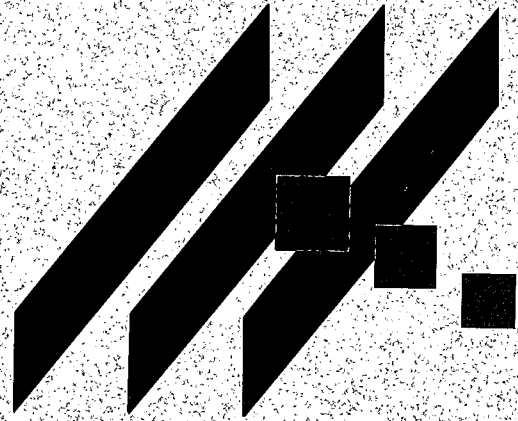


M K E C E N G I N E E R I N G C O N S U L T A N T S , I N C



DRAINAGE REPORT

FOR

CESSNA ELEMENTARY SCHOOL ADDITION

January, 2003

Drainage Report for Cessna Elementary School Addition Wichita, Sedgwick County, Kansas

Location

The site is located in Sedgwick County, Kansas, on the southwest corner of Clarence Avenue and 45th Street South. It lies in the North Half of the Southeast Quarter of the Southwest Quarter of Section 18, Township 28 South, Range 1 East. The total site area is approximately 18.5 acres. The dimensions of the site are approximately 1282 feet east to west and 629 feet north to south. The address of the site is 2101 West 45th Street South. The site is bounded by Clarence Avenue to the west, 45th Street South to the north, developed residential to the south, and an unplatted park to the west. The site is shown in the Derby, Kansas Quadrangle located in Appendix A.

Soils

According to the NRCS (SCS) Sedgwick County Soil Survey (Appendix B), the soil on the site is fine sandy loam. Most of the site is Naron fine sandy loam (Na – HSG “B”). The west edge of the site is Carwile fine sandy loam (Cc – HSG “D”). The east edge of the site is Plevna fine sandy loam (Pb – HSG “D”). Approximately half of the site is Hydrological Soil Group (HSG) “B” and approximately half is “D”. Soil types were averaged to determine the HSG of “C” used for calculations for the site is.

Pre-developed Conditions

Current Development

The site is developed as an elementary school. The school has one 40,000 square foot building in the northeast corner of the site. Two parking lots and an asphalt drive are located near the building. Playground equipment is scattered throughout the western and southern portions of the site.

Current Landform and Slope

The northeast area of the site drains into Clarence Avenue and 45th Street South. Inlets along Clarence Avenue capture runoff and it flows to the south through a 60” pipe. Along 45th Street South inlets capture runoff and a 15” pipe flows to the west. The east half of the site has a slope of approximately 1.2% to the east. North of the building, ground slopes to 45th Street South at approximately 2.0%. Slopes around the playground equipment are close to zero. The west side of the site does not have positive drainage. The playground area is an approximately 5.6-acre sump. The west and south property lines generally slope to the south and east, but have minimal, varying, and sometimes negative slopes. Elevations vary from 90 feet in the west to 84 in the northeast corner.

Current Drainage Conditions

The site lies in an area designated as Zone C – areas of minimal flooding (FIRM Panel 35, Wichita, Kansas, May 15, 1986) (shown in Appendix C). The nearest Zone A designations are approximately 1 mile from the site (FIRM Panels 200 & 225, Sedgwick County, June 3, 1986).

Current Runoff Characteristics

The pre-developed watershed is divided into two sub-watersheds shown in the drainage and utility plan in Appendix D. Watershed "A" is the sump around the playground area. Watershed "B" contains the existing school building. The rational method was used to determine pre-developed runoff. Runoff values are shown in Table 1. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration (t_c), and the flow rate (Q) for each sub-watershed for the 2, 5, 10, and 100-year events. Watershed "B" is approximately 20% impervious.

Table 1. Pre-developed runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	4.9	6.4	9.4	19.3
B	6.7	9.9	15.2	32.5

Post-Developed Condition

Proposed Development

A 16,000 square foot addition will be constructed on the south side of the building. All other areas will remain unchanged.

Proposed Landform and Slope

Landform and slope of the site will not change. Ground surrounding the new addition will slope away from the building and towards Clarence Avenue at 1-2%.

Proposed Runoff Characteristics

The developed watershed is divided into the same two sub-watersheds as in existing conditions shown in the drainage and utility plan in Appendix D. Watershed "A" is the sump around the playground area. Watershed "B" contains the existing school building and the proposed addition to the school. The rational method was used to determine developed runoff. Runoff values are shown in Table 2. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration (t_c), and the flow rate (Q) for each sub-watershed for the 2, 5, 10, and 100-year events. Watershed "A" does not change from existing to proposed conditions. Watershed "B" increases do to the increased impervious area. After development impervious area for watershed "B" will be approximately 22%.

Table 2. Post-developed runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	4.9	6.4	9.4	19.3
B	7.2	10.5	15.6	33.4

Summary

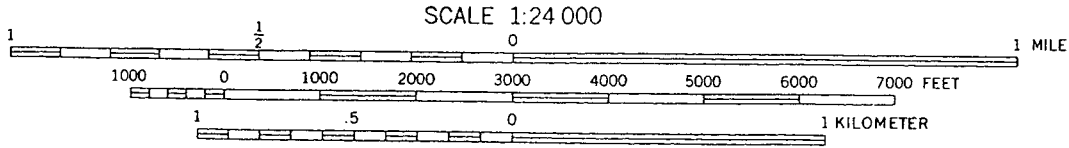
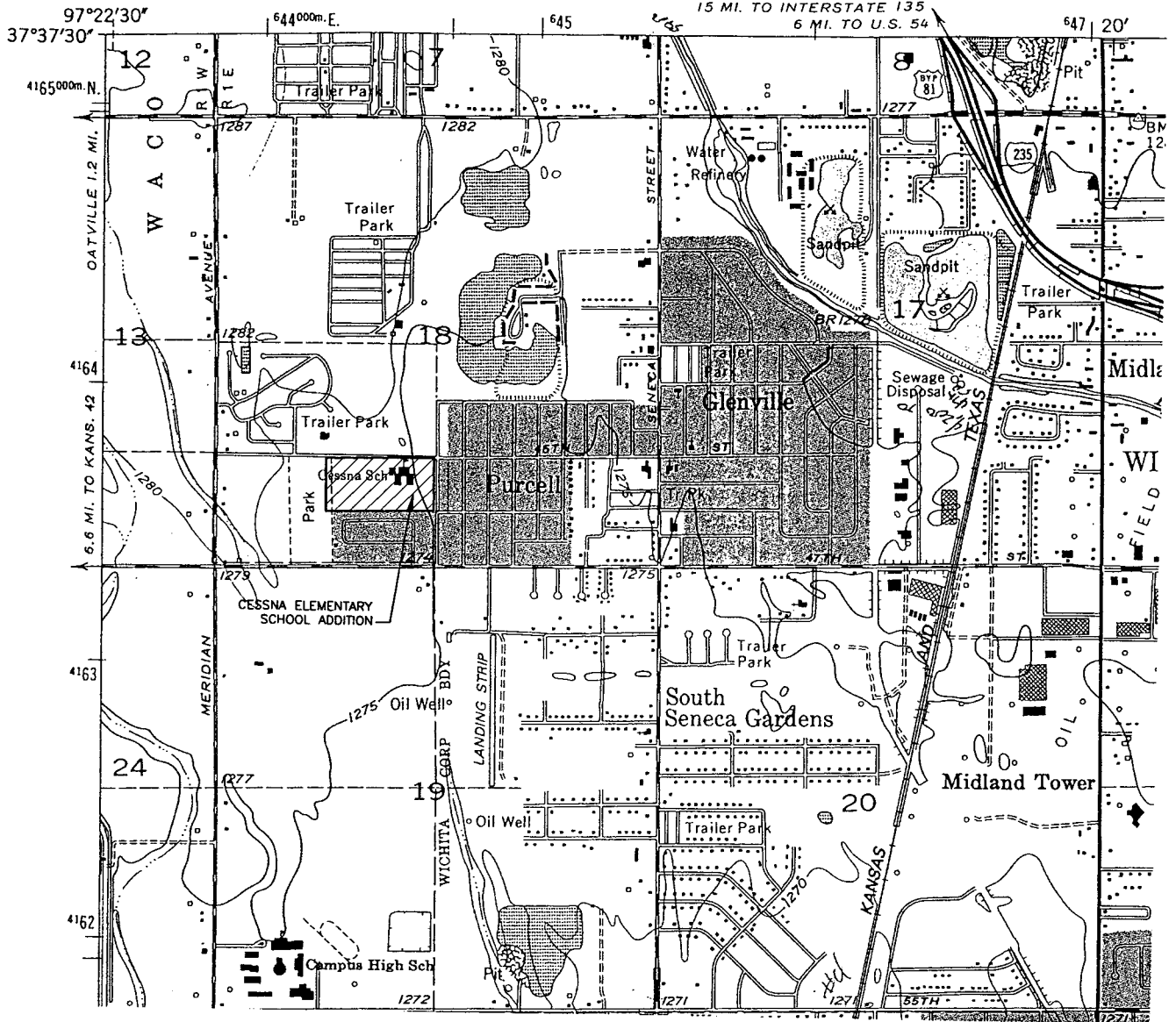
The Cessna Elementary School site contains an elementary school, parking lots, and a playground. An addition is proposed to the south side of the Cessna Elementary School building. In the eastern watershed (watershed "B") the impervious area will increase from 20% to 22% with the additional building area. The change in impervious area increases runoff from watershed "B" from 32.5 to 33.4 cfs in the 100-year event. Runoff from watershed "B" is increased by 2.8% in the 100-year event. After leaving the site runoff enters Clarence Avenue and 45th Street South where it flows into storm water systems. The storm water system along Clarence Avenue flows to the south. The storm water system along 45th Street South flows to the west. The increased runoff due to development is negligible. Watershed "A" does not undergo any changes during the proposed improvements. The playground area does not have positive drainage and this will not change with the proposed improvements.

Appendix A

Quadrangle

6539 III NW
(WICHITA WEST)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

CESSNA ELEMENTARY SCHOOL ADDITION
PROJECT NAME

DERBY KANSAS QUADRANGLE
SHEET TITLE

KLA	KLA	GJA
DESIGN BY.	DRAWN BY.	CHECKED BY.

JANUARY 2003	02287	1 / 1
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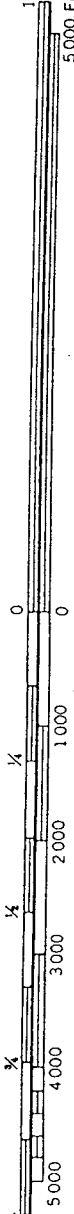
Appendix B

Soil Survey

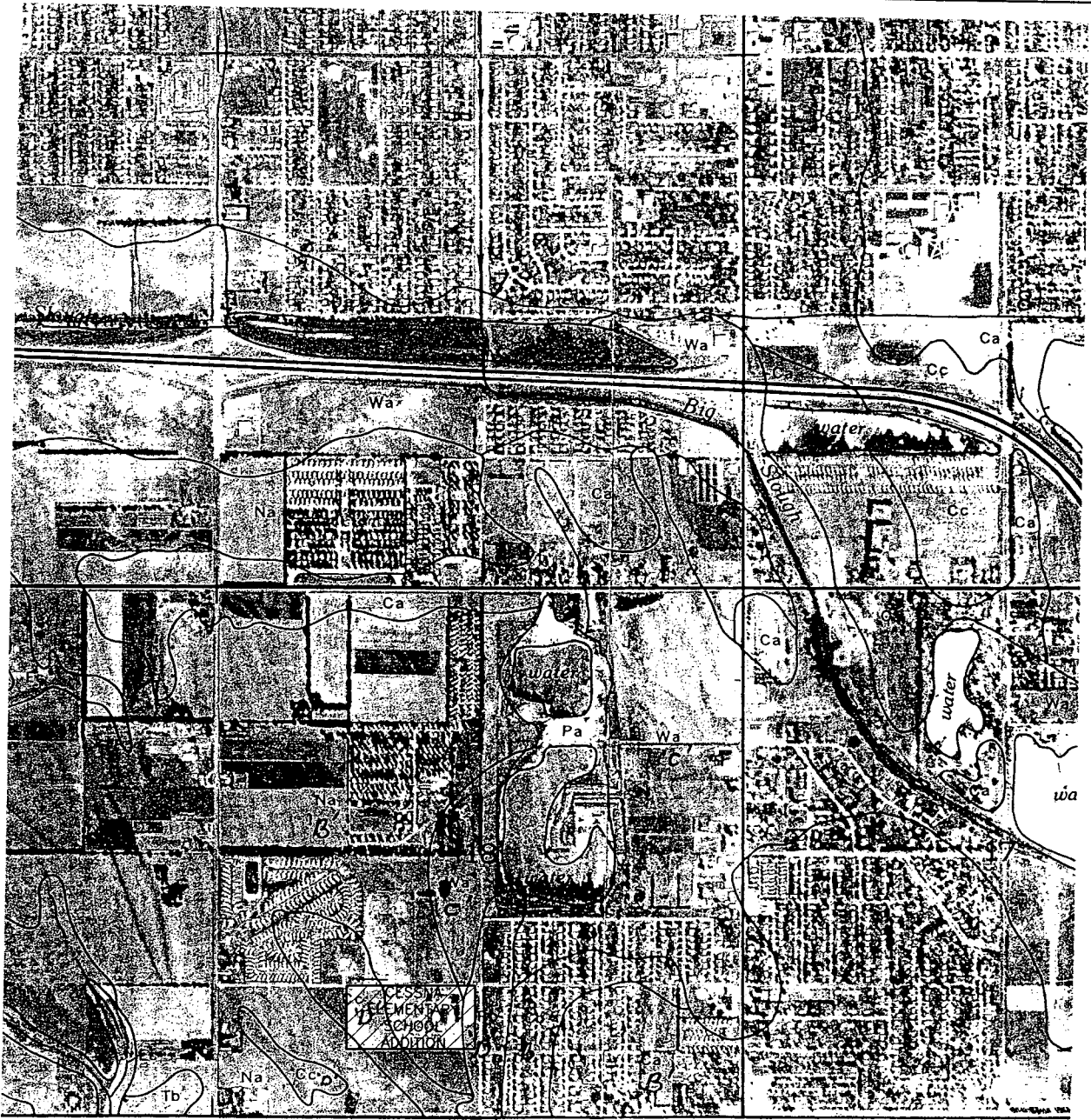
50



1 Mile
5000 Feet



Scale: 1:20000



H:\CIVIL\02287\DWG\PROP\DRNG\022870M.DWG



MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9400

CESSNA ELEMENTARY SCHOOL ADDITION
PROJECT NAME

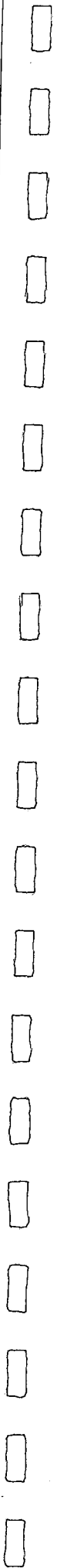
SOIL SURVEY
SEDGWICK COUNTY, KANSAS
SHEET TITLE

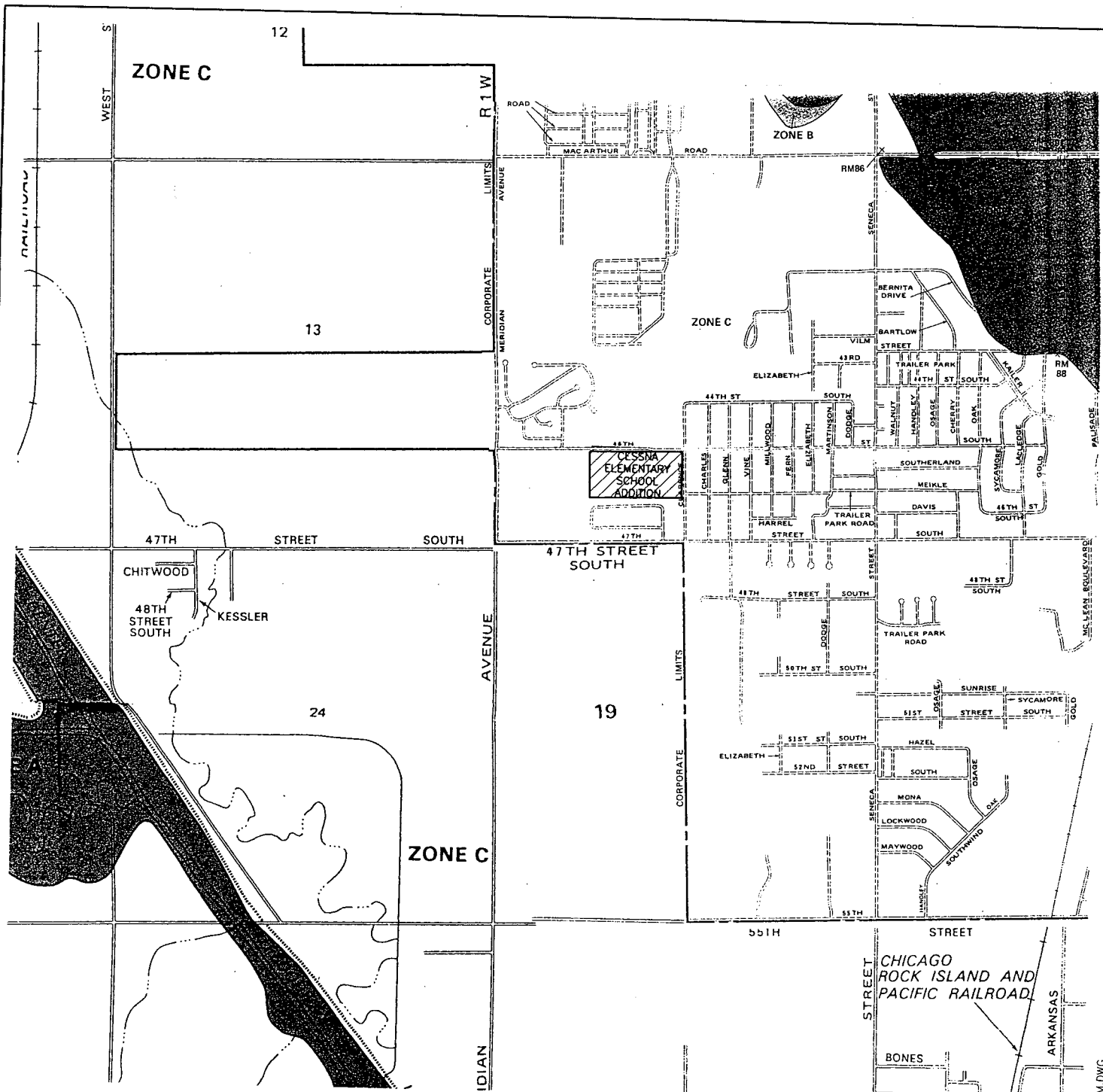
DESIGN BY: KLA DRAWN BY: GJA CHECKED BY:

JANUARY 2003 02287 1 / 1
DATE

Appendix C

Flood Insurance Rate Map





NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY,
KANSAS
(UNINCORPORATED AREAS)

PANEL 225 OF 300

COMMUNITY-PANEL NUMBER
200321 0225 A

EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WICHITA,
KANSAS
SEDGWICK COUNTY

PANEL 35 OF 40
(SEE MAP INCL. 4 FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
200328 0035 B

EFFECTIVE DATE:
MAY 15, 1986

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

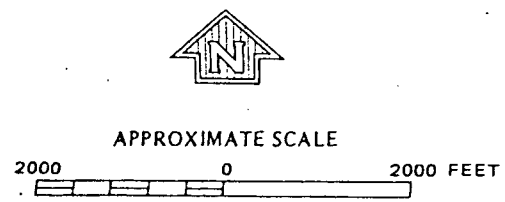
SEDGWICK COUNTY,
KANSAS
(UNINCORPORATED AREAS)

PANEL 200 OF 300

COMMUNITY-PANEL NUMBER
200321 0200 A

EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency



MKEC
ENGINEERING CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316-884-9600

CESSNA ELEMENTARY SCHOOL ADDITION
PROJECT NAME

FEMA FLOOD INSURANCE RATE MAP
SHEET TITLE

KLA DESIGN BY. KLA DRAWN BY. GJA CHECKED BY.

JANUARY 2003 | 02287 | 1 / 1

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Appendix D

Drainage & Utility Plan

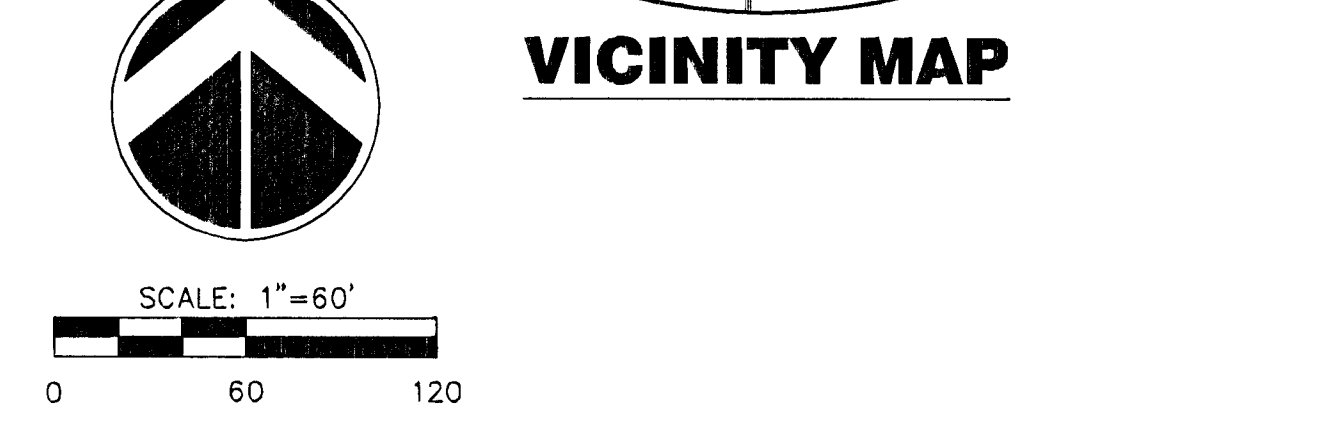
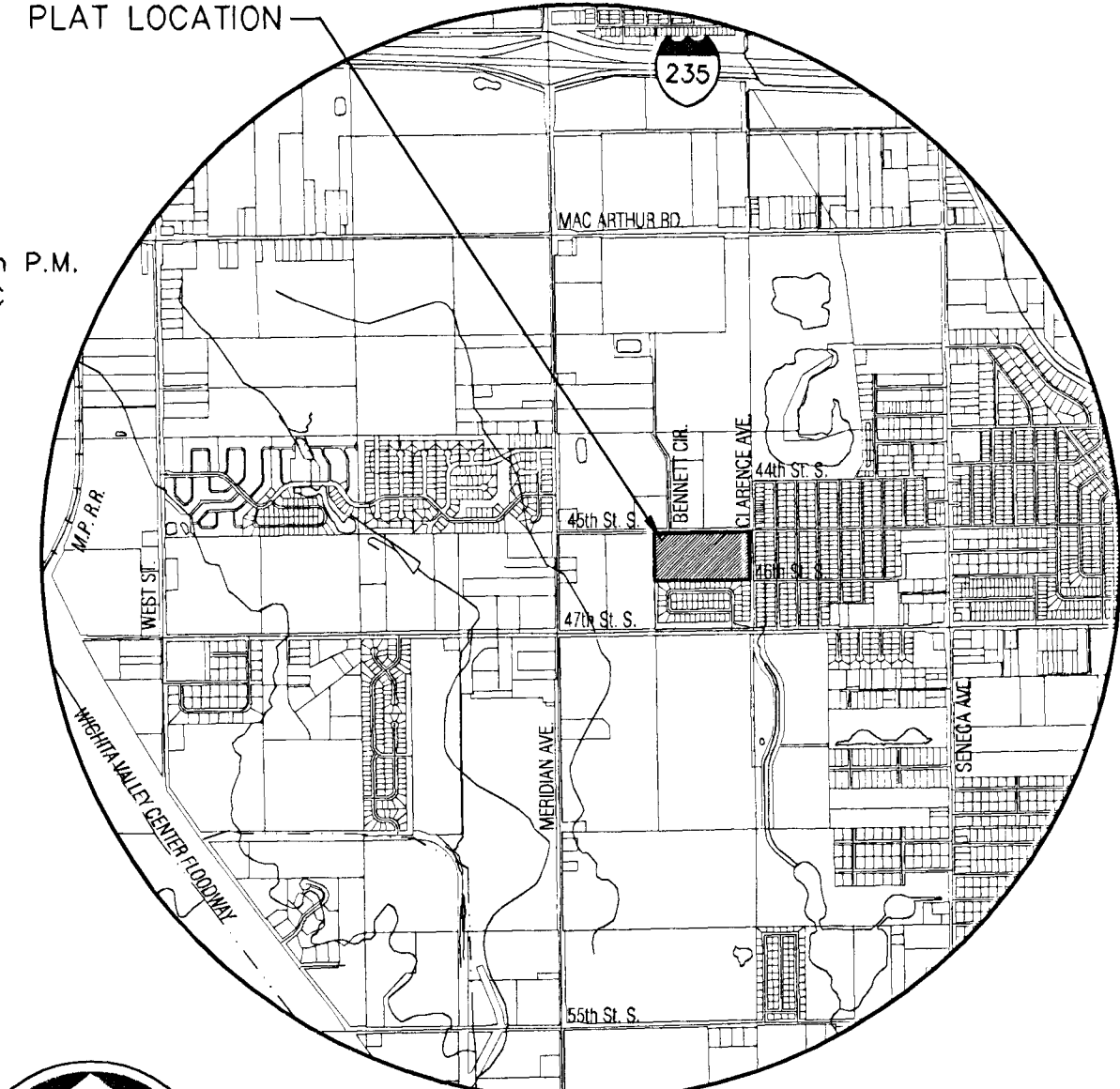
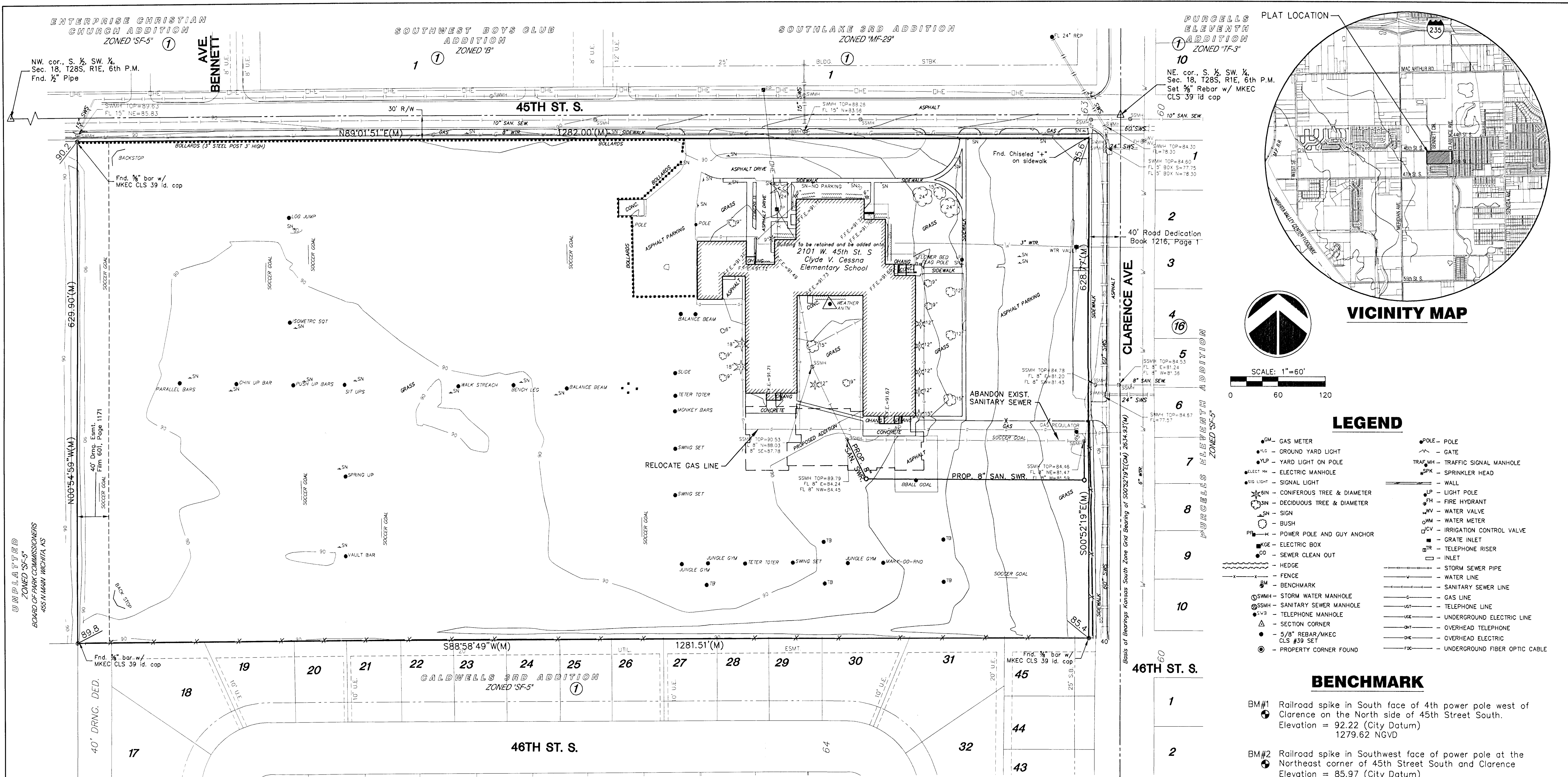
Appendix E

Drainage Calculations

1/10/03

DRAINAGE ANALYSIS SUMMARY
Cessna Elementary School Addition

Area ID	Area ac	Accum. Area ac	C2	C5	C10	C100	Elev Max	Elev Min	Flow Length	Tc2 Calc	Tc5 Calc	Tc10 Calc	Tc10 Calc	Tc5 min	Tc10 min	Tc100 min	I2 in/hr	I5 in/hr	I10 in/hr	I100 in/hr	Q2' cfs	Q5 cfs	Q10 cfs	Q100 cfs	
																									Tc2 Calc
Soil Group C																									
Pre-Developed																									
A	5.6		0.33	0.35	0.42	0.55	1390.8	1389.4	300.0	30.95	0.16	30.14	0.17	27.33	0.18	22.11	0.23	31	30	27	22	4.93	6.35	9.36	19.28
B	13.5		0.37	0.40	0.48	0.61	1390.7	1384.0	1900.0	81.07	0.39	77.74	0.41	68.85	0.46	54.42	0.58	81	78	69	54	6.67	9.85	15.16	32.51
Developed																									
A	5.6		0.33	0.35	0.42	0.55	1390.8	1389.4	300.0	30.95	0.16	30.14	0.17	27.33	0.18	22.11	0.23	31	30	27	22	4.93	6.35	9.36	19.28
B	13.5		0.39	0.42	0.49	0.62	1390.7	1384.0	1900.0	78.85	0.40	75.52	0.42	67.74	0.47	53.31	0.59	79	76	68	53	7.24	10.51	15.63	33.38



BENCHMARK

1	BM#1 Railroad spike in South face of 4th power pole west of Clarence on the North side of 45th Street South. Elevation = 92.22 (City Datum) 1279.62 NGVD
2	BM#2 Railroad spike in Southwest face of power pole at the Northeast corner of 45th Street South and Clarence. Elevation = 85.97 (City Datum) 1187.40 NGVD
3	BM#3 Chiseled "D" on top of curb at the North return of the Northeast corner of Clarence and 46th Street South. Elevation = 84.57 (City Datum) 1271.97 NGVD

LEGAL DESCRIPTION

The North Half of the Southeast Quarter of the Southwest Quarter of Section Eighteen, Township Twenty-eight South, Range One East of the Sixth Principal Meridian, Sedgwick County, Kansas.

NOTES

- Under current zoning this site is zoned "SF-5" - Single Family
- The utilities located and shown on this survey were located or represented by either B.O.E. record, City utility record, or "Kansas One Call" Ticket # 305267 called in on August 16, 2002. Prior to digging field verify all utilities.
- No easement of record found for sanitary sewer serving site.
- Area of Lot 1, Block 1 = 806,655 s.f. or 18.52 ac.

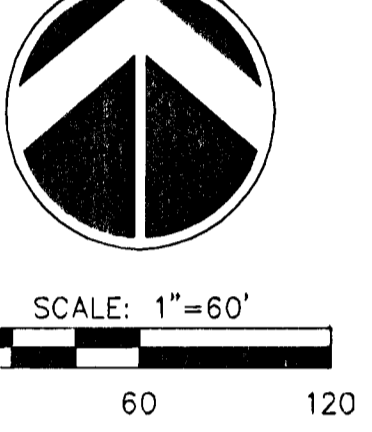
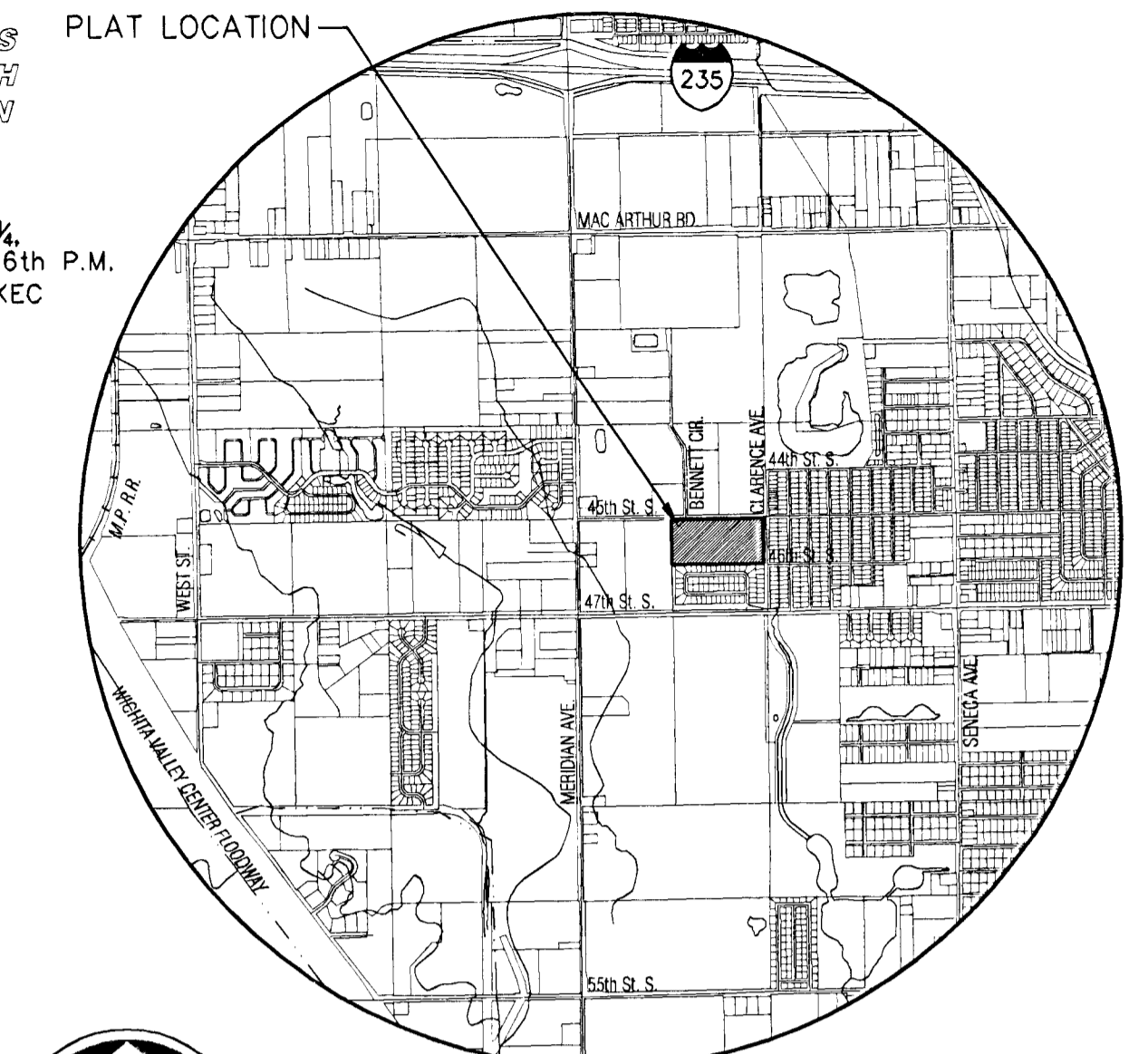
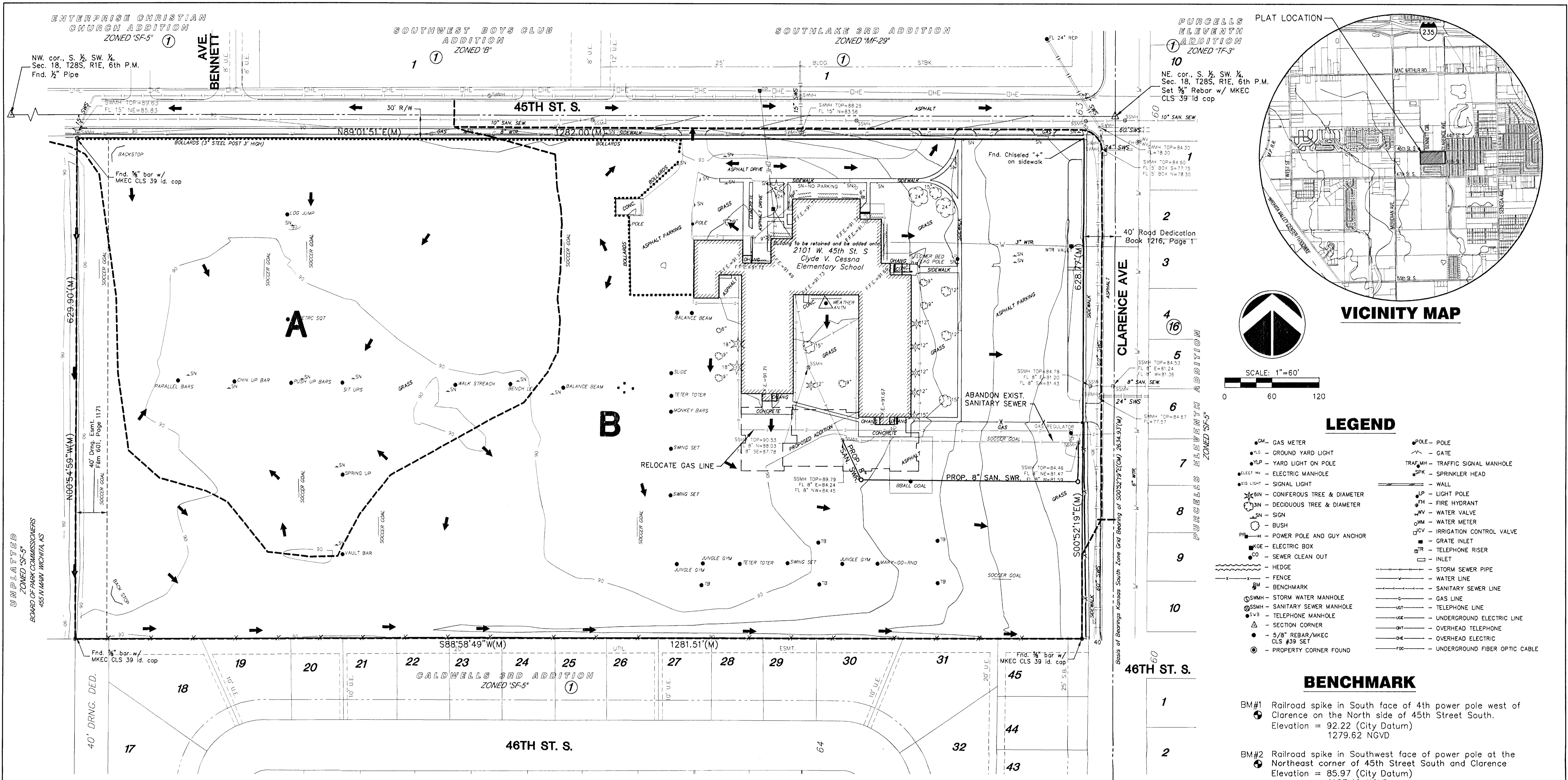
PRELIMINARY GRADING PLAN

CESSNA ELEMENTARY SCHOOL ADDITION

OWNER/DEVELOPER: Unified School District #259 201 N. Water Street, Wichita, KS 67202 316-973-4000
 Attn: Joe Hoover

DATE: JANUARY 2003





LEGEND

- G.M. - GAS METER
- G.L. - GROUND YARD LIGHT
- Y.L.P. - YARD LIGHT ON POLE
- E.M. - ELECTRIC MANHOLE
- S.L. - SIGNAL LIGHT
- C.T. - CONIFEROUS TREE & DIAMETER
- D.T. - DECIDUOUS TREE & DIAMETER
- S. - SIGN
- B. - BUSH
- P.P. - POWER POLE AND GUY ANCHOR
- E.B. - ELECTRIC BOX
- S.C.O. - SEWER CLEAN OUT
- H. - HEDGE
- F. - FENCE
- B.M. - BENCHMARK
- S.W.M.H. - STORM WATER MANHOLE
- S.S.M.H. - SANITARY SEWER MANHOLE
- S.V. - SECTION CORNER
- R.A./MKEC CLS #39 SET
- P.C.F. - PROPERTY CORNER FOUND
- P. - POLE
- G. - GATE
- T.S.M.H. - TRAFFIC SIGNAL MANHOLE
- S.P.K. - SPRINKLER HEAD
- W. - WALL
- L.P. - LIGHT POLE
- F.H. - FIRE HYDRANT
- W.V. - WATER VALVE
- W.M. - WATER METER
- I.C.V. - IRRIGATION CONTROL VALVE
- G.I. - GRATE INLET
- T.R. - TELEPHONE RISER
- I. - INLET
- S.S.P. - STORM SEWER PIPE
- W.L. - WATER LINE
- S.S.S.P. - SANITARY SEWER LINE
- G.L. - GAS LINE
- T.L. - TELEPHONE LINE
- U.E.L. - UNDERGROUND ELECTRIC LINE
- O.H.T. - OVERHEAD TELEPHONE
- O.H.E. - OVERHEAD ELECTRIC
- F.O.C. - UNDERGROUND FIBER OPTIC CABLE

BENCHMARK

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