

Preliminary Drainage Report for the Shady Ridge 2nd Addition Wichita, Sedgwick County, Kansas

Location

The subject property is in Wichita, Sedgwick County, Kansas. The site has been platted as Shady Ridge Addition. The proposed development is located approximately 600 feet east of Ridge Road between Central Avenue and Maple Street. The site is between Shade Lane and Wayside Lane. Residential developments and vacant lots surround the site. Shady Ridge 2nd Addition is in the South Half of the Southeast Quarter, of Section 29, Township 29 South, Range 1 East. The dimensions of the property are approximately 250 feet by 525 feet. The area of the plat is 3.1 acres. The site is shown on the Wichita West, 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 silty loam. The site is made up of Milan loam, 1-3% slopes, (Ma - HSG "B"). The HSG used to select runoff coefficients is "B".

Pre-developed Conditions

Current Development

The site is currently vacant land zoned as Multi-Family.

Current Landform and Slope

Slopes in the site vary from 0.5% to 3.5%. Elevations vary from 149' at the southwest corner to 146' at the street south corner of the site.

Current Drainage Conditions

The site drains from southwest to northeast. The Wichita-Valley Center Floodway is approximately 1000 feet northeast of the site. The remaining site is in Zone C – areas of minimal flooding (FIRM Panel 125, Sedgwick, County, Kansas, January 16, 1987) (shown in Appendix C). The nearest Zone A is approximately 1000 feet northeast of the site.

Current Runoff Characteristics

The site currently drains into Shade Lane and into a drainage ditch north of the site. The drainage ditch crosses under Winterset Lane through a 2-9'x4' RCB. Approximately 45.8 acres from offsite drain into the ditch as it runs parallel with the site. Peak flow during the 100-year design event is 165 cfs. A storm water pipe from the north outlets into the drainage ditch just before it crosses under Winterset Lane via the RCB. Approximately 17.3 acres drain into the ditch, in addition to the 45.8 acres, before crossing under Winterset Lane. Before development began on Shady Ridge 1st Addition the RCB had a peak flow of 228 cfs during the 100-year design event. Runoff calculations were done

using the rational method and are shown in the spreadsheet in Appendix D. Drainage boundaries are shown in the Drainage and Utility Plan in Appendix E and include areas for both the 1st and 2nd additions. Time of Concentration was calculated using the FAA method. Under Pre-Shady Ridge 1st Addition conditions, 17.2 cfs leaves the site in the 100-year design event. A summary of the runoff values is shown in Table 1.

Table 1. Pre-developed Runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	1.5	1.7	2.7	6.7
B	2.3	2.6	4.3	10.5
From Shady Ridge	3.8	4.3	7.0	17.2
To RCB	70.4	95.9	125.7	228.0

Developed Conditions

Proposed Development

Lots 1 through 11 of Shady Ridge 1st Addition are to be combined into 2 larger lots roughly 1.5 acre in size. The site will still be developed as Multi-family lots.

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. The preliminary lot-grading plan is shown in Appendix F.

Proposed Runoff Characteristics

The site will continue to drain into Shade Lane and into the drainage ditch north of the site. Proposed runoff calculations were done using the rational method and are shown in the spreadsheet in Appendix D. The drainage areas were the same as in the 1st addition; however, the runoff coefficients were altered to indicate the slightly different land usage. Time of Concentration was calculated using the FAA method. Under proposed conditions, 49.9 cfs leaves Shady Ridge in the 100-year design event. A summary of the runoff values is shown in Table 2.

Table 3. Developed Runoff.

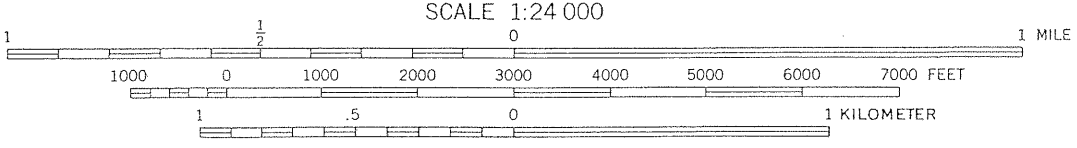
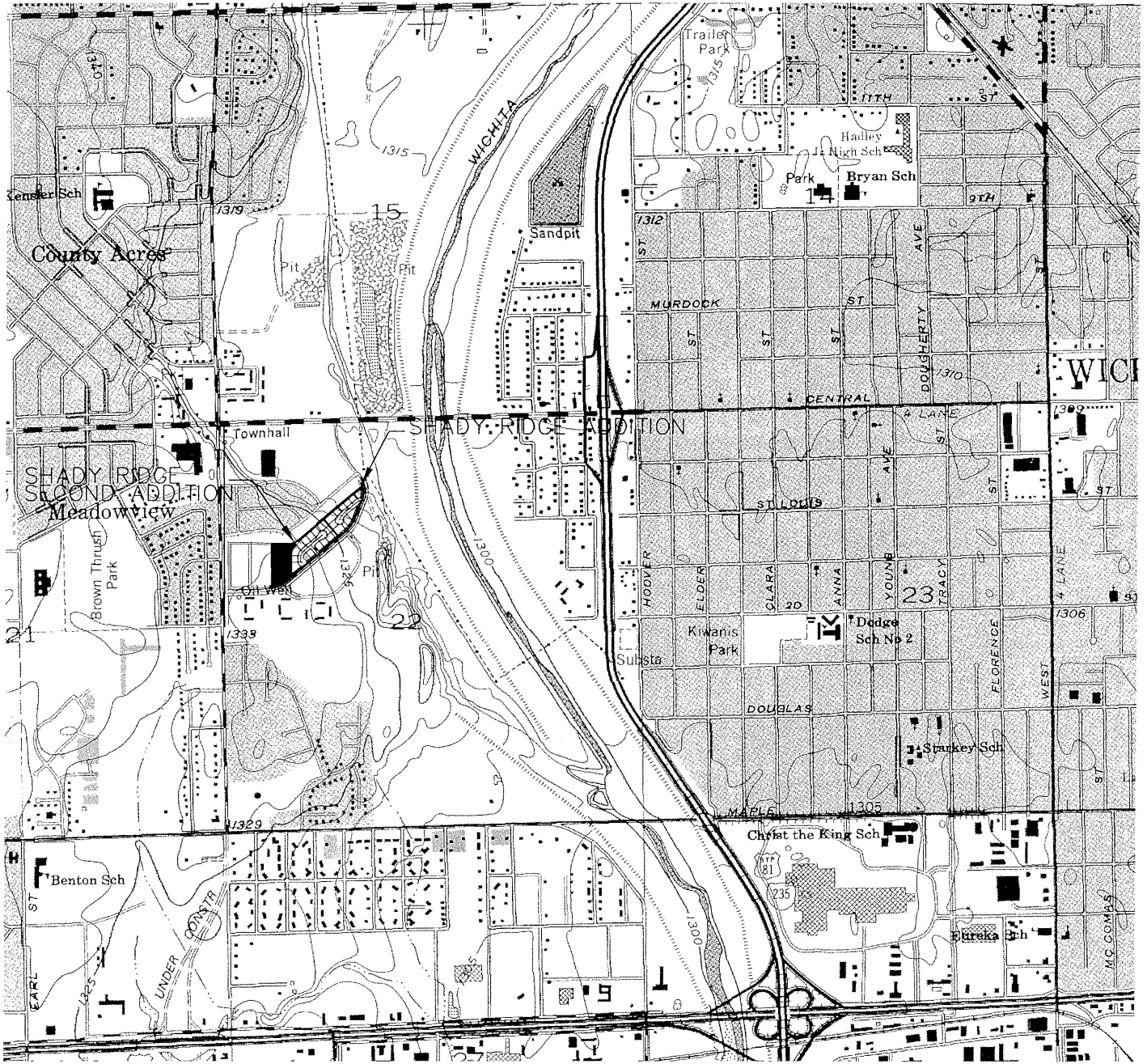
Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	6.5	8.5	11.2	19.5
B	10.1	13.5	17.5	30.4
From Shady Ridge 1 & 2	16.6	22.1	28.7	49.9
To RCB	76.4	103.8	136.0	241.9

An HY-8 run has been completed on the RCB under Winterset Lane and is shown in Appendix G. The 100-year water surface elevation from the Wichita-Valley Center Floodway was used as a constant water surface elevation. The box can handle 650 cfs before overtopping the street.

Summary

The Shady Ridge 2nd Addition is currently vacant lots and is a re-plat of The Shady Ridge Addition. In the 2nd Addition lots 1-11, from the first addition are combined into 2 larger lots approximately 1.5-acre in size. A drainage ditch flows from west to northeast, north of the site. Peak runoff from the Shady Ridge Addition will increase by 32.7 cfs during the 100-year design event. The site enters the Wichita-Valley Center Floodway through a 2-9x4' RCB under Winterset. Flow to the RCB will increase from 228.0 cfs to 241.9 cfs. This increase of 13.9 cfs is 6.1% of the total flow to the RCB. According to the HY-8 model, the 100-year water surface elevation is 124.26 feet under current conditions and 124.30 feet after development. The RCB will handle the increased flow from the development of this site. The site is at the base of the drainage area, before it outlets into the Wichita-Valley Center Floodway. The site will have a negligible effect on runoff through the ditch and to the RCB. Minimum pad elevations will be provided with the final plat.

APPENDIX A
QUADRANGLE MAP



CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

© NCSA, 04/07/2007 13:58:54 mapjuncency\gac07\0406.dwg 2/2/2005 1:21:16 PM CST

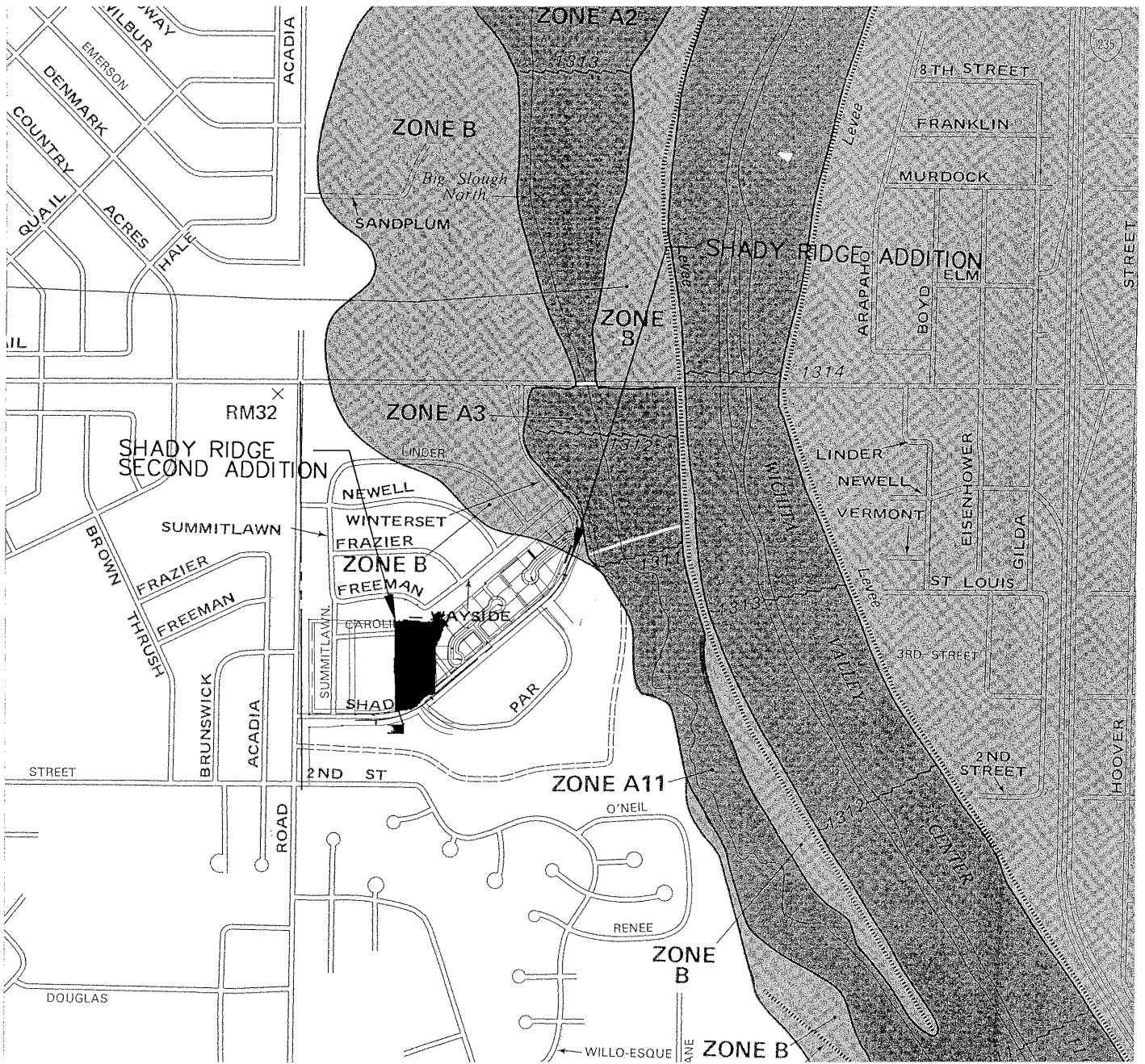


SHADY RIDGE SECOND ADDITION
PROJECT NAME
USGS GEOLOGICAL SURVEY
SEDGWICK COUNTY, KANSAS
SHEET TITLE

<i>KLA</i>	<i>AJK</i>	<i>GJA</i>
DESIGN BY:	DRAWN BY:	CHECKED BY:
<i>JANUARY 2005</i>	<i>05030</i>	<i>1 / 1</i>
DATE	JOB NO.	SHEET/OF

**APPENDIX B
SOIL SURVEY**

APPENDIX C
FIRM



NATIONAL FLOOD INSURANCE PROGRAM


FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WICHITA,
KANSAS
SEDGWICK COUNTY

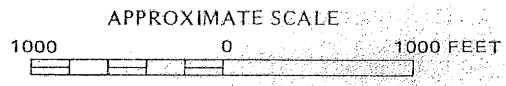

PANEL 20 OF 40
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
200328 0020 B

EFFECTIVE DATE:
MAY 15, 1986



Federal Emergency Management Agency

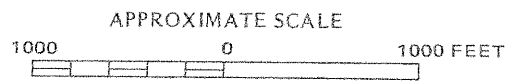
MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

SHADY RIDGE SECOND ADDITION
PROJECT NAME

FLOOD INSURANCE RATE MAP
SEDGWICK COUNTY, KANSAS
SHEET TITLE

<i>KLA</i>	<i>AJK</i>	<i>GJA</i>
DESIGN BY:	DRAWN BY:	CHECKED BY:
JANUARY 2005	05030	1 / 1
DATE	JOB NO.	SHEET/OF

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NATIONAL FLOOD INSURANCE PROGRAM

**FLOODWAY
FLOOD BOUNDARY AND
FLOODWAY MAP**

CITY OF
WICHITA,
KANSAS
SEDGWICK COUNTY

PANEL 20 OF 40
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
200328 0020

EFFECTIVE DATE:
MAY 15, 1986

Federal Emergency Management Agency



MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67204
316 - 684 - 9600

SHADY RIDGE SECOND ADDITION

PROJECT NAME

**FLOOD BOUNDARY AND FLOODWAY MAP
SEDGWICK COUNTY, KANSAS**

SHEET TITLE

KLA

DESIGN BY:

AJK

DRAWN BY:

GJA

CHECKED BY:

JANUARY 2005

DATE

05030

JOB NO.

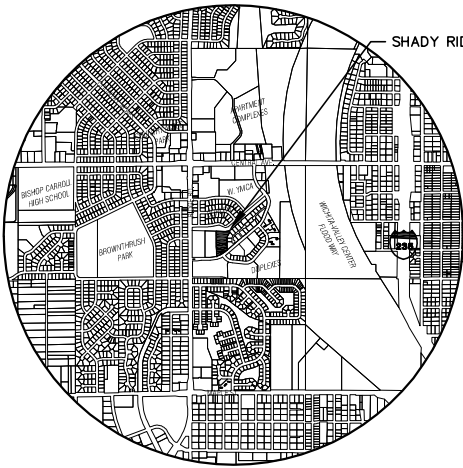
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SHEET/OF

APPENDIX D
DRAINAGE CALCULATIONS

2/18/2005				COMPUTATION FORM										SHADY RIDGE 1 ST AND 2 ND ADDITIONS														X Preliminary				
STORM DRAINAGE SYSTEM DESIGN BY THE RATIONAL METHOD										PROPOSED CONDITIONS STORM SEWER DESIGN														Final								
Area ID	Conveyance		Area ac	Accum. Area ac	Runoff Coefficients					Slope Data			Time of Concentration										Rainfall Intensity				Storm Flows					
	From	To			C2	C5	C10	C100	Explanation of Runoff Coefficients	Elev Max	Elev Min	Flow Length	Tc2 Calc	Avg V2	Tc5 Calc	Avg V5	Tc10 Calc	Avg V10	Tc100 Calc	Avg V100	Tc2 min	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
Existing																																
A			4.30	4.30	0.20	0.18	0.24	0.37	Urban Lawn Areas 1-4% Slope - 0% Impervious	149.0	125.0	1700	59.54	0.48	60.87	0.47	56.90	0.50	48.30	0.59	60	61	57	48	1.72	2.15	2.64	4.23	1.48	1.66	2.72	6.73
B			6.70	6.70	0.20	0.18	0.24	0.37	Urban Lawn Areas 1-4% Slope - 0% Impervious	149.0	125.0	1700	59.54	0.48	60.87	0.47	56.90	0.50	48.30	0.59	60	61	57	48	1.72	2.15	2.64	4.23	2.30	2.59	4.25	10.49
A+B				11.00	0.20	0.18	0.24	0.37	Urban Lawn Areas 1-4% Slope - 0% Impervious	149.0	125.0	1700	59.54	0.48	60.87	0.47	56.90	0.50	48.30	0.59	60	61	57	48	1.72	2.15	2.64	4.23	3.78	4.26	6.97	17.22
C	West	RCB	45.80	45.80	0.61	0.64	0.68	0.75	Multi-Unit Attached - 65% Impervious	170.0	125.0	4000	53.64	1.24	50.35	1.32	45.97	1.45	38.31	1.74	54	50	46	38	1.86	2.41	3.01	4.79	51.96	70.64	93.74	164.54
D	East	RCB	17.30	17.30	0.61	0.64	0.68	0.75	Multi-Unit Attached - 65% Impervious	150.0	125.0	1500	28.81	0.87	27.05	0.92	24.70	1.01	20.58	1.21	29	27	25	21	2.78	3.43	4.22	6.53	29.34	37.98	49.64	84.73
A+C+D		RCB		67.40	0.58	0.61	0.65	0.73	Multi-Unit Attached - 65% Impervious	170.0	125.0	4000	56.50	1.18	53.56	1.24	49.05	1.36	40.96	1.63	56	54	49	41	1.79	2.33	2.86	4.66	70.44	95.90	125.67	227.95
Proposed																																
A			4.30	4.30	0.60	0.62	0.67	0.74	2.46 Acres Multi-Unit Attached - 65% Impervious 1.84 Acres Multi-Unit Detached - 60% Impervious	149.0	125.0	1700	33.08	0.86	31.76	0.89	28.45	1.00	23.82	1.19	33	32	28	24	2.52	3.19	3.90	6.13	6.50	8.50	11.24	19.51
B			6.70	6.70	0.60	0.63	0.67	0.74	5.51 Acres Multi-Unit Attached - 65% Impervious 1.19 Acres Multi-Unit Detached - 60% Impervious	149.0	125.0	1700	33.08	0.86	31.09	0.91	28.45	1.00	23.82	1.19	33	31	28	24	2.52	3.19	3.90	6.13	10.13	13.46	17.51	30.39
A+B				11.00	0.60	0.63	0.67	0.74	7.97 Acres Multi-Unit Attached - 65% Impervious 3.03 Acres Multi-Unit Detached - 60% Impervious	149.0	125.0	1700	33.08	0.86	31.09	0.91	28.45	1.00	23.82	1.19	33	31	28	24	2.52	3.19	3.90	6.13	16.63	22.11	28.74	49.90
C	West	RCB	45.80	45.80	0.61	0.64	0.68	0.75	Multi-Unit Attached - 65% Impervious	170.0	125.0	4000	53.64	1.24	50.35	1.32	45.97	1.45	38.31	1.74	54	50	46	38	1.86	2.41	3.01	4.79	51.96	70.64	93.74	164.54
D	East	RCB	17.30	17.30	0.61	0.64	0.68	0.75	Multi-Unit Attached - 65% Impervious	150.0	125.0	1500	28.81	0.87	27.05	0.92	24.70	1.01	20.58	1.21	29	27	25	21	2.78	3.43	4.22	6.53	29.34	37.98	49.64	84.73
A+C+D		RCB		67.40	0.61	0.64	0.68	0.75	Multi-Unit Attached - 65% Impervious	170.0	125.0	4000	53.70	1.24	50.49	1.32	46.04	1.45	38.38	1.74	54	50	46	38	1.86	2.41	2.97	4.79	76.39	103.75	135.99	241.93

**APPENDIX E
DRAINAGE & UTILITY PLAN**



VICINITY MAP

BENCH MARKS

- BM #1 City Disc NW corner RCBC West side of Shade and Winterset at SW corner of inlet. Elev. = 127.21' City Datum 1314.61' NGVD
- BM #2 Square cut NW corner S. side Shade at P.C. of Lot 1, Blk. 1, Farmington Square 2nd Add. Elev. = 146.06' City Datum 1333.46' NGVD

LEGAL DESCRIPTION

A replat of a portion of land lying in "Woodland Heights 2nd Addition", an addition to Wichita, Kansas;
 A replat of all of Lot 2, said addition, EXCEPT; West 260 feet thereof.
 TOGETHER WITH;
 A replat of Lots 3 and 4, Block 1, of said addition.

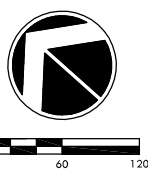
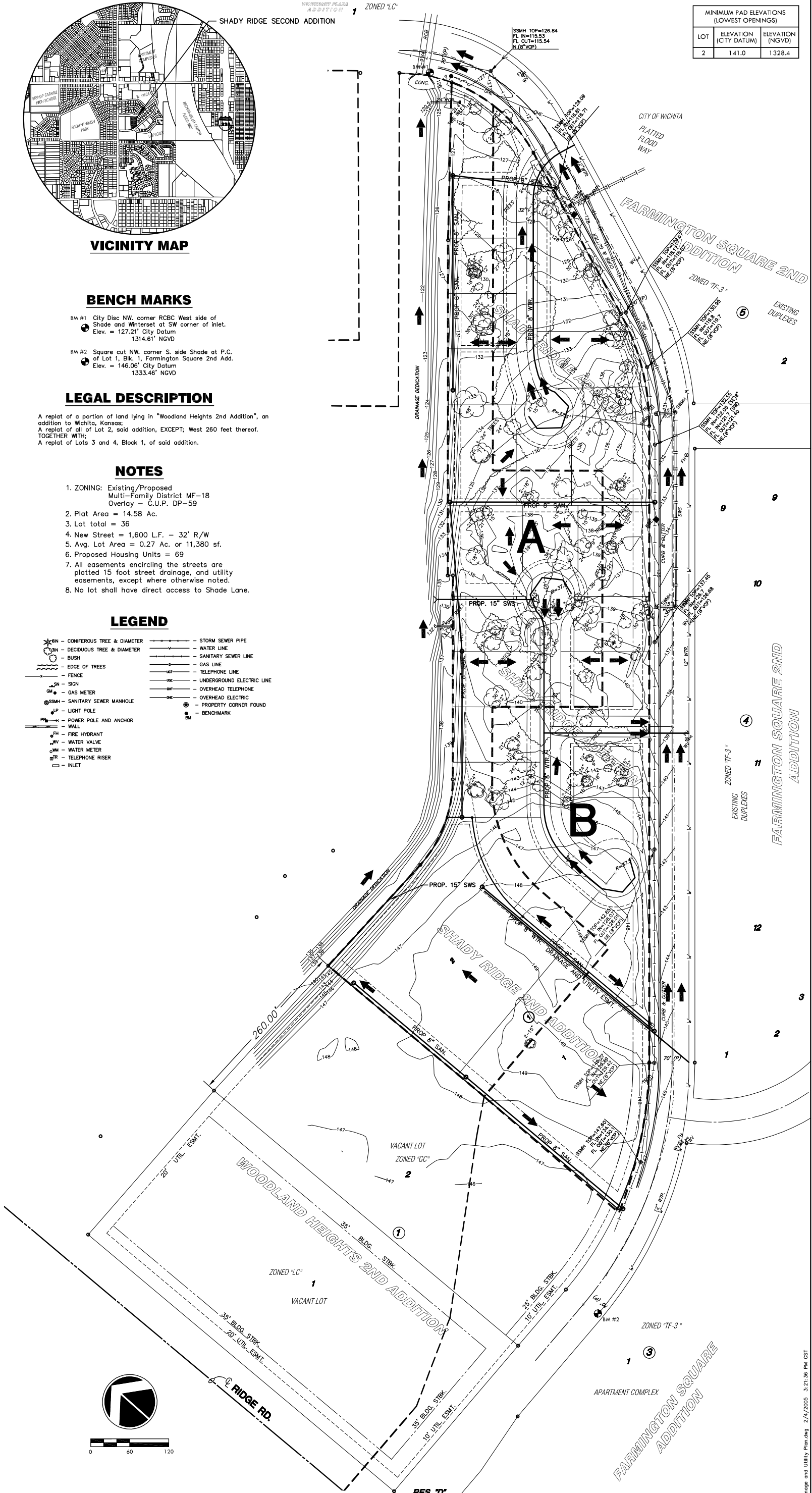
NOTES

1. ZONING: Existing/Proposed Multi-Family District MF-18 Overlay - C.U.P. DP-59
2. Plat Area = 14.58 Ac.
3. Lot total = 36
4. New Street = 1,600 L.F. - 32' R/W
5. Avg. Lot Area = 0.27 Ac. or 11,380 sf.
6. Proposed Housing Units = 69
7. All easements encircling the streets are platted 15 foot street drainage, and utility easements, except where otherwise noted.
8. No lot shall have direct access to Shade Lane.

LEGEND

- ✱ - CONIFEROUS TREE & DIAMETER
- - DECIDUOUS TREE & DIAMETER
- - BUSH
- - EDGE OF TREES
- - - - FENCE
- SN - SIGN
- GM - GAS METER
- SSMH - SANITARY SEWER MANHOLE
- LP - LIGHT POLE
- PA - POWER POLE AND ANCHOR
- W - WALL
- PH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- TR - TELEPHONE RISER
- - INLET
- - STORM SEWER PIPE
- - WATER LINE
- - SANITARY SEWER LINE
- - GAS LINE
- - TELEPHONE LINE
- - UNDERGROUND ELECTRIC LINE
- - OVERHEAD ELECTRIC
- - OVERHEAD ELECTRIC
- - PROPERTY CORNER FOUND
- BM - BENCHMARK

MINIMUM PAD ELEVATIONS (LOWEST OPENINGS)		
LOT	ELEVATION (CITY DATUM)	ELEVATION (NGVD)
2	141.0	1328.4



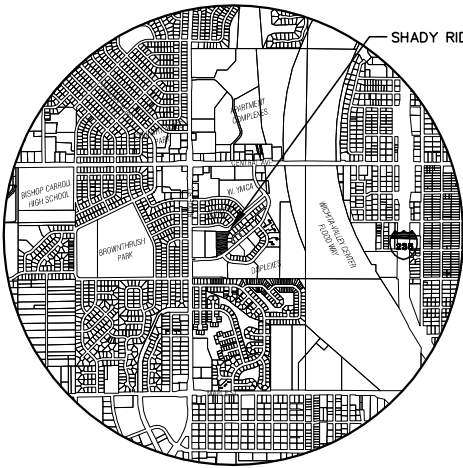
DRAINAGE AND UTILITY PLAN
SHADY RIDGE SECOND ADDITION

REVISED 2-4-05



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APPENDIX F
LOT GRADING PLAN



VICINITY MAP

BENCH MARKS

- BM #1 City Disc NW corner RCBC West side of Shade and Winterset at SW corner of inlet. Elev. = 127.21' City Datum 1314.61' NGVD
- BM #2 Square cut NW corner S. side Shade at P.C. of Lot 1, Blk. 1, Farmington Square 2nd Add. Elev. = 146.06' City Datum 1333.46' NGVD

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 A replat of all of Lot 2, said addition, EXCEPT; West 260 feet thereof.
 TOGETHER WITH;
 A replat of Lots 3 and 4, Block 1, of said addition.

NOTES

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2. Plat Area = 14.58 Ac.
3. Lot total = 36
4. New Street = 1,600 L.F. - 32' R/W
5. Avg. Lot Area = 0.27 Ac. or 11,380 sf.
6. Proposed Housing Units = 69
7. All easements encircling the streets are platted 15 foot street drainage, and utility easements, except where otherwise noted.
8. No lot shall have direct access to Shade Lane.

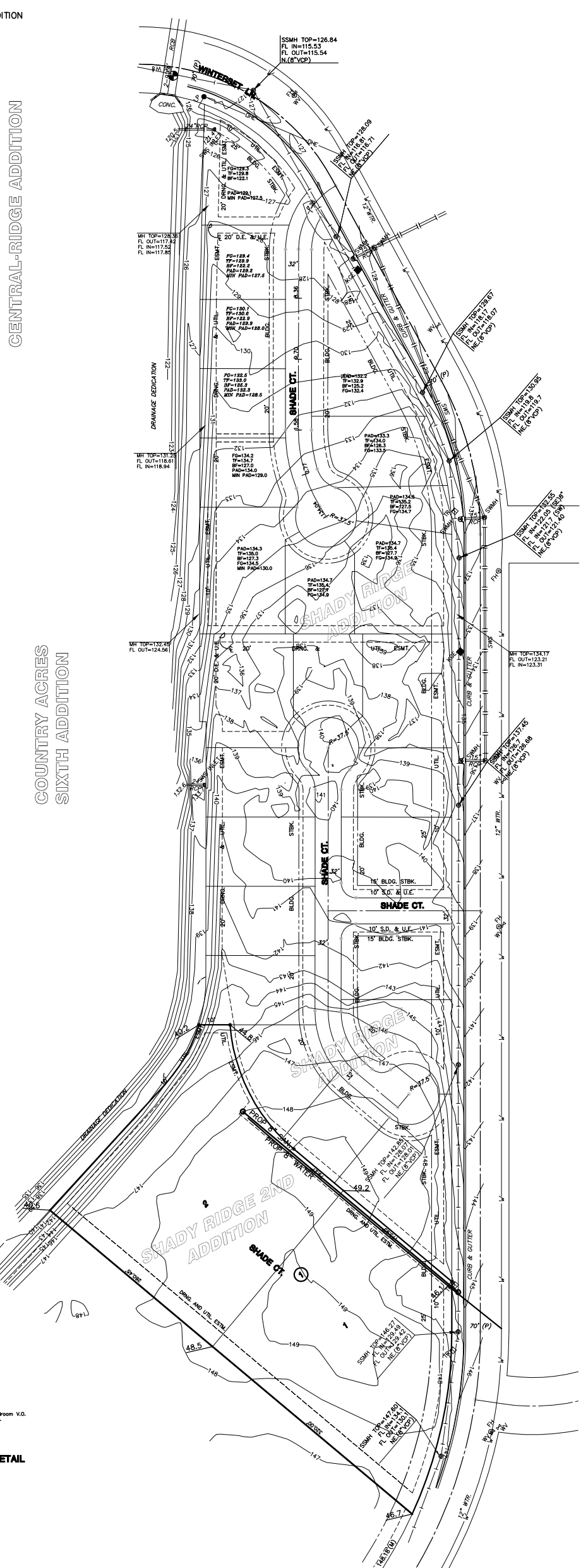
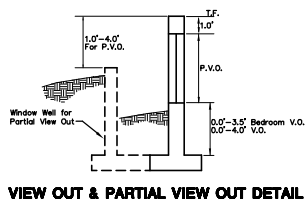


SCALE: 1"=60'
 0 60 120

LEGEND

- ✱ - CONIFEROUS TREE & DIAMETER
- - DECIDUOUS TREE & DIAMETER
- - SIGN
- - BUSH
- - EDGE OF TREES
- - FENCE
- - SANITARY SEWER MANHOLE
- - GAS METER
- - POLE
- - HIGH LINE POLE
- - GATE
- - WALL
- - LIGHT POLE
- - FIRE HYDRANT
- - WATER VALVE
- - WATER METER
- - POWER POLE AND GUY ANCHOR
- - TELEPHONE RISER
- - INLET
- - STORM SEWER PIPE
- - WATER LINE
- - SANITARY SEWER LINE
- - GAS LINE
- - TELEPHONE LINE
- - UNDERGROUND ELECTRIC LINE
- - OVERHEAD ELECTRIC
- - OVERHEAD TELEPHONE
- - UNDERGROUND FIBER OPTIC CABLE
- △ - SECTION CORNER
- - PROPERTY CORNER FOUND
- - BENCHMARK
- WO - WALK OUT
- VO - VIEW OUT
- PVO - PARTIAL VIEW OUT
- PWO - PARTIAL WALK OUT
- NVO - NO VIEW OUT
- WOP - WALKOUT WHICH MAY REQUIRE THICKER FOOTING AND/OR ENGINEERED FILL UNDER FOOTINGS

MINIMUM PAD ELEVATIONS (LOWEST OPENINGS)		
LOT	ELEVATION (CITY DATUM)	ELEVATION (NGVD)
2	141.0	1328.4



LOT GRADING PLAN SHADY RIDGE SECOND ADDITION

OWNER/DEVELOPER: THE CREW, a Kansas General Partnership, 7328 E. Elm Ct. Wichita, KS 67206 316-688-5560 **DATE: FEBRUARY, 2005**



2/4/2005 3:21:36 PM CST
 C:\WORK\104071\02501\02501.dwg (D:\KCS) Site Grading Plan.dwg

APPENDIX G
HY - OUTPUT

CURRENT DATE: 03-29-2004
CURRENT TIME: 13:37:17

FILE DATE: 03-29-2004
FILE NAME: SHDYRDG

FHWA CULVERT ANALYSIS
HY-8, VERSION 4.1
SITE DATA CULVERT SHAPE, MATERIAL, INLET
U
L INLET OUTLET CULVERT BARRELS
V ELEV. ELEV. LENGTH SHAPE SPAN RISE MANNING INLET
(FT) (FT) (FT) MATERIAL (FT) (FT) n TYPE
1 120.18 120.12 67.99 2 RCB 9.00 4.00 .012 CONVENTIONAL
2
3
4
5
6

SUMMARY OF CULVERT FLOWS (CFS) FILE: SHDYRDG DATE: 03-29-2004

Table with columns: ELEV (FT), TOTAL, 1, 2, 3, 4, 5, 6, ROADWAY, ITR. Rows show flow data for elevations from 124.00 to 126.60.

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: SHDYRDG DATE: 03-29-2004

Table with columns: HEAD ELEV (FT), HEAD ERROR (FT), TOTAL FLOW (CFS), FLOW ERROR (CFS), % FLOW ERROR. Rows show error data for elevations from 124.00 to 124.30.

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 03-29-2004 FILE DATE: 03-29-2004
 CURRENT TIME: 13:37:17 FILE NAME: SHDYRDG

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (9 BY 4) RCB

DIS-CHARGE FLOW (cfs)	HEAD-ELEV. (ft)	INLET DEPTH (ft)	OUTLET DEPTH (ft)	CONTROL FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	124.00	0.00	3.82	0-NF	0.00	0.00	0.00	0.00	0.00	3.88
25	124.01	0.67	3.83	3-M1t	0.54	0.39	0.36	3.88	0.00	3.88
50	124.02	1.07	3.84	3-M1t	0.87	0.62	0.72	3.88	0.00	3.88
75	124.03	1.40	3.85	3-M1t	1.13	0.82	1.07	3.88	0.00	3.88
100	124.06	1.70	3.87	3-M1t	1.36	0.99	1.43	3.88	0.00	3.88
125	124.08	1.97	3.90	3-M1t	1.59	1.15	1.79	3.88	0.00	3.88
150	124.13	2.21	3.94	3-M1t	1.79	1.29	2.15	3.88	0.00	3.88
175	124.17	2.44	3.98	3-M1t	2.00	1.43	2.50	3.88	0.00	3.88
200	124.21	2.66	4.03	3-M1t	2.18	1.57	2.86	3.88	0.00	3.88
225	124.26	2.87	4.08	3-M1t	2.37	1.70	3.22	3.88	0.00	3.88
242	124.30	3.01	4.12	3-M1t	2.50	1.78	3.46	3.88	0.00	3.88

El. inlet face invert 120.18 ft El. outlet invert 120.12 ft
 El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** EMBANKMENT TOE *****
 UPSTREAM STATION (FT) 100.00
 UPSTREAM ELEVATION (FT) 120.20
 UPSTREAM EMBANKMENT SLOPE (X:1) 4.00
 DOWNSTREAM STATION (FT) 0.00
 DOWNSTREAM ELEVATION (FT) 120.10
 DOWNSTREAM EMBANKMENT SLOPE (X:1) 4.00

***** CULVERT DATA SUMMARY *****
 BARREL SHAPE BOX
 BARREL SPAN 9.00 FT
 BARREL RISE 4.00 FT
 BARREL MATERIAL CONCRETE
 BARREL MANNING'S N 0.012
 INLET TYPE CONVENTIONAL
 INLET EDGE AND WALL SQUARE EDGE (90-45 DEG.)
 INLET DEPRESSION NONE
