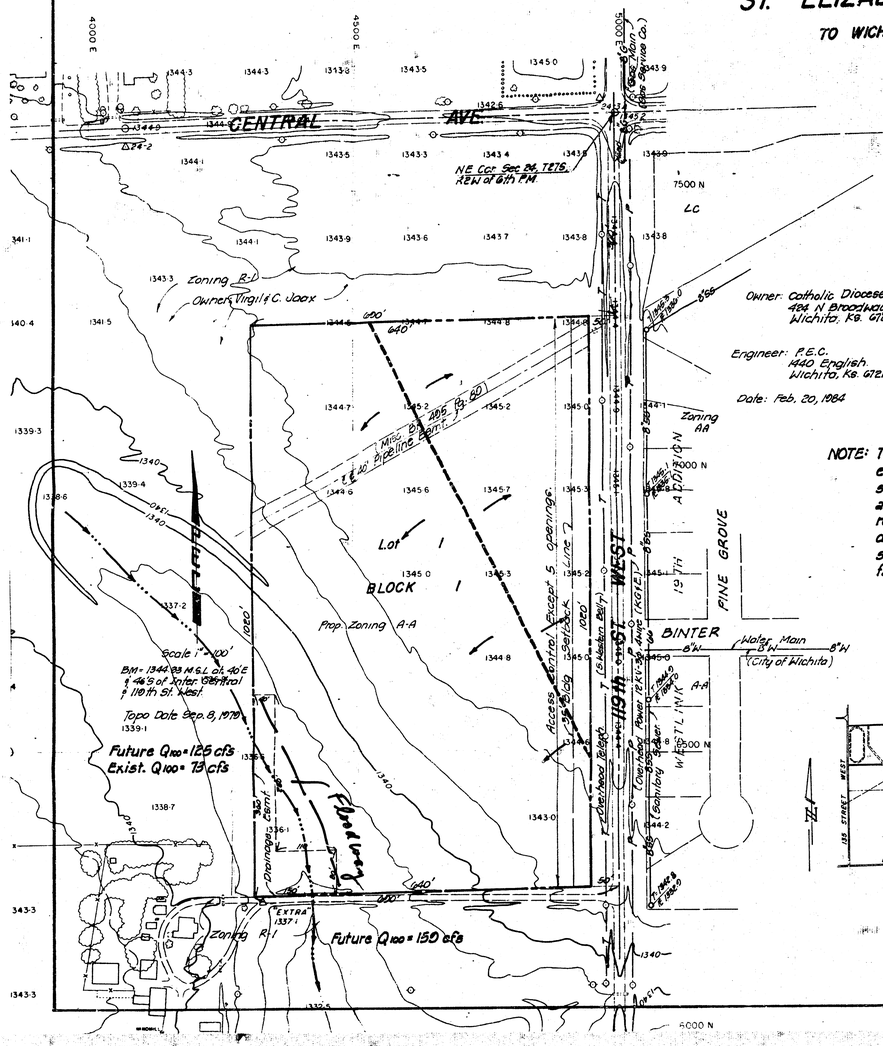
DRAINAGE PLAN

PRELIMINARY PLAT

ST. ELIZABETH ANN SETON ADD.

TO WICHITA, SEDGWICK COUNTY, KANSAS.

3-2-84

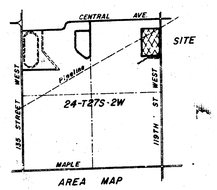


Owner: Catholic Diocese of Wichita
424 N Broadway
Wichita, Ks. 67202

Engineer: P.E.C.
1440 English
Wichita, Ks. 67211

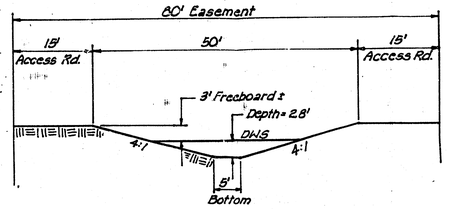
Date: Feb. 20, 1984

NOTE: The front of the lot shall be graded to drain to existing streets, ditches, gutters, and/or storm sewers via drives, flumes, private storm sewers and/or other approved drainage facilities. The rear of the lot shall be graded to the proposed drainage easement via drives, flumes, private storm sewers and/or other approved drainage facilities.



LEGEND

- DRAINAGE FLOW DIRECTION
- DRAINAGE BASIN BOUNDARY
- EXISTING DRAINAGE SWALE



TYPICAL SECTION

ST. ELIZABETH ANN SETON ADDITION
(Drainage)

MEMO

TO: City of Wichita
Engineering Department
7th Floor - City Hall
455 N. Main
Wichita, KS. 67202

ATTN: Chris Breiterstein, P. E.

PROJECT NO. 36-83697-1-237

PROJECT: St. Elizabeth Ann Seton Addition

DATE: February 24, 1984

FROM: Charles S. Brown, P. E.

REFERENCE: Drainage Plan

COPIES TO:
File
Louise Olivarez, MAPD
Jim Weber, SCDPW

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

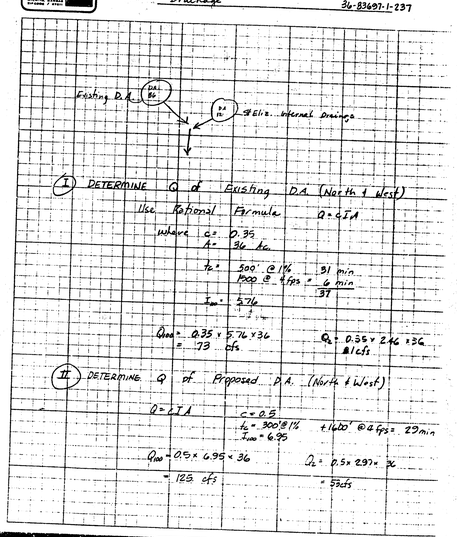
Transmitted herewith is one copy of the Drainage Plan and supporting calculations for the proposed St. Elizabeth Ann Seton Addition to Wichita, Kansas.

The preliminary plat will be submitted on March 2, 1984, for hearing by the Sub-Division Committee on March 15, 1984.

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

FEB 1984
DESIGN DIVISION

Date February 16, 1984 Page 1 of 5
Project St. Elizabeth Addition
Item Drainage 36-83697-1-237



I DETERMINE Q of Existing D.A. (North & West)

Use Rational Formula $Q = CIA$

where $c = 0.35$
$A = 36$ Ac.

T_c = 500' @ 1% = 31 min
1000' @ 4 fps = 4 min
T_c = 37

$Q_{100} = 0.35 \times 5.74 \times 36$
$= 73$ cfs

$Q_2 = 0.35 \times 2.46 \times 36$
$= 31$ cfs

II DETERMINE Q of Proposed D.A. (North & West)

$Q = CIA$ $c = 0.5$
$T_c = 300'@1\% + 1400'@4fps = 23$ min
$T_{100} = 6.95$

$Q_{100} = 0.9 \times 6.95 \times 36$
$= 125$ cfs

$Q_2 = 0.5 \times 2.97 \times 36$
$= 53$ cfs

Date February 16, 1984 Page 2 of 5
Project St. Elizabeth Addition
Item Drainage

III DETERMINE RUNOFF FROM PROJECT SITE.

$Q = CIA$ where $c = \frac{11}{24} Q\ 0.9 \div .90$
$\frac{13}{24} Q\ 0.3 \div .20$
0.50

$T_c = 7.36$ $\frac{1}{2}$ 300'@1% + 900'@4fps = 25 min
A = 12 Ac.

$Q_{100} = 0.50 \times 7.36 \times 12$
$= 44$ cfs

$Q_2 = 0.50 \times 3.32 \times 12$
$= 20$ cfs

II TOTAL Q SOUTH OF PROPERTY

A. Existing condition basin + proposed cond @ channel.

$73 cfs + \frac{5.74}{7.36}(44)$
$= 73 + 34$
$= 107$ cfs

B. Proposed condition basin + proposed condition @ channel.

$125 + \frac{5.74}{7.36}(44)$
$= 125 + 34$
$= 159$ cfs

Date Feb 16, 1984 Page 3 of 5
Project St. Elizabeth's Addition
Item Drainage

IV DETERMINE CHANNEL GEOMETRICS FOR VARIOUS RUNOFFS.

Use Manning's Equation

$Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$ where $n = 0.035$, $S = 0.4\%$ (10' drop / 2500')

$AR^{2/3} = \frac{Qn}{1.486(S^{1/2})} = Q\frac{0.035}{1.486(.0632)} = Q(0.37267)$

$AR^{2/3} = 0.37267\,Q$

for $Q = 113$ cfs : $AR^{2/3} = 27.2$
$Q = 107$ cfs : $AR^{2/3} = 39.9$
$Q = 125$ cfs : $AR^{2/3} = 46.6$
$Q = 159$ cfs : $AR^{2/3} = 59.3$ ← Design Easement for Ultimate Condition

ALT. No. 1 20' CHANNEL BOTTOM

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
1.0	24.0	28.25	0.85	0.90	21.6
1.5	39.0	32.37	1.20	1.13	44.2
2.0	56.0	36.49	1.53	1.33	74.5

Date Feb 16, 1984 Page 4 of 5
Project St Elizabeth
Item Drainage

ALT. #2 - 10' BOTTOM

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
1.0	14.0	18.25	0.77	0.836	11.7
1.5	24.0	22.37	1.07	1.048	25.2
2.0	36.0	26.49	1.36	1.227	44.2
2.5	50.0	30.62	1.63	1.387	69.3

ALT. #3 - 5' BOTTOM

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
2.0	26.0	21.63	1.2	1.182	29.5
2.5	37.5	25.62	1.46	1.289	48.3
3.0	51.0	29.14	1.71	1.432	73.1
← 2.8	49.4	28.09	1.62	1.377	68.5 ← USE

FREEBOARD = 2' ACCESS RD 2:1

TOTAL DEPTH = 27.4' + 2' + 2' = 31.4'

VELOCITY = 159 / 49.4 = 3.5 fps

Page 1 of 3

RAINFALL INTENSITY TABLE

for

SEDGWICK COUNTY KANSAS

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

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.67	6.23	8.00	9.34	10.67	12.23	13.79
6	4.35	5.80	7.45	8.70	9.94	11.39	12.84
7	4.09	5.46	7.02	8.19	9.36	10.72	12.09
8	3.88	5.18	6.66	7.77	8.89	10.18	11.48
9	3.71	4.95	6.36	7.43	8.49	9.72	10.96
10	3.56	4.75	6.11	7.13	8.15	9.33	10.52
11	3.43	4.58	5.89	6.87	7.85	8.99	10.14
12	3.32	4.43	5.69	6.64	7.59	8.69	9.80
13	3.21	4.29	5.51	6.43	7.35	8.42	9.50
14	3.12	4.17	5.36	6.25	7.14	8.18	9.23
15	3.04	4.06	5.21	6.08	6.95	7.97	8.98
16	2.96	3.96	5.09	5.93	6.78	7.77	8.76
17	2.90	3.86	4.97	5.79	6.62	7.59	8.55
18	2.83	3.78	4.86	5.67	6.48	7.42	8.37
19	2.77	3.70	4.76	5.55	6.34	7.27	8.19
20	2.72	3.63	4.66	5.44	6.22	7.12	8.03
21	2.67	3.56	4.57	5.34	6.10	6.99	7.88
22	2.62	3.49	4.49	5.24	5.99	6.86	7.74
23	2.57	3.43	4.41	5.15	5.89	6.74	7.60
24	2.53	3.38	4.34	5.07	5.79	6.63	7.48
25	2.49	3.32	4.27	4.99	5.70	6.53	7.36
26	2.45	3.23	4.21	4.91	5.61	6.43	7.25
27	2.42	3.13	4.15	4.84	5.53	6.33	7.14
28	2.38	3.05	4.09	4.77	5.45	6.25	7.04
29	2.35	2.97	4.02	4.68	5.38	6.16	6.95
30	2.32	2.89	3.92	4.56	5.31	6.08	6.79
31	2.29	2.82	3.82	4.44	5.19	6.00	6.62
32	2.26	2.75	3.72	4.33	5.07	5.87	6.45
33	2.24	2.68	3.64	4.23	4.95	5.73	6.30
34	2.19	2.62	3.55	4.13	4.83	5.60	6.16
35	2.14	2.57	3.47	4.04	4.73	5.47	6.02
36	2.09	2.51	3.40	3.95	4.62	5.35	5.89
37	2.05	2.46	3.33	3.87	4.52	5.21	5.76
38	2.00	2.41	3.26	3.79	4.43	5.13	5.64
39	1.96	2.36	3.19	3.71	4.34	5.02	5.53
40	1.92	2.32	3.13	3.64	4.26	4.92	5.42
41	1.89	2.27	3.07	3.57	4.18	4.83	5.32

NOTES:

1. Computations have been based on the following:
   - A. Standard Curb (0.5%)
   - B. Reinforced concrete pipe corriduits (Mannings n=0.013)
2. Minimum Pad Elevations:
   - Block 10, Lots 20 thru 52 — 144.6
   - Block 10, Lots 53 thru 61 — 144.6
   - Block 12, Lots 10 thru 24 — 144.2

20' Drainage R/W
20' Bk-Bk Flume
Min Grade = 0.60%
10" Curb (Monolithic) (Typ)
Reinf. Concrete Flume

SECTION A-A

UNPLATTED

ST. ELIZABETH ANN SETON ADDITION (In Progress)

UNPLATTED

119TH ST. WEST

UNPLATTED

CENTRAL

RESERVE "A"

RESERVE "B"

RESERVE "C"

CREEK

FEMA 100-Yr Floodplain Boundary

100-Yr DWS = 144.8

Existing Drainageway

Future Crest for Improved Section

Pick up Road Ditch ex15" Pipe Stub & End Section

Drainage Area A

Board of Park Commissioners

"B" SOIL

"C" SOIL

"D" SOIL

KENNY

HICKORY

BIRCH

MURDOCK

PINE GROVE

BEKEMEYER

CINDY

DELANO

GOVINGTON

SHEFFORD

GARDNER RIDGE

GOLDEN HILLS

PARKRIDGE

WESTLINK 138kV

15" CMP B.P.

520'

LEGEND

- Inlet w/Node Identification — ● (103)
- Manhole w/Node Identification — ● (103)
- Storm Sewer w/Size — 36"
- Open Channel
- Inlet(s) (By Others) — ▫
- Storm Sewer (By Others)
- Drainage Direction (Minor Storm)
- Drainage Direction (Major Storm)
- Drainage Crest (Minor Storm)
- Drainage Crest (Major Storm)
- Elevation (Top of Std. Curb) — 100.0
- SCS Hydrologic Soil Group Boundary
- FEMA Floodplain Boundary

MICHAEL W. BERRY LICENSED 9989 KANSAS PROFESSIONAL ENGINEER

N

ASSUMED AZIMUTH

TOPOGRAPHIC MAP OF LANDS LOCATED AT S.W. QUARTER SECTION 18, 27S / 1W, SEDGWICK COUNTY, KANSAS

SURVEYING & ENGINEERING

PROFESSIONAL CONSULTANTS, P.A. 1440 EAST ENGLISH STREET, WICHITA, KS 67211

0 100 200 300 500

1:1200

CONTOUR INTERVAL 2 ft.

PHOTOGRAMMETRY BY MILES AIR PHOTO SURVEY 1201 THURSTON STREET MANHATTAN, KANSAS 66502 (913) 539-7000

AERIAL PHOTOGRAPHY FLOWN VERTICAL AT SCALE OF 1" = 1000' ON FILM DATED OBTAINED 17 MAY 1979

BENCH MARKS:

C.O.W. B.M. Disc. 40' E. & 40' S. of ℄ 119th St. W. & Central. Elev = 1390.05

C.O.W. B.M. Disc. N.E. Cor. Central Ave. bridge over Cowskin Creek. Elev = 1438.08 " Elev = 1331.06 MSL

C.O.W. B.M. Disc. 16 in. W. & 3 of Central ℄ 41' E of ℄ 119th St. W. Elev = 1390.58

DRAINAGE PLAN

GOLDEN HILLS ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

H. WILLIAM SOLT — PRES.

DATE: JUNE 7, 1985

OWNER: SUNN ENTERPRISES, LTD.
491 Industrial Road, Goddard, Kansas 67052
P.O. Box 131, (316) 794-8625

ENGINEER: PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
1440 E. English
Wichita, Kansas 67211

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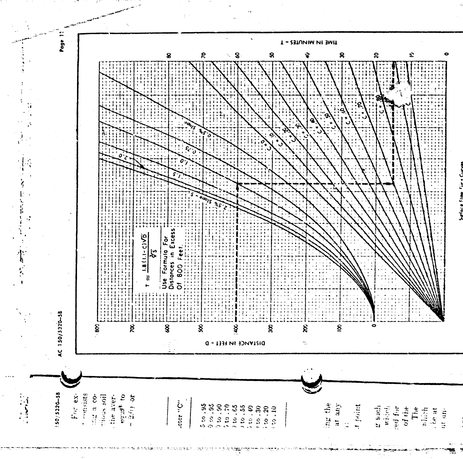
DURATION IN MINUTES	1-YR	2-YR	RETURN PERIODS OF 5-YR	10-YR	25-YR	50-YR	100-YR
46	1.73	2.08	2.41	2.81	3.27	3.62	4.06
47	1.67	2.01	2.33	2.72	3.16	3.50	3.92
48	1.61	1.94	2.25	2.63	3.06	3.38	3.79
49	1.56	1.88	2.18	2.55	2.97	3.28	3.68
50	1.51	1.82	2.11	2.47	2.88	3.19	3.57
51	1.46	1.76	2.05	2.40	2.79	3.09	3.47
52	1.42	1.71	1.99	2.33	2.71	3.00	3.36
53	1.38	1.66	1.93	2.26	2.63	2.91	3.26
54	1.34	1.61	1.88	2.20	2.56	2.83	3.17
55	1.30	1.57	1.83	2.14	2.49	2.75	3.08
56	1.27	1.53	1.78	2.09	2.43	2.69	3.01
57	1.24	1.49	1.74	2.04	2.37	2.62	2.94
58	1.21	1.45	1.70	1.99	2.32	2.56	2.87
59	1.18	1.42	1.66	1.94	2.26	2.50	2.80
60	1.15	1.39	1.62	1.90	2.21	2.44	2.74
61	1.13	1.36	1.59	1.86	2.16	2.39	2.68
62	1.10	1.33	1.55	1.82	2.12	2.34	2.62
63	1.08	1.30	1.52	1.78	2.07	2.29	2.57
64	1.06	1.28	1.49	1.74	2.03	2.24	2.51
65	1.04	1.25	1.46	1.71	1.99	2.20	2.46
66	1.02	1.23	1.43	1.68	1.95	2.15	2.41
67	1.00	1.20	1.40	1.65	1.92	2.11	2.37
68	0.98	1.18	1.38	1.62	1.88	2.07	2.32
69	0.96	1.16	1.35	1.59	1.85	2.03	2.28
70	0.94	1.14	1.33	1.56	1.82	2.00	2.24
71	0.93	1.12	1.31	1.53	1.79	1.96	2.20
72	0.91	1.10	1.28	1.51	1.76	1.93	2.16
73	0.90	1.08	1.26	1.48	1.73	1.90	2.13
74	0.88	1.06	1.24	1.46	1.70	1.87	2.09
75	0.87	1.05	1.22	1.43	1.68	1.84	2.06
76	0.86	1.03	1.20	1.41	1.65	1.81	2.03
77	0.84	1.01	1.18	1.39	1.62	1.78	1.99
78	0.83	1.00	1.16	1.36	1.60	1.75	1.96
79	0.82	0.98	1.15	1.34	1.57	1.73	1.93
80	0.81	0.97	1.13	1.32	1.55	1.70	1.90
81	0.80	0.96	1.11	1.30	1.52	1.67	1.87
82	0.79	0.95	1.10	1.28	1.50	1.65	1.84
83	0.78	0.94	1.08	1.26	1.48	1.62	1.82
84	0.77	0.92	1.07	1.24	1.45	1.60	1.79
85	0.76	0.91	1.06	1.23	1.43	1.57	1.77
86	0.75	0.90	1.04	1.21	1.42	1.55	1.74

Page 3 of 3

DURATION IN MINUTES	1-YR	2-YR	RETURN PERIODS OF 5-YR	10-YR	25-YR	50-YR	100-YR
91	1.00	1.23	1.45	1.92	2.26	2.57	2.86
92	1.00	1.22	1.43	1.90	2.23	2.55	2.83
93	0.99	1.21	1.42	1.89	2.20	2.53	2.81
94	0.98	1.20	1.41	1.87	2.20	2.51	2.79
95	0.97	1.19	1.39	1.85	2.17	2.49	2.76
96	0.96	1.18	1.38	1.84	2.15	2.46	2.74
97	0.96	1.16	1.36	1.82	2.14	2.44	2.72
98	0.95	1.15	1.35	1.80	2.12	2.42	2.70
99	0.94	1.14	1.34	1.79	2.10	2.41	2.67
100	0.93	1.13	1.33	1.77	2.08	2.39	2.65
101	0.93	1.12	1.31	1.75	2.05	2.35	2.61
102	0.92	1.11	1.30	1.73	2.03	2.31	2.57
103	0.91	1.10	1.29	1.72	2.01	2.30	2.55
104	0.90	1.09	1.27	1.70	1.99	2.28	2.54
105	0.90	1.08	1.26	1.68	1.96	2.25	2.50
106	0.89	1.07	1.25	1.67	1.94	2.23	2.48
107	0.88	1.06	1.24	1.65	1.93	2.21	2.45
108	0.88	1.05	1.23	1.64	1.91	2.20	2.43
109	0.87	1.04	1.22	1.62	1.90	2.18	2.41
110	0.86	1.03	1.21	1.61	1.88	2.15	2.40
111	0.86	1.02	1.20	1.59	1.86	2.14	2.38
112	0.85	1.01	1.19	1.58	1.85	2.12	2.35
113	0.84	1.00	1.18	1.56	1.84	2.11	2.33
114	0.84	1.00	1.17	1.55	1.82	2.09	2.32
115	0.83	0.99	1.16	1.54	1.81	2.07	2.30
116	0.82	0.98	1.15	1.52	1.79	2.06	2.29
117	0.82	0.97	1.14	1.51	1.77	2.04	2.26
118	0.81	0.96	1.13	1.50	1.76	2.03	2.25
119	0.81	0.96	1.12	1.48	1.74	2.00	2.24
120	0.80	0.95	1.11	1.47	1.73	1.99	2.22
121	0.80	0.94	1.10	1.46	1.71	1.97	2.20
122	0.79	0.93	1.09	1.45	1.70	1.96	2.18
123	0.79	0.93	1.08	1.43	1.68	1.94	2.16
124	0.78	0.92	1.07	1.42	1.67	1.92	2.14
125	0.78	0.91	1.06	1.41	1.65	1.91	2.12
126	0.77	0.90	1.05	1.40	1.64	1.89	2.10
127	0.77	0.90	1.04	1.38	1.63	1.88	2.09
128	0.76	0.89	1.03	1.37	1.61	1.86	2.07
129	0.76	0.88	1.02	1.36	1.60	1.85	2.05
130	0.75	0.88	1.01	1.35	1.59	1.83	2.04
131	0.75	0.87	1.01	1.34	1.57	1.82	2.02
132	0.74	0.86	1.00	1.33	1.56	1.80	2.01
133	0.74	0.86	0.99	1.32	1.55	1.79	1.99
134	0.73	0.85	0.98	1.31	1.54	1.78	1.98
135	0.73	0.85	0.98	1.30	1.53	1.77	1.96