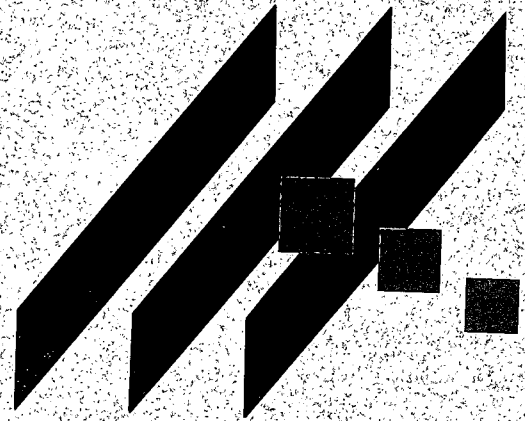


M K E C E N G I N E E R I N G C O N S U L T A N T S , I N C .



DRAINAGE REPORT

FOR

**CRESTVIEW COUNTRY CLUB ESTATES,
OVERBROOK 5th ADDITION**

NOVEMBER 2003

**Drainage Report for
Crestview Country Club Estates, Overbrook Fifth Addition
Wichita, Sedgwick County, Kansas**

Location

The subject property is in Sedgwick County, Kansas. The proposed development is located North of East 9th Street North, north of Central Avenue, and East of 143rd Street East. The site lies in the Northwest Quarter of Section 13, Township 27 South, Range 2 East. The dimensions of the property are approximately 510 feet north to south and 690 feet east to west at the widest points. The area of the plat is 5.0 acres. The site is shown on the Andover, Kansas Quadrangle, located in Appendix A.

Soils

According to the NRCS (SCS) Sedgwick County Soil Survey in Appendix B, the soil on the site is comprised mostly of Clime Silty Clay with 3-6% slopes (Ce - HSG "C") and a small area of Rosehill Silty Clay with 1-3% slopes (Rd - HSG "D"). The Hydrological Soil Group (HSG) used to select runoff coefficients is "C".

Pre-developed Conditions

Current Development

The site is zoned as single family residential. The existing land use is vacant lots.

Current Landform and Slope

Currently the elevation on the site varies from 1331' on the west edge of the property to 1343' on the east edge of the property. Slopes range from 1.0% to 6.0% across the property.

Current Drainage Conditions

Fourmile Creek is the receiving water for the site. Flow through Fourmile Creek near the site is approximately 5,400 cfs in the 100-year design event (Sedgwick County, Kansas FIS Volume 1 of 2, June 3, 1986). According to the Federal Emergency Management Agency (FEMA), the site is in Zone C areas of minimal flooding. The nearest Zone A (area of 100-year flooding) is approximately 2000 feet southwest of the site. (FIRM Panel 150, Sedgwick County, Kansas, June 3, 1986) (shown in Appendix C).

Current Runoff Characteristics

Runoff sheet flows to the west. The site is in a 132 acre watershed that drains to Fourmile Creek. Existing runoff from the watershed is 250-cfs in the 100-year design event. The site is divided into the watersheds shown in the Drainage and Utility Plan in

Appendix D. The rational method was used to analyze each watershed. Times of concentration (t_c) were calculated using the FAA method. Runoff coefficients were selected based upon zero-percent impervious area. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration (t_c), and flow rate (Q) for the 2, 5, 10, and 100-year event for each watershed. Time of concentrations vary from 15 to 26 in undeveloped conditions. Undeveloped runoff values are found in Table 1.

Table 1. Undeveloped Runoff.

	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	0.6	0.8	1.2	2.8
B	0.4	0.6	1.0	2.2
C	0.6	0.8	1.3	2.7
D	1.5	2.0	3.1	7.1
E	0.5	0.7	1.0	2.3
F	0.5	0.7	1.0	2.0
G	0.1	0.1	0.1	0.2
Totals	4.1	5.6	8.6	19.2

Developed Conditions

Proposed Development

The site will develop as 11 residential lots with an average size of 0.45 acres.

Proposed Landform and Slope

Final slopes in the development have not been determined, but the minimum will be 0.5% within street right-of-way and 1-2% in back yards. The preliminary lot-grading plan is shown in Appendix F.

Proposed Runoff Characteristics

The same watersheds shown in Appendix D were used to analyze developed conditions. Times of concentration (t_c) were calculated using the FAA method and ranged from 15 to 24 minutes. Runoff coefficients were selected based upon ½-acre residential lots with twenty five-percent impervious areas. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration (t_c), and flow rate (Q) for the 2, 5, 10, and 100-year event for each watershed under developed conditions. Developed runoff values are found in Table 2.

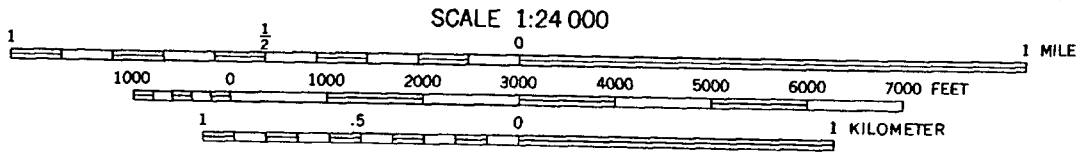
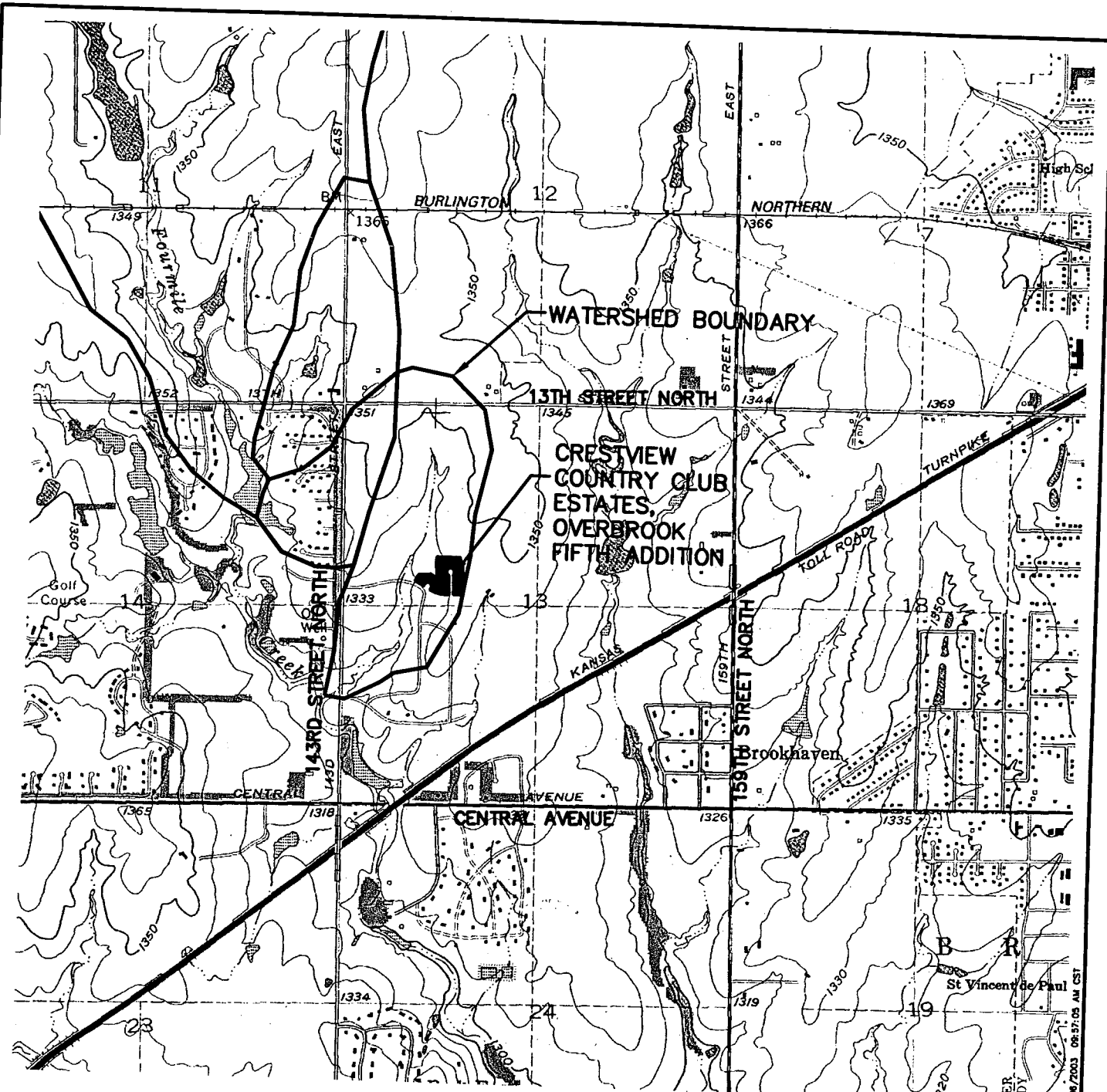
Table 2. Developed Runoff.

	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	1.0	1.3	1.8	3.4
B	0.8	1.0	1.4	2.8
C	1.0	1.3	1.8	3.2
D	2.5	3.3	4.6	8.4
E	0.8	1.1	1.5	2.8
F	0.8	1.0	1.4	2.4
G	0.1	0.1	0.1	0.3
Totals	6.9	9.0	12.6	23.2

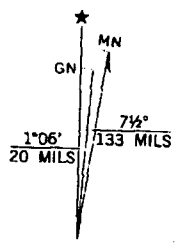
Summary

The Crestview Country Club Estates, Overbrook Fifth Addition is a single-family residential development covering 5.0 acres. The development will have 11 lots approximately 0.5 acres in size. The site drains into a 132-acre watershed that has a peak flow of 250 cfs during the 100-year event. Runoff from the developing site will increase by 4.0 cfs. This is an increase of 1.6% for the watershed. Due to the location of the site in the watershed, peak flow from the site should pass through the watershed before the watershed reaches it's peak outflow. Increased runoff from the 5-acre site is negligible compared to the size of the watershed feeding Fourmile Creek.

**APPENDIX A
QUADRANGLE MAP**



CONTOUR INTERVAL 10 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1982 MAGNETIC NORTH
 DECLINATION AT CENTER OF SHEET

**CRESTVIEW COUNTRY CLUB ESTATES,
 OVERBROOK FIFTH ADDITION**

PROJECT NAME

ANDOVER, KANSAS QUADRANGLE

SHEET TITLE

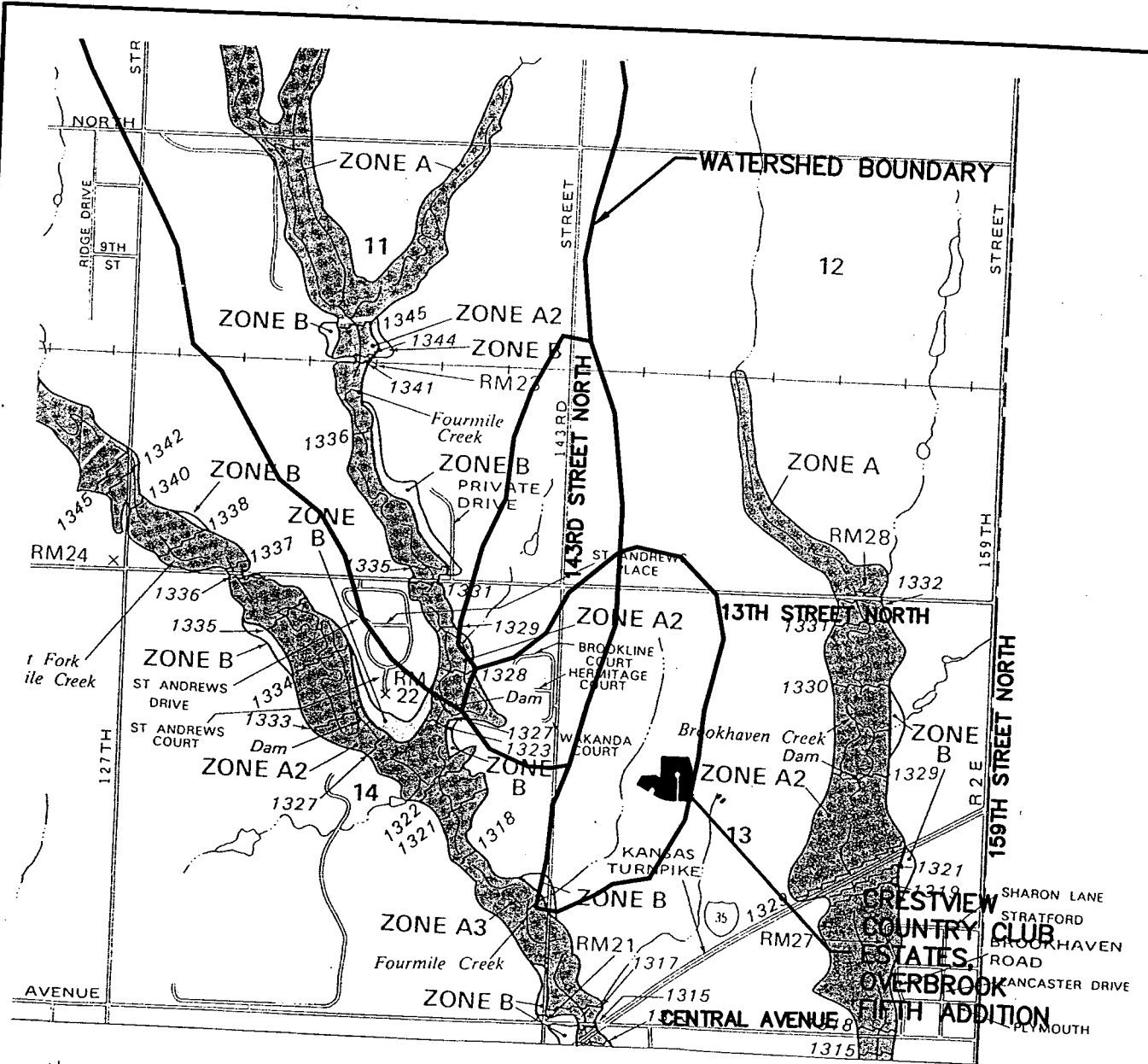
JSM DESIGN BY. **JSM** DRAWN BY. **GM** CHECKED BY.

NOVEMBER 2003 DATE **03120** JOB NO. **1 / 1** SHEET OF

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**APPENDIX B
SOIL SURVEY**

APPENDIX C
FIRM



NATIONAL FLOOD INSURANCE PROGRAM


FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY,
KANSAS
(UNINCORPORATED AREAS)

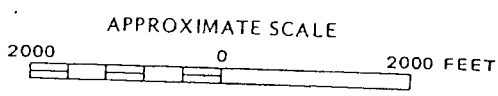

PANEL 150 OF 300

COMMUNITY-PANEL NUMBER
200321 0150 A

EFFECTIVE DATE:
JUNE 3, 1986



Federal Emergency Management Agency

MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67204
316 - 684 - 9800

**CRESTVIEW COUNTRY CLUB ESTATES,
OVERBROOK FIFTH ADDITION**

PROJECT NAME
FIRM PANEL 150 OF 300
SEDGWICK COUNTY, KANSAS

SHEET TITLE

DESIGN BY. <i>JSM</i>	DRAWN BY. <i>JSM</i>	CHECKED BY. <i>GJA</i>
DATE NOVEMBER 2003	JOB NO. 03120	SHEET/OF 1 / 1

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**APPENDIX D
DRAINAGE & UTILITY PLAN**

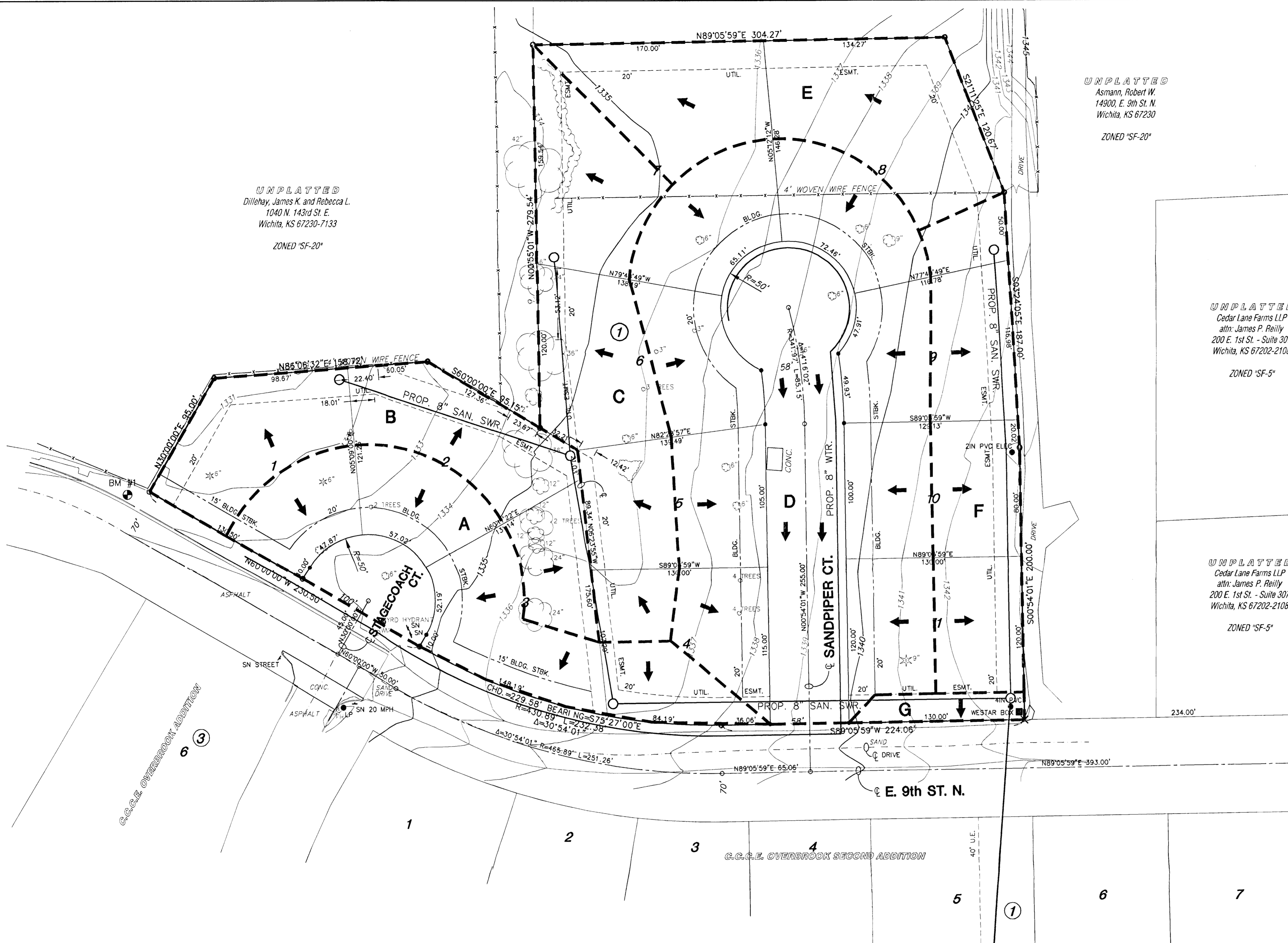
**APPENDIX E
DRAINAGE CALCULATIONS**

11/11/03

DRAINAGE ANALYSIS SUMMARY
Crestview Country Club Estates, Overbrook Fifth Addition
Soil Group C

Area ID	Area ac	C2	C5	C10	C100	Elev Max	Elev Min	Flow Length	Tc2 min	Tc5 min	Tc10 min	Tc100 min	I5 in/hr	I10 in/hr	I100 in/hr	Q2 cfs	Q5 cfs	Q10 cfs	Q100 cfs	Inlet Size ft	Pipe Size in	Min Slope %	COMMENTS
Undeveloped																							
A	0.7	0.26	0.29	0.37	0.53	1336.0	1332.0	310	24	21	17	3.03	3.73	4.50	7.18	0.57	0.78	1.21	2.76				
B	0.6	0.26	0.29	0.37	0.53	1335.0	1331.0	350	27	24	18	2.84	3.50	4.31	6.84	0.44	0.60	0.95	2.16				
C	0.7	0.26	0.29	0.37	0.53	1336.0	1334.0	190	20	18	15	3.33	4.10	4.95	7.37	0.59	0.82	1.26	2.68				
D	1.8	0.26	0.29	0.37	0.53	1342.0	1339.0	260	23	22	16	3.10	3.81	4.60	7.37	1.46	1.99	3.07	7.05				
E	0.6	0.26	0.29	0.37	0.53	1341.0	1335.0	360	24	23	16	3.03	3.73	4.50	7.18	0.48	0.66	1.02	2.32				
F	0.5	0.26	0.29	0.37	0.53	1343.0	1342.0	70	15	15	15	3.83	4.56	5.22	7.37	0.51	0.68	1.00	2.01				
G	0.1	0.26	0.29	0.37	0.53	1342.0	1340.0	130	15	15	15	3.83	4.56	5.22	7.37	0.05	0.07	0.11	0.22				
Total																							
Developed																							
A	0.7	0.40	0.43	0.50	0.63	1336.0	1332.0	310	20	17	15	3.33	4.10	4.95	7.37	0.97	1.28	1.80	3.37				
B	0.6	0.40	0.43	0.50	0.63	1335.0	1331.0	350	23	22	19	3.17	3.90	4.71	7.37	0.76	1.00	1.40	2.76				
C	0.7	0.40	0.43	0.50	0.63	1336.0	1334.0	190	17	16	15	3.61	4.43	5.22	7.37	0.99	1.31	1.79	3.18				
D	1.8	0.40	0.43	0.50	0.63	1342.0	1339.0	260	19	19	15	3.42	4.20	5.08	7.37	2.47	3.28	4.59	8.38				
E	0.6	0.40	0.43	0.50	0.63	1341.0	1335.0	360	20	19	17	3.33	4.10	4.95	7.37	0.91	1.08	1.51	2.83				
F	0.5	0.40	0.43	0.50	0.63	1343.0	1342.0	70	15	15	15	3.83	4.56	5.22	7.37	0.79	1.01	1.35	2.39				
G	0.1	0.40	0.43	0.50	0.63	1342.0	1340.0	130	15	15	15	3.83	4.56	5.22	7.37	0.08	0.11	0.14	0.26				
Total																							
Watershed	132.0	0.31	0.34	0.42	0.57	1355.0	1325.0	4500	109	105	84	1.08	1.49	1.87	3.34	44.63	67.47	103.49	250.37				

APPENDIX F
LOT GRADING PLAN

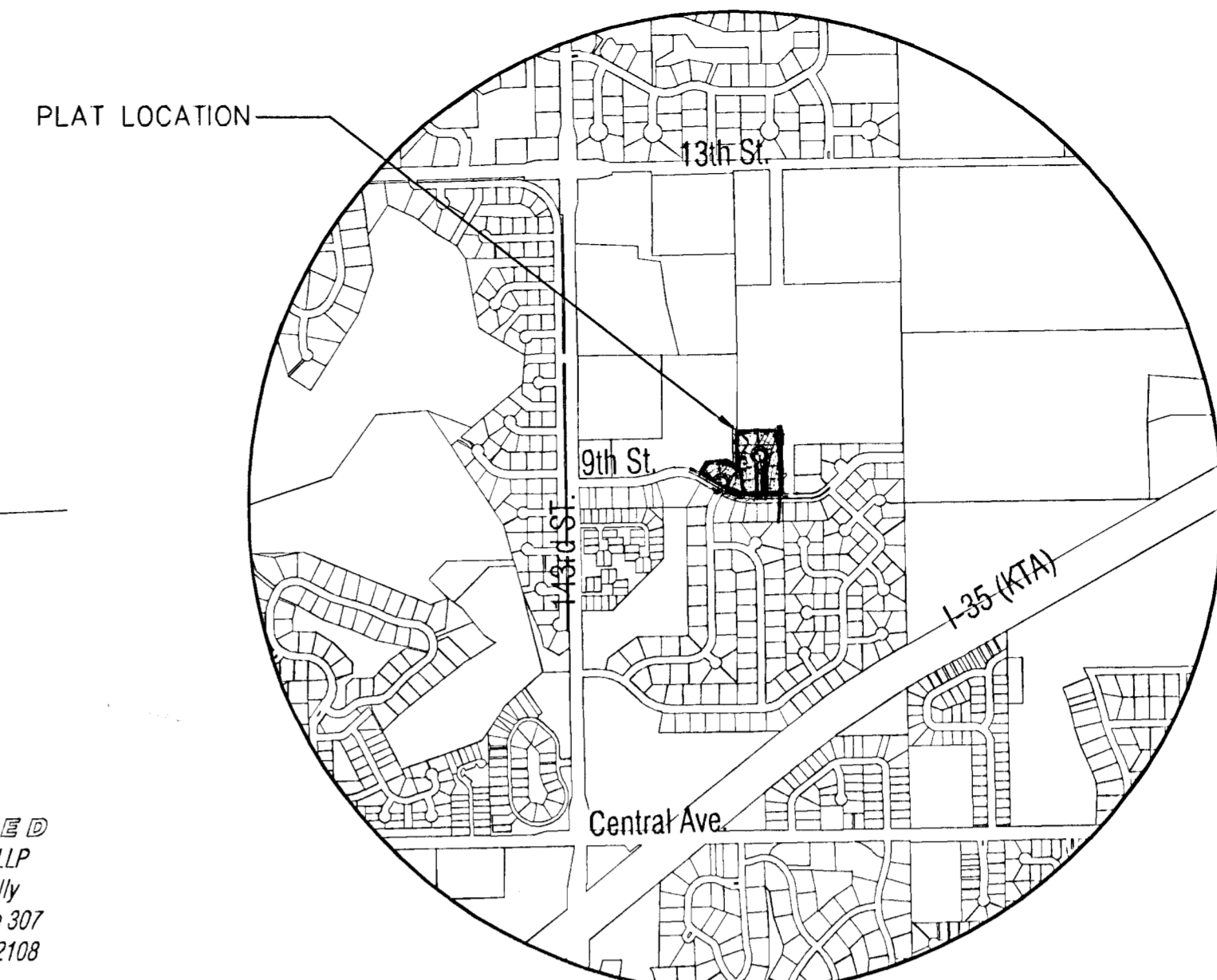


UNPLATTED
 Dillehay, James K. and Rebecca L.
 1040 N. 143rd St. E.
 Wichita, KS 67230-7133
 ZONED "SF-20"

UNPLATTED
 Asmann, Robert W.
 14900, E. 9th St. N.
 Wichita, KS 67230
 ZONED "SF-20"

UNPLATTED
 Cedar Lane Farms LLP
 attn: James P. Reilly
 200 E. 1st St. - Suite 307
 Wichita, KS 67202-2108
 ZONED "SF-5"

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VICINITY MAP

LEGAL DESCRIPTION

All of Lots 1, 2, 3, 4, 5, 6, and 7, Block 4, Crestview Country Club Estates, Overbrook Second Addition, an addition to Sedgwick County, Kansas. TOGETHER WITH: A tract of land located in the Northwest Quarter of Section 13, Township 27 South, Range 2 East, of the Sixth Principal Meridian, Sedgwick County, Kansas, described as follows: BEGINNING at the Northeast corner of Lot 6, Block 4, Crestview Country Club Estates, Overbrook Second Addition, an addition to Sedgwick County, Kansas; thence S89°05'59"W, 320.00 feet to the Northwest corner of Lot 5, said Block 4; thence N60°00'00"W, 39.85 feet; thence N00°55'01"W, 279.54 feet; thence N89°05'59"E, 304.27 feet; thence S21°11'25"E, 120.67 feet; thence S03°24'01"E, 187.0 feet to the POINT OF BEGINNING.

LEGEND

ICV - IRRIGATION CONTROL VALVE	— — — — — EDGE OF TREES
GR - GRATE INLET	CTN - CONIFEROUS TREE & DIAMETER
TR - TELEPHONE RISER	DN - DECIDUOUS TREE & DIAMETER
SWB - TELEPHONE MANHOLE	B - BUSH
EB - ELECTRIC BOX	SN - SIGN
PA - POWER POLE AND GUY ANCHOR	POLE - POLE
GM - GAS METER	G - GATE
GL - GROUND YARD LIGHT	SPK - SPRINKLER HEAD
YLP - YARD LIGHT ON POLE	LP - LIGHT POLE
SMWH - STORM WATER MANHOLE	— — — — — STORM SEWER PIPE
IN - INLET	— — — — — WATER LINE
SSMH - SANITARY SEWER MANHOLE	— — — — — SANITARY SEWER LINE
CO - SEWER CLEAN OUT	— — — — — GAS LINE
WV - WATER VALVE	— — — — — TELEPHONE LINE
WM - WATER METER	— — — — — UNDERGROUND ELECTRIC LINE
FH - FIRE HYDRANT	— — — — — OVERHEAD TELEPHONE
— — — — — FENCE	— — — — — OVERHEAD ELECTRIC
	— — — — — UNDERGROUND FIBER OPTIC CABLE

NOTES

- ZONING: SF-20 and SF-5 (Current)
SF-5 (Proposed)
- RESERVES: none
- PLAT AREA: 5.00 acres
- SURVEY DATE: October 25th, 2003
- EXISTING USE: Vacant lots
- LOT TOTAL: 11

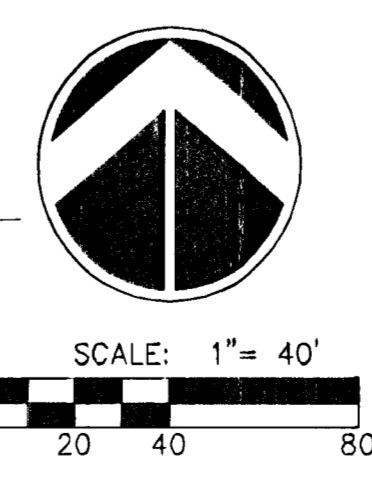
BENCH MARK

BM #1 Square cut top curb on N. side of 9th St. 14.5' S. and 3' W. of SW. cor. of Overbrook 2nd Add. (SW. Cor. Lot 1, Blk. 4)
 Elev. = 1332.765 NGVD

DRAINAGE AND UTILITY PLAN

CRESTVIEW COUNTRY CLUB ESTATES, OVERBROOK FIFTH ADDITION

OWNERS/DEVELOPER: INK ENTERPRISES, INC. 1223 NORTH ROCK ROAD BLDG. 1/STE. 200 WICHITA, KS 67206 Phone: (316) 681-3500



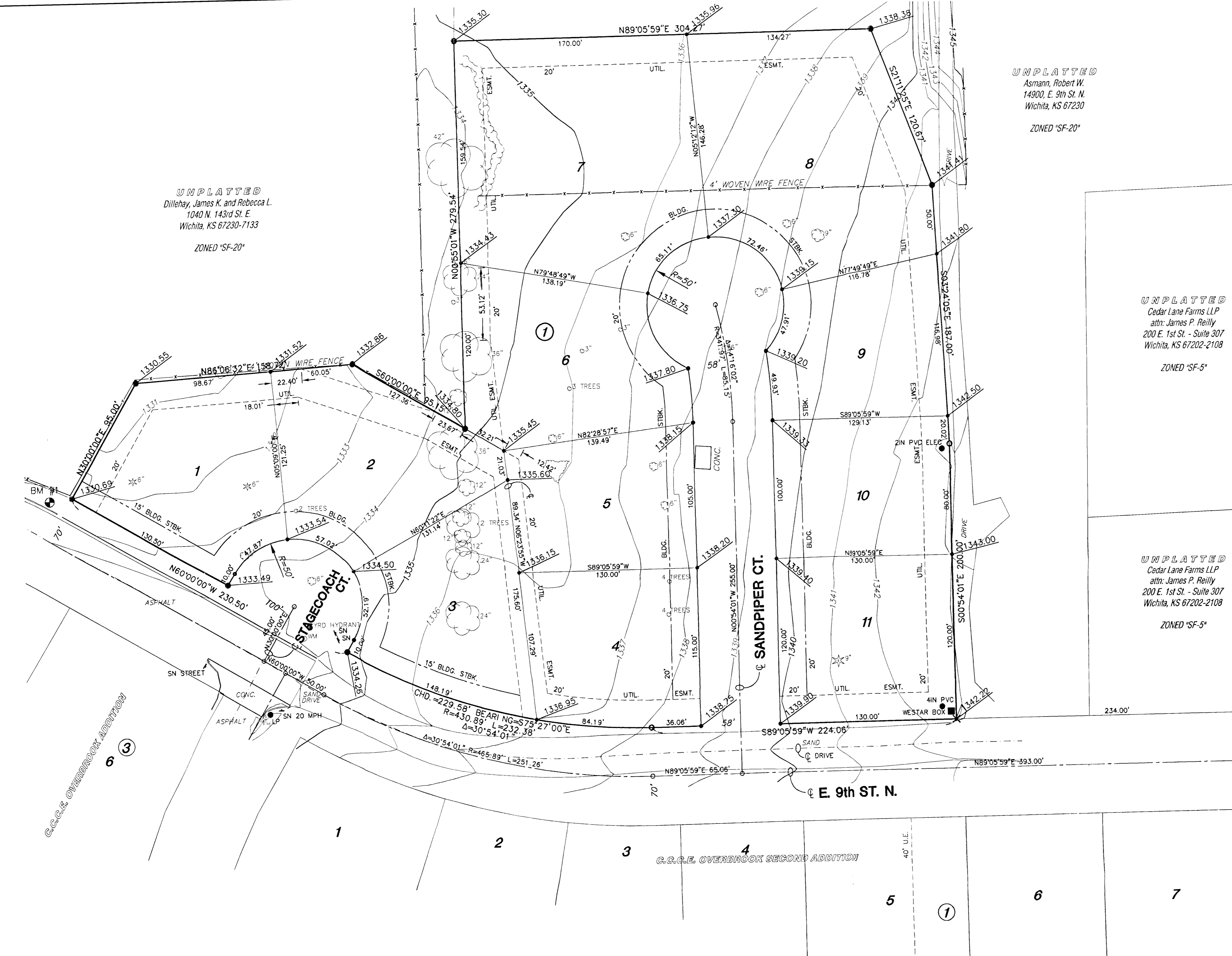
DATE: NOVEMBER 2003

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PRELIMINARY LOT GRADING PLAN

CRESTVIEW COUNTRY CLUB ESTATES, OVERBROOK FIFTH ADDITION

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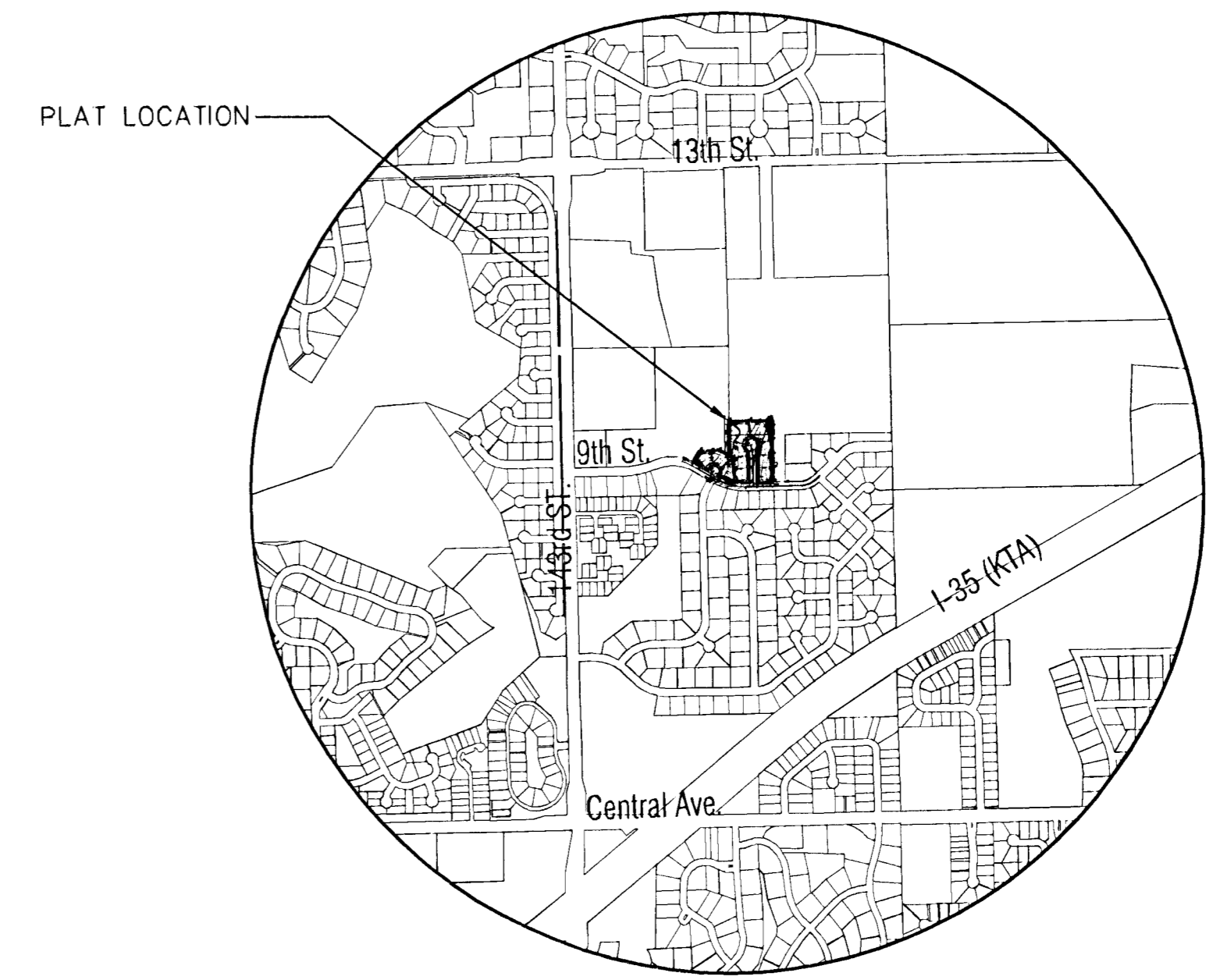


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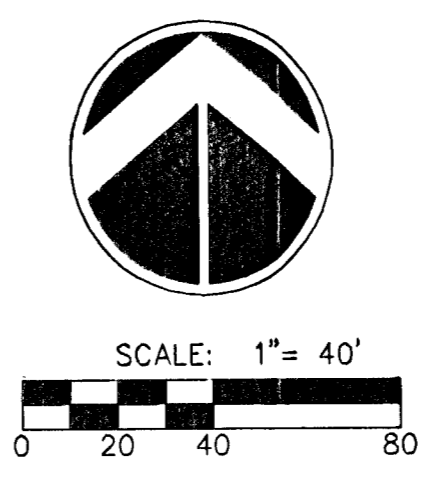
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DATE: NOVEMBER 2003



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