNOFF FROM SUB AREAS # 5. THROUGH # 15. (FOR 100 YEAR RECURRENCE INTERVAL TIME)

Total Area = 66.7 aerea.
Length of travel = 2400 ft.
Maximum elevation difference = 7 ft.

time of concentration = 29 min
rainfall intensity = 6.95 in/hr for 100 yr storm

Let c = 0.5 for developed area.

$Q = c i a$

$Q = 0.5 \times 6.95 \times 66.7$

$Q = 232$ cfs.

THE CITY OF WICHITA

OFFICE OF Public Works Engineering DATE September 7, 1979

TO Louise Olivarez, Junior Planner

FROM Mike Lindebak, Program Development Engineer

SUBJECT Pawnee Mesa Addition Drainage

August 22, 1979, City staff met with the Developer's representatives to discuss Pawnee Mesa Addition drainage. One of the many items discussed was the outfall drainage system.

Currently drainage from the undeveloped site flows northeasterly crossing under 107th Street West in two thirty (30) inch pipes. The two thirty (30) inch pipes lack the capacity to carry the existing runoff, therefore water also overtops the road. The Developer's representatives indicated they would install a pipe system that would handle the existing runoff from the site without overtopping the road.

The water then flows northeasterly in an undefinable natural drainage channel across a cultivated farm field and then northerly at the rear of a number of residential properties along 107th Street West.

The Developer's representatives indicated they would not obtain drainage easements and construct a drainage channel east of the Pawnee Mesa plat. After some discussion, Mr. Bruggeman concluded that the City Commission be advised ~~that~~ at the time they considered the plat that a CIP drainage project would be necessary.

Mike Lindebak
Program Development Engineer

ML:ck

cc: Dean Sellers
Acting City Engineer

Ray Bruggeman
Director of Public Works

Robert Lakin
Director of Planning