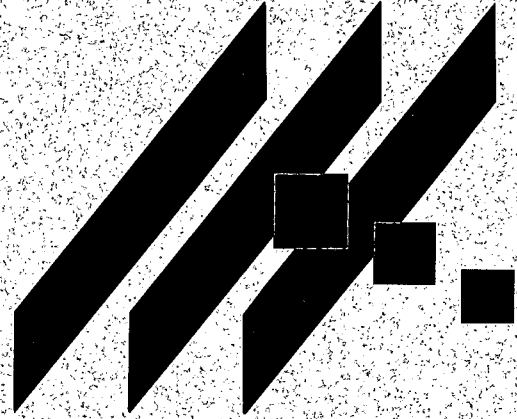


M K E C E N G I N E E R I N G C O N S U L T A N T S , I N C



DRAINAGE REPORT

FOR

THE ESTATES AT HOLLENBECK FARMS ADDITION

June 2003

**Drainage Report for
The Estates at Hollenbeck Farms Addition
Wichita, Sedgwick County, Kansas**

Location

The subject property is in Sedgwick County, Kansas. The proposed development is located south of 13th 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 880 feet north to south and 800 feet east to west at the widest points. The area of the plat is 13.94 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"), Gossel Silty Clay with 1-2% slopes (Gb – HSG "D"), 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 "D".

Pre-developed Conditions

Current Development

The site is zoned as single family residential. There is one existing house on the property. A driveway crosses the site from 143rd Street to the house.

Current Landform and Slope

Currently the elevation on the site varies from 1361' around the house to 1342' at the southwest corner of the site. Slopes range from 3.0% to 12.0% around the house.

Current Drainage Conditions

Fourmile Creek is the receiving water for the site. Flow through Fourmile Creek near the site is approximately 3,130 cfs in the 100-year design event with a 2.2 square mile watershed (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 600 feet west of the site. (FIRM Panel 150, Sedgwick County, Kansas, June 3, 1986) (shown in Appendix C).

Current Runoff Characteristics

The site is on a natural ridge. Runoff sheet flows to the west and the southeast. 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 20 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 - West	8.8	12.6	19.6	40.1
B - Southeast	5.5	7.9	12.6	25.7

Developed Conditions

Proposed Development

The site will develop as 4 residential lots with an average size of 3.5 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 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 18 minutes. Runoff coefficients were selected based upon ten-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 under developed conditions. Developed runoff values are found in Table 2.

Table 2. Developed Runoff.

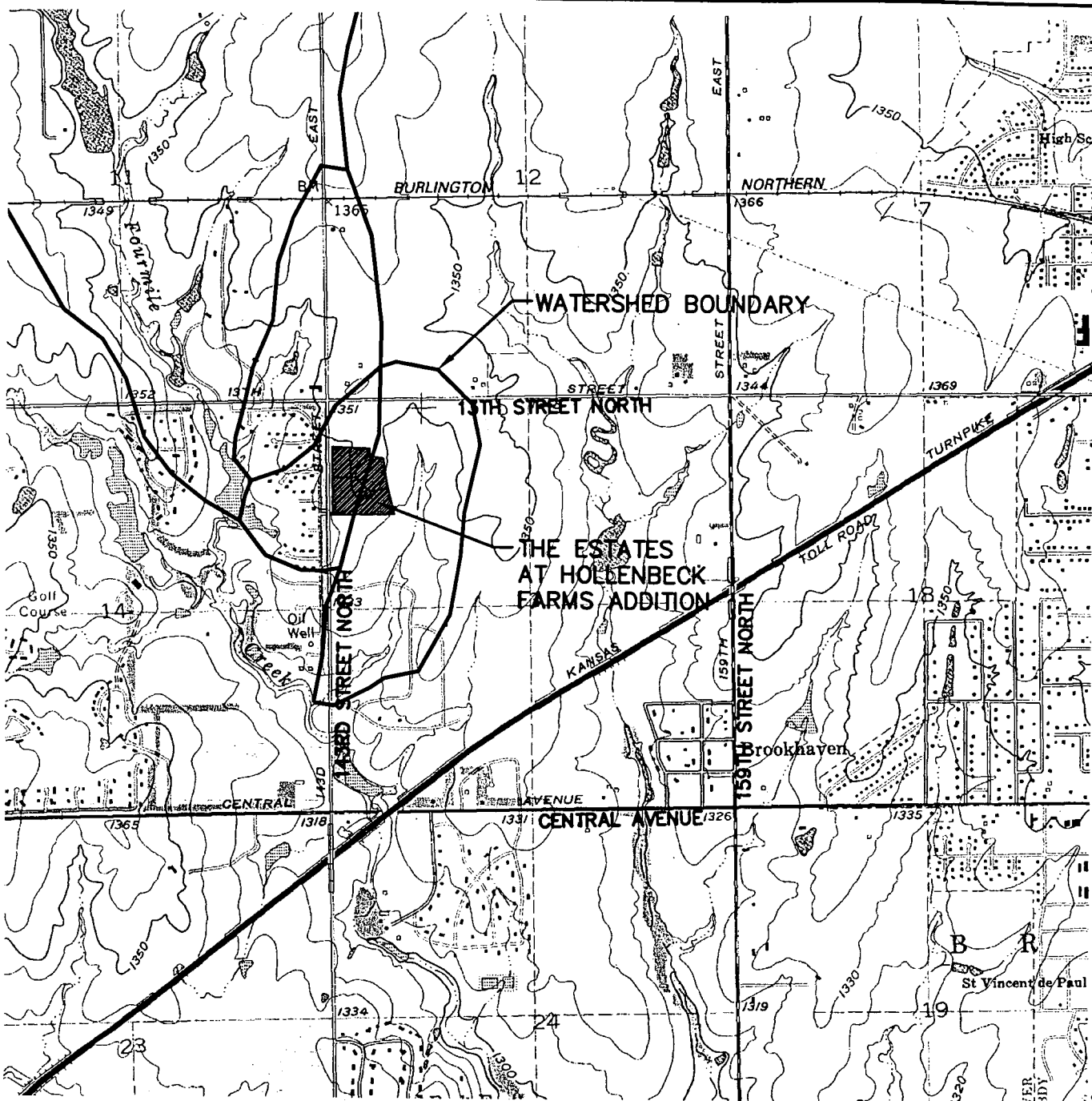
	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A - West	10.9	14.8	21.8	41.9
B - Southeast	6.8	9.3	14.0	26.9

Summary

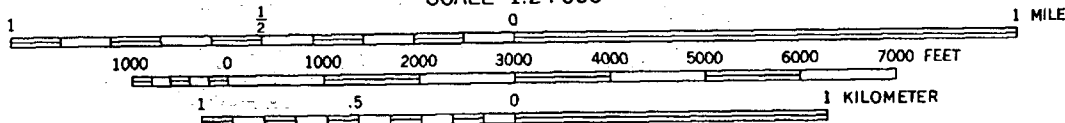
The Estates at Hollenbeck Farms Addition is a single-family residential development covering 14 acres. The development will have 4 lots approximately 3.5 acres in size.

Runoff from the site to the west increases 1.8 cfs, from 40.1 cfs to 41.9 cfs in the 100-year design event. Runoff from the site to the southeast increases 1.2 cfs, from 25.7 cfs to 26.9 cfs in the 100-year design event. The development of the Estates at Hollenbeck Farms Addition will have little effect on the receiving water (Fourmile Creek). Increased runoff from the 14 acre site is negligible compared to the size of the watershed feeding Fourmile Creek.

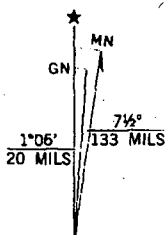
**APPENDIX A
QUADRANGLE MAP**



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1982 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67208
316 - 684 - 9688

**THE ESTATES AT
HOLLENBECK FARMS ADDITION**

PROJECT NAME

ANDOVER, KANSAS QUADRANGLE

SHEET TITLE

KLA
DESIGN BY.

KLA
DRAWN BY.

GM
CHECKED BY.

JUNE 2003
DATE

98057
JOB NO.

1 / 1
SHEET/OF

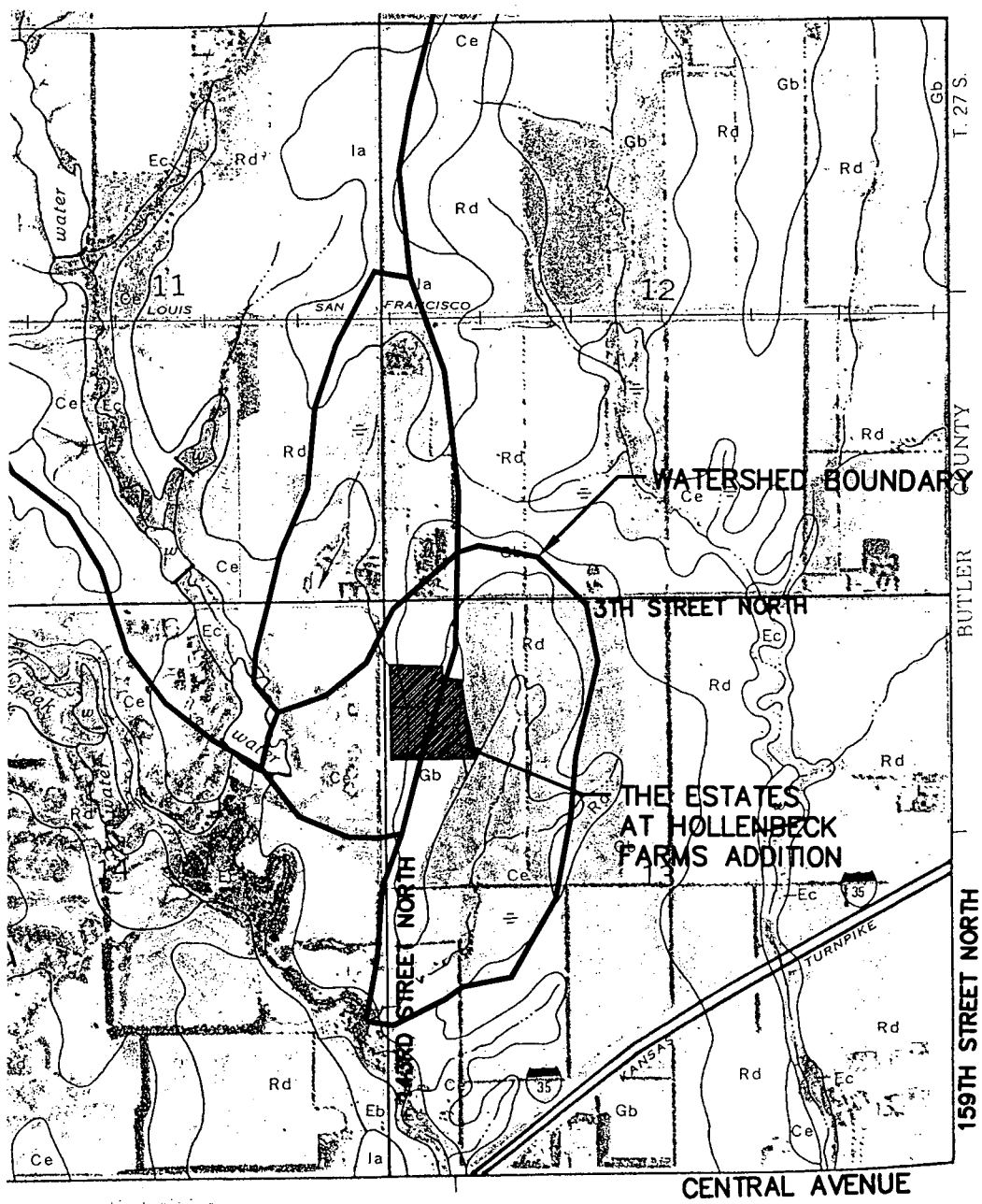
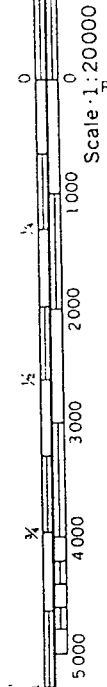
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**APPENDIX B
SOIL SURVEY**

36



1 Mile
5000 Feet



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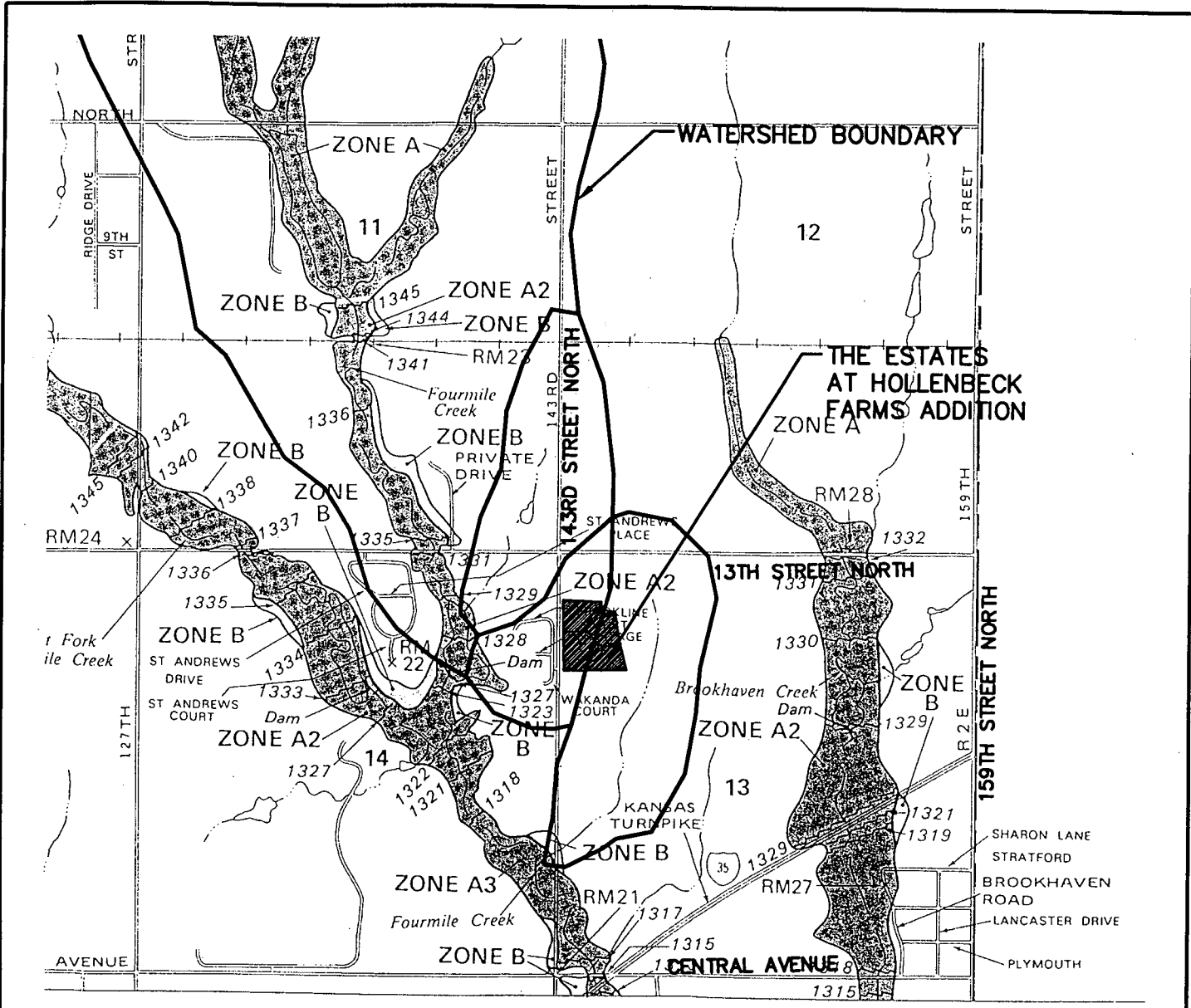
MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67204
316 - 884 - 9400

**THE ESTATES AT
HOLLENBECK FARMS ADDITION**

PROJECT NAME
**SOIL SURVEY OF
SEDGWICK COUNTY, KANSAS**

SHEET TITLE		
KLA	KLA	GM
DESIGN BY.	DRAWN BY.	CHECKED BY.
JUNE 2003	98057	1 / 1
DATE	JOB NO.	SHEET/OF

APPENDIX C
FIRM



NATIONAL FLOOD INSURANCE PROGRAM


FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY,
KANSAS
(UNINCORPORATED AREAS)

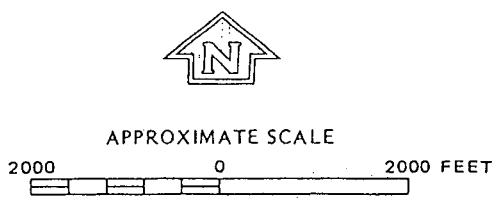

PANEL 150 OF 300

COMMUNITY-PANEL NUMBER
200321 0150 A

EFFECTIVE DATE:
JUNE 3, 1986



Federal Emergency Management Agency

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

**THE ESTATES AT
HOLLENBECK FARMS ADDITION**
PROJECT NAME

**FIRM PANEL 150 OF 300
SEDGWICK COUNTY, KANSAS**
SHEET TITLE

MJA DESIGN BY.	MJA DRAWN BY.	GJM CHECKED BY.
JUNE 2003 DATE	98057 JOB NO.	1 / 1 SHEET/OF

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**APPENDIX D
DRAINAGE & UTILITY PLAN**

APPENDIX E
DRAINAGE CALCULATIONS

6/2/03

DRAINAGE ANALYSIS SUMMARY
The Estates at Hollenbeck Farms Addition

Soil Group D

Area ID	Area ac	C2	C5	C10	C100	Elev Max	Elev Min	Flow Length	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	Inlet Size ft	Pipe Size in	Min Slope %	COMMENTS
Undeveloped																								
A	8.4	0.30	0.35	0.45	0.65	1361.0	1342.0	450	19	18	15	15	3.51	4.31	5.22	7.37	8.80	12.61	19.64	40.05				
B	5.4	0.30	0.35	0.45	0.65	1361.0	1338.0	500	20	18	16	15	3.42	4.20	5.22	7.37	5.51	7.90	12.62	25.74				
Developed																								
A	8.4	0.36	0.40	0.50	0.68	1361.0	1342.0	450	17	17	15	15	3.61	4.43	5.22	7.37	10.86	14.81	21.82	41.90				
B	5.4	0.36	0.40	0.50	0.68	1361.0	1338.0	500	18	17	15	15	3.51	4.31	5.22	7.37	6.79	9.26	14.02	28.93				

APPENDIX F
GRADING PLAN