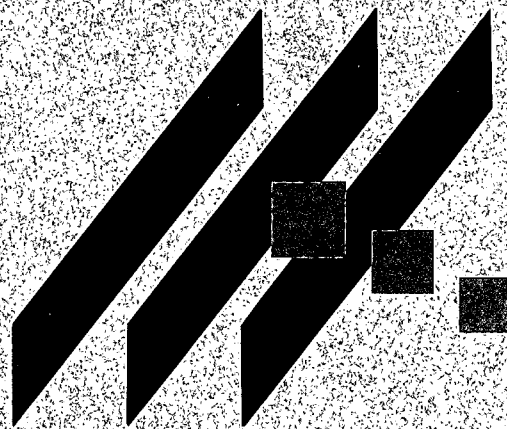


M K E C ENGINEERING CONSULTANTS, INC.



DRAINAGE REPORT

FOR

**NORTHEAST ELEMENTARY SCHOOL ADDITION**

JULY 2002

# Drainage Report for Northeast Elementary School Addition

## Wichita, Kansas

### Location

The subject property lies in the Northeast corner of the Sec. 1, Township 27 South, Range 1 East. The property abuts 29<sup>th</sup> Street North on the North and Woodlawn Ave. on the East. The property to the West is developed as single family residences. The property to the South is currently undeveloped. The total site area is approximately 53 acres.

### Soils

According to the NRCS (SCS) Sedgwick County Soil Survey, the majority of the drainage watershed soil is Farnum Loam, with 1-3 percent slopes and a Hydrological Soil Group (HSG) of "B". The southwest corner of the site is Rosehill Silty Clay, with 1-3 percent slopes and a HSG of "D." The far northwest corner of the site is Tabler silty clay loam and a HSG of "D." See Appendix A for soil survey map.

### Pre-developed Conditions

#### *Current Development*

The property is currently undeveloped and is used for agriculture.

#### *Current Landform and Slope*

The slopes in the area range between 1-3%. Elevations vary from 194 ft in the southeast corner to 174 ft in the southwest corner.

#### *Current Drainage Conditions*

No portion of the site is included in a regulatory floodplain. A copy of the effective FEMA map (FIRM Panel 15, Wichita, Kansas May 15, 1986) is attached as Appendix B.

#### *Current Runoff Characteristics*

No runoff enters the site from surrounding areas. A high point is located in the southeast area of the site with all surrounding ground draining away from this point. The site is divided into four drainage areas. See Appendix D for drainage and utility map. Drainage area "A" comprises approximately the west half of the property and drains into a ditch that flows south along the western edge of the site. Drainage area "B" covers the southeast corner of the property and drains south onto

undeveloped land. Drainage area "C" is approximately the eastern 150 ft of the property and drains to the east and north onto Woodlawn Ave. Drainage area "D" comprises the north and central sections of the site and drains to the north onto 29<sup>th</sup> Street North.

The rational method was used to calculate current runoff through the site. Runoff coefficients ranged from 0.16 to 0.40 based on soil type and impervious area. Time of concentration values were calculated using the FAA method. Values ranged from 15-52 minutes.

Table 1 shows the flow rates for 2, 5, 10, and 100 year events before development. The table displays the four drainage areas and the total for the entire site. See Appendix E for detailed calculations.

Table 1: Pre-development runoff.

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	8.53	12.71	19.84	47.89
B	2.64	3.70	5.91	14.24
C	2.77	3.73	5.87	13.47
D	6.30	8.93	14.65	35.93
TOTAL	20.25	29.07	46.26	111.53

## Post-developed Conditions

### *Proposed Development*

The property will be developed as Northeast Elementary School. In addition to the building, parking lots, ball fields, and walkways will be added.

### *Proposed Landform and Slope*

The proposed development will affect the overall landform slope and basic drainage patterns on the property. Slopes around the building will decrease, with the northern half of the site continuing to range from 1-3%. Slopes in the developed areas will range from 0.5-3%.

### *Proposed Runoff Characteristics*

Current runoff characteristics will be affected by the proposed development. The majority of the school and parking will be in drainage area "A." This area will continue to drain to the west, but the runoff will increase significantly. The runoff in all the areas will increase due to the development, but the most significant increase will be in drainage area "A." The northern half of the site will continue to drain north and drainage area "C" will continue to drain to the east.

Table 2 shows the 2, 5, 10, and 100 year post-development runoff values. The time of concentrations decreased slightly with a range of 15-49 minutes. The runoff coefficients increased significantly due to an increase in impervious area. They ranged from 0.16 to 0.66. See Appendix E for detailed calculations.

Table 2: Post-development runoff.

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	20.80	29.81	44.82	104.24
B	6.55	8.33	11.44	21.92
C	2.77	3.73	5.87	13.47
D	9.17	12.50	19.07	42.54
TOTAL	39.29	54.38	81.20	182.16

A detention pond was sized and located in the southwest corner of the site, within area "A". The pond was modeled using the Hydraflow Hydrograph software by Intellisolve. The outlet structure modeled was a 3' rectangular weir. The resulting flows are shown in Table 3. See Appendix F for detailed output.

Table 3: Post-development runoff w/ Detention Pond

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	7.21	10.74	15.78	31.76
B	6.55	8.33	11.44	21.92
C	2.77	3.73	5.87	13.47
D	9.17	12.50	19.07	42.54
TOTAL	25.7	35.3	52.16	109.69

The detention provided by the pond as shown on the drainage and utility plan is adequate to reduce the additional runoff produced by the development to below current runoff peak flows for area "A". The detention pond as shown is a preliminary concept. Adequate detention could possibly be built into proposed athletic fields or playground areas. This should be determined at the time of site design. Slight increases in the flows from drainage areas "B" and "D" will occur with the development. Based on preliminary site plan information, a portion of areas "B" and "D" will likely drain into the proposed detention pond, reducing the proposed flows to the existing peak flows. As shown in Table 3, the total proposed peak flows with detention will be less than the existing flows.

## Summary

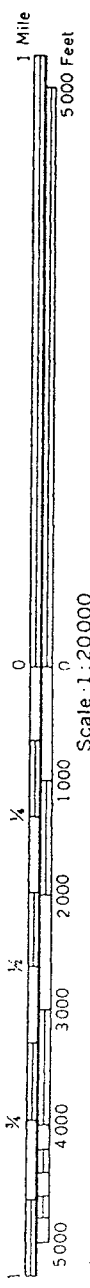
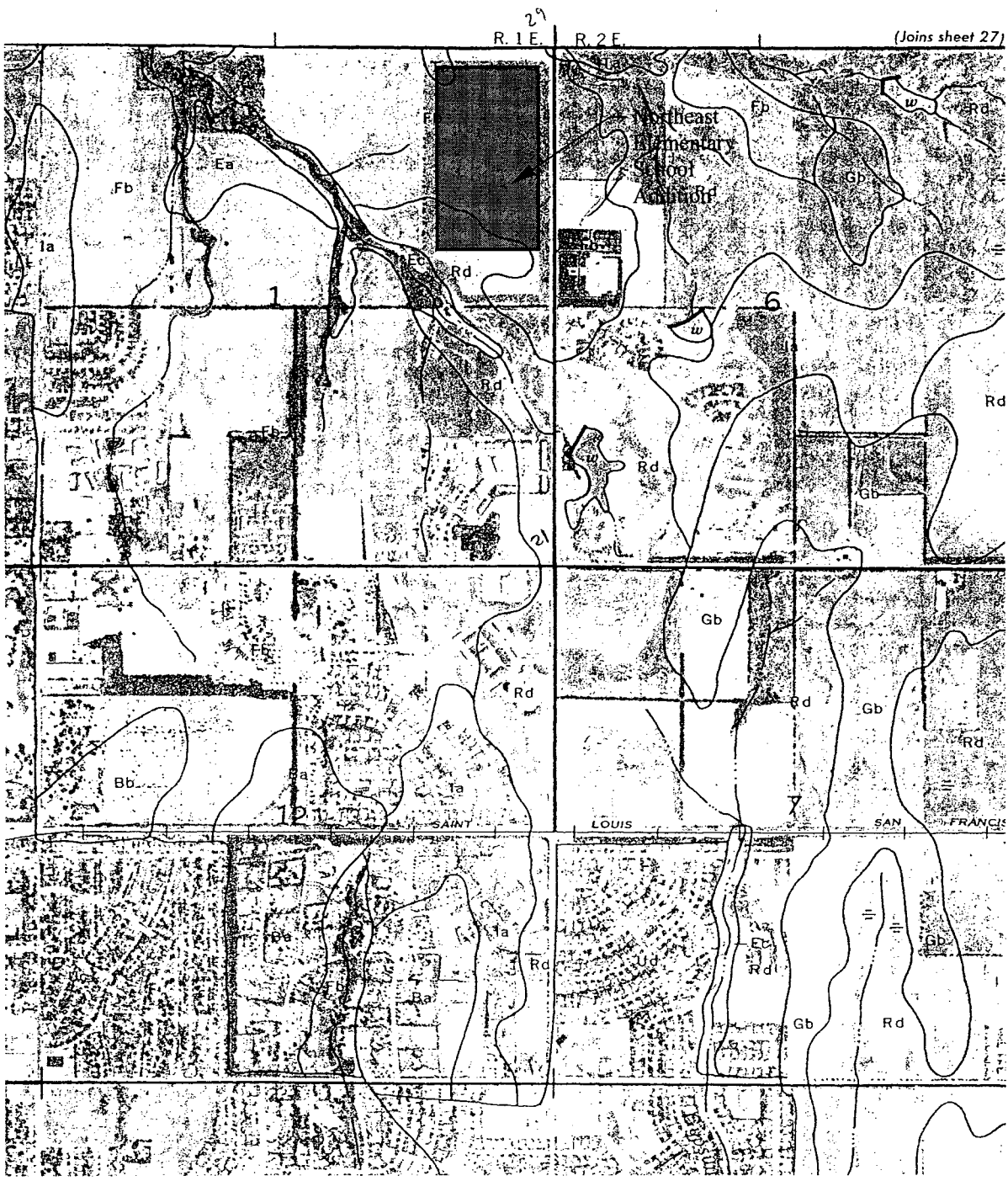
The site is approximately 53 acres of land on the southwest corner of 29<sup>th</sup> Street North and Woodlawn Avenue. The property is currently undeveloped with slopes ranging from 1-3%. An elementary school is proposed for the site. This will increase the amount of runoff for all rainfall events. A proposed detention facility in

the southwest corner of the site will reduce proposed peak flows to less than the existing flows. The detention facility design and drainage areas should be reviewed at the time of site development to insure that the peak flows are reduced to less than or equal to the existing flows.

**Appendix A**

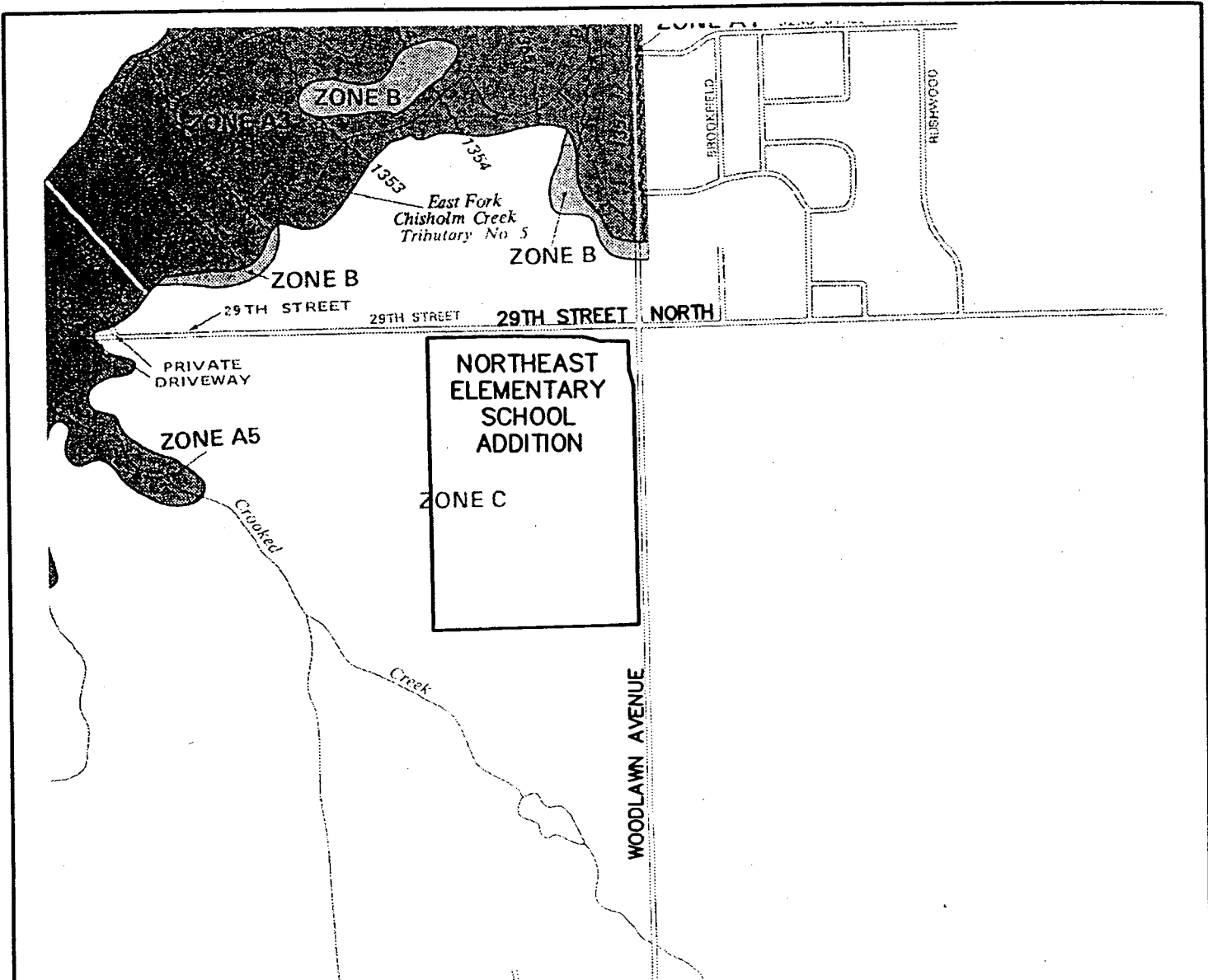
**Soil Survey**

(SCS) Sedgwick County Soil Survey



**Appendix B**

**FIRM Panel**



NATIONAL FLOOD INSURANCE PROGRAM


**FIRM**  
FLOOD INSURANCE RATE MAP

CITY OF  
WICHITA,  
KANSAS  
SEDGWICK COUNTY

PANEL 15 OF 40  
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER  
200328 0015 B

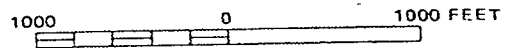
EFFECTIVE DATE:  
MAY 15, 1986



Federal Emergency Management Agency



APPROXIMATE SCALE



G:\GIVE\01160\DWG\PROP\DRNG\01160PM.DWG



**MKEC**  
ENGINEERING  
CONSULTANTS  
411 N. WEBB ROAD  
WICHITA, KS. 67204  
314 - 684 - 9600

**NORTHEAST ELEMENTARY  
SCHOOL ADDITION**

PROJECT NAME

**FIRM PANEL 15 OF 40  
WICHITA, SEDGWICK COUNTY, KANSAS**

SHEET TITLE

**KLA**  
DESIGN BY.

**KLA**  
DRAWN BY.

**GJA**  
CHECKED BY.

**JULY 2002**  
DATE

**01160**  
JOB NO.

**1 / 1**  
SHEET/OF

**Appendix C**

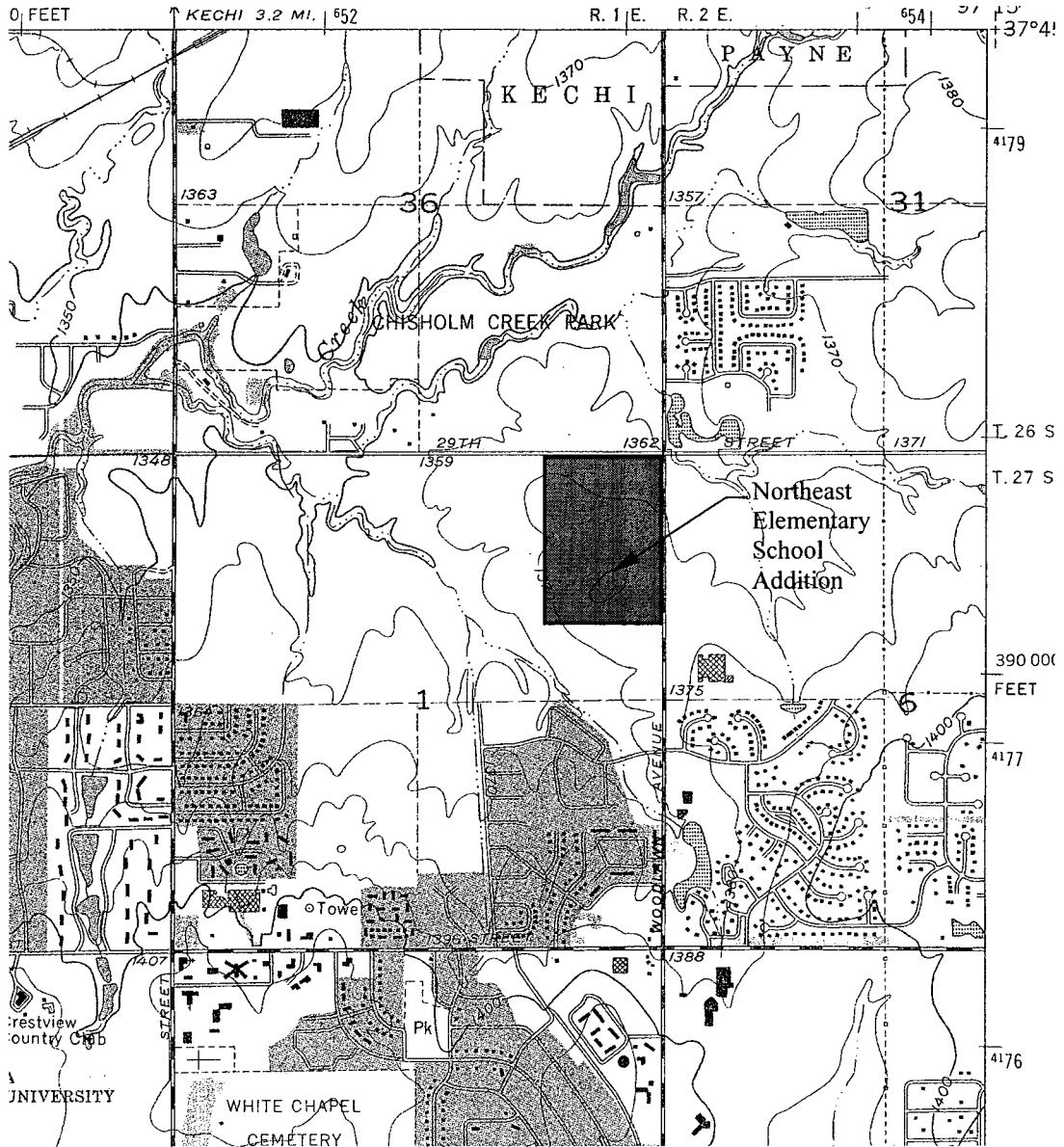
**Quadrangle**

# EAST WICHITA KANSAS QUADRANGLE

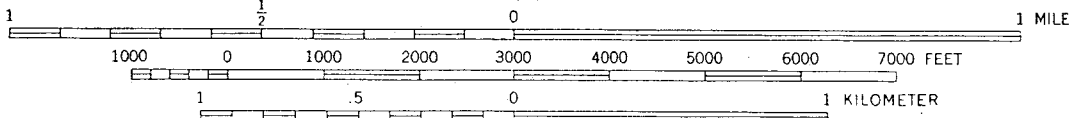
United States

Department of the Interior

Geological Survey



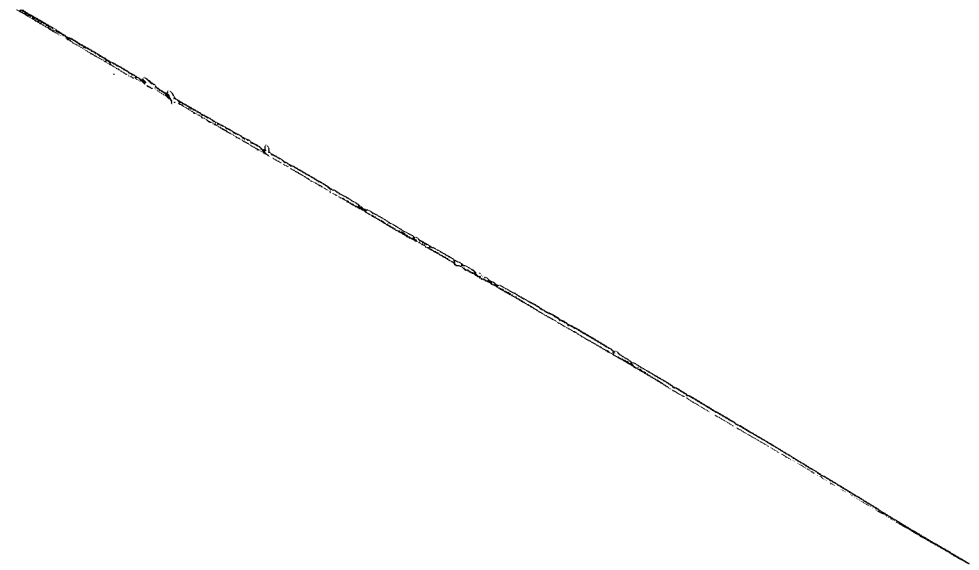
SCALE 1:24 000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

**Appendix D**

**Drainage and Utility Plan**



# DRAINAGE ANALYSIS SUMMARY

## NE Elementary

Area ID	Area ac	Accum. 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
<b>Before Development</b>																					
A	19.92		0.17	0.20	0.26	0.40	194.00	174.00	750.00	33	32	30	25	2.52	3.19	3.83	6.01	8.53	12.71	19.84	47.89
B	7.01		0.16	0.18	0.24	0.37	194.00	187.00	570.00	38	37	35	29	2.35	2.93	3.51	5.49	2.64	3.70	5.91	14.24
C	4.94		0.16	0.18	0.24	0.37	192.00	188.00	200.00	19	19	17	15	3.51	4.20	4.95	7.37	2.77	3.73	5.87	13.47
D	20.84		0.16	0.18	0.24	0.37	194.00	177.00	1200.00	52	51	48	41	1.89	2.38	2.93	4.66	6.30	8.93	14.65	35.93
<b>Total</b>	<b>52.71</b>																	<b>20.25</b>	<b>29.07</b>	<b>46.26</b>	<b>111.53</b>
<b>After Development</b>																					
A	19.92		0.36	0.41	0.50	0.66	194.00	174.00	750.00	26	25	21	16	2.90	3.65	4.50	7.37	20.80	29.81	44.82	96.89
B	7.01		0.35	0.36	0.41	0.51	194.00	187.00	570.00	30	30	28	24	2.67	3.30	3.98	6.13	6.55	8.33	11.44	21.92
C	4.94		0.16	0.18	0.24	0.37	192.00	188.00	200.00	19	19	17	15	3.51	4.20	4.95	7.37	2.77	3.73	5.87	13.47
D	20.84		0.22	0.24	0.30	0.42	194.00	177.00	1200.00	49	48	44	38	2.00	2.50	3.05	4.86	9.17	12.50	19.07	42.54
<b>Total</b>	<b>52.71</b>																	<b>39.29</b>	<b>54.38</b>	<b>81.20</b>	<b>174.82</b>

**Appendix F**

**Hydraflow Hydrographs Output**

# Hydrograph Report

## Hyd. No. 1

Area A - 2-Year Storm

Hydrograph type = Rational  
Storm frequency = 2 yrs  
Drainage area = 19.9 ac  
Intensity = 2.903 in/hr  
IDF Curve = Sedgwick County.IDF

Peak discharge = 20.82 cfs  
Time interval = 1 min  
Runoff coeff. = 0.36  
Time of conc. (Tc) = 26 min  
Asc/Rec limb fact = 1/1

Hydrograph Volume = 0.746 acft

## Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
0.10 4.80	0.67 9.61
0.12 5.61	0.68 8.81
0.13 6.41	0.70 8.01
0.15 7.21	0.72 7.21
0.17 8.01	0.73 6.41
0.18 8.81	0.75 5.61
0.20 9.61	0.77 4.80
0.22 10.41	
0.23 11.21	
0.25 12.01	...End
0.27 12.81	
0.28 13.61	
0.30 14.41	
0.32 15.21	
0.33 16.01	
0.35 16.82	
0.37 17.62	
0.38 18.42	
0.40 19.22	
0.42 20.02	
0.43 20.82 <<	
0.45 20.02	
0.47 19.22	
0.48 18.42	
0.50 17.62	
0.52 16.82	
0.53 16.01	
0.55 15.21	
0.57 14.41	
0.58 13.61	
0.60 12.81	
0.62 12.01	
0.63 11.21	
0.65 10.41	

# Hydrograph Report

## Hyd. No. 2

### Detention Pond Routing

Hydrograph type = Reservoir  
 Storm frequency = 2 yrs  
 Inflow hyd. No. = 1  
 Max. Elevation = 176.80 ft

Peak discharge = 7.21 cfs  
 Time interval = 1 min  
 Reservoir name = Detention concept  
 Max. Storage = 1.130 acft

Storage Indication method used.

Outflow hydrograph volume = 0.746 acft

### Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.32	15.21	176.29	----	----	----	----	1.56	----	----	----	----	1.56
0.33	16.01	176.32	----	----	----	----	1.80	----	----	----	----	1.80
0.35	16.82	176.35	----	----	----	----	2.07	----	----	----	----	2.07
0.37	17.62	176.38	----	----	----	----	2.36	----	----	----	----	2.36
0.38	18.42	176.41	----	----	----	----	2.66	----	----	----	----	2.66
0.40	19.22	176.45	----	----	----	----	3.00	----	----	----	----	3.00
0.42	20.02	176.48	----	----	----	----	3.35	----	----	----	----	3.35
0.43	20.82 <<	176.52	----	----	----	----	3.73	----	----	----	----	3.73
0.45	20.02	176.55	----	----	----	----	4.12	----	----	----	----	4.12
0.47	19.22	176.58	----	----	----	----	4.48	----	----	----	----	4.48
0.48	18.42	176.61	----	----	----	----	4.82	----	----	----	----	4.82
0.50	17.62	176.64	----	----	----	----	5.16	----	----	----	----	5.16
0.52	16.82	176.67	----	----	----	----	5.46	----	----	----	----	5.46
0.53	16.01	176.69	----	----	----	----	5.74	----	----	----	----	5.74
0.55	15.21	176.71	----	----	----	----	5.99	----	----	----	----	5.99
0.57	14.41	176.73	----	----	----	----	6.23	----	----	----	----	6.23
0.58	13.61	176.75	----	----	----	----	6.44	----	----	----	----	6.44
0.60	12.81	176.76	----	----	----	----	6.63	----	----	----	----	6.63
0.62	12.01	176.77	----	----	----	----	6.78	----	----	----	----	6.78
0.63	11.21	176.78	----	----	----	----	6.91	----	----	----	----	6.91
0.65	10.41	176.79	----	----	----	----	7.02	----	----	----	----	7.02
0.67	9.61	176.80	----	----	----	----	7.10	----	----	----	----	7.10
0.68	8.81	176.80	----	----	----	----	7.16	----	----	----	----	7.16
0.70	8.01	176.80	----	----	----	----	7.19	----	----	----	----	7.19
0.72	7.21	176.80 <<	----	----	----	----	7.21	----	----	----	----	7.21 <<
0.73	6.41	176.80	----	----	----	----	7.19	----	----	----	----	7.19
0.75	5.61	176.80	----	----	----	----	7.16	----	----	----	----	7.16
0.77	4.80	176.80	----	----	----	----	7.11	----	----	----	----	7.11
0.78	4.00	176.79	----	----	----	----	7.03	----	----	----	----	7.03
0.80	3.20	176.78	----	----	----	----	6.94	----	----	----	----	6.94
0.82	2.40	176.78	----	----	----	----	6.83	----	----	----	----	6.83
0.83	1.60	176.77	----	----	----	----	6.70	----	----	----	----	6.70
0.85	0.80	176.75	----	----	----	----	6.55	----	----	----	----	6.55
0.87	0.00	176.74	----	----	----	----	6.38	----	----	----	----	6.38
0.88	0.00	176.73	----	----	----	----	6.21	----	----	----	----	6.21
0.90	0.00	176.71	----	----	----	----	6.04	----	----	----	----	6.04
0.92	0.00	176.70	----	----	----	----	5.88	----	----	----	----	5.88
0.93	0.00	176.69	----	----	----	----	5.73	----	----	----	----	5.73

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**Hydrograph Discharge Table**

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.95	0.00	176.68	----	----	----	----	5.58	----	----	----	----	5.58
0.97	0.00	176.67	----	----	----	----	5.44	----	----	----	----	5.44
0.98	0.00	176.65	----	----	----	----	5.31	----	----	----	----	5.31
1.00	0.00	176.64	----	----	----	----	5.17	----	----	----	----	5.17
1.02	0.00	176.63	----	----	----	----	5.04	----	----	----	----	5.04
1.03	0.00	176.62	----	----	----	----	4.91	----	----	----	----	4.91
1.05	0.00	176.61	----	----	----	----	4.79	----	----	----	----	4.79
1.07	0.00	176.60	----	----	----	----	4.67	----	----	----	----	4.67
1.08	0.00	176.59	----	----	----	----	4.56	----	----	----	----	4.56
1.10	0.00	176.58	----	----	----	----	4.45	----	----	----	----	4.45
1.12	0.00	176.57	----	----	----	----	4.35	----	----	----	----	4.35
1.13	0.00	176.56	----	----	----	----	4.25	----	----	----	----	4.25
1.15	0.00	176.56	----	----	----	----	4.15	----	----	----	----	4.15
1.17	0.00	176.55	----	----	----	----	4.05	----	----	----	----	4.05
1.18	0.00	176.54	----	----	----	----	3.96	----	----	----	----	3.96
1.20	0.00	176.53	----	----	----	----	3.87	----	----	----	----	3.87
1.22	0.00	176.52	----	----	----	----	3.78	----	----	----	----	3.78
1.23	0.00	176.51	----	----	----	----	3.69	----	----	----	----	3.69
1.25	0.00	176.51	----	----	----	----	3.60	----	----	----	----	3.60
1.27	0.00	176.50	----	----	----	----	3.52	----	----	----	----	3.52
1.28	0.00	176.49	----	----	----	----	3.45	----	----	----	----	3.45
1.30	0.00	176.48	----	----	----	----	3.38	----	----	----	----	3.38
1.32	0.00	176.48	----	----	----	----	3.30	----	----	----	----	3.30
1.33	0.00	176.47	----	----	----	----	3.23	----	----	----	----	3.23
1.35	0.00	176.46	----	----	----	----	3.17	----	----	----	----	3.17
1.37	0.00	176.46	----	----	----	----	3.10	----	----	----	----	3.10
1.38	0.00	176.45	----	----	----	----	3.04	----	----	----	----	3.04
1.40	0.00	176.44	----	----	----	----	2.97	----	----	----	----	2.97
1.42	0.00	176.44	----	----	----	----	2.91	----	----	----	----	2.91
1.43	0.00	176.43	----	----	----	----	2.85	----	----	----	----	2.85
1.45	0.00	176.43	----	----	----	----	2.79	----	----	----	----	2.79
1.47	0.00	176.42	----	----	----	----	2.73	----	----	----	----	2.73
1.48	0.00	176.41	----	----	----	----	2.67	----	----	----	----	2.67
1.50	0.00	176.41	----	----	----	----	2.62	----	----	----	----	2.62
1.52	0.00	176.40	----	----	----	----	2.56	----	----	----	----	2.56
1.53	0.00	176.40	----	----	----	----	2.51	----	----	----	----	2.51
1.55	0.00	176.39	----	----	----	----	2.46	----	----	----	----	2.46
1.57	0.00	176.39	----	----	----	----	2.42	----	----	----	----	2.42
1.58	0.00	176.38	----	----	----	----	2.37	----	----	----	----	2.37
1.60	0.00	176.38	----	----	----	----	2.33	----	----	----	----	2.33
1.62	0.00	176.37	----	----	----	----	2.28	----	----	----	----	2.28
1.63	0.00	176.37	----	----	----	----	2.24	----	----	----	----	2.24
1.65	0.00	176.36	----	----	----	----	2.20	----	----	----	----	2.20
1.67	0.00	176.36	----	----	----	----	2.16	----	----	----	----	2.16
1.68	0.00	176.35	----	----	----	----	2.12	----	----	----	----	2.12
1.70	0.00	176.35	----	----	----	----	2.08	----	----	----	----	2.08
1.72	0.00	176.35	----	----	----	----	2.04	----	----	----	----	2.04
1.73	0.00	176.34	----	----	----	----	2.00	----	----	----	----	2.00
1.75	0.00	176.34	----	----	----	----	1.97	----	----	----	----	1.97
1.77	0.00	176.33	----	----	----	----	1.93	----	----	----	----	1.93
1.78	0.00	176.33	----	----	----	----	1.89	----	----	----	----	1.89

Continues on next page...

**Hydrograph Discharge Table**

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
1.80	0.00	176.32	----	----	----	----	1.86	----	----	----	----	1.86
1.82	0.00	176.32	----	----	----	----	1.82	----	----	----	----	1.82
1.83	0.00	176.32	----	----	----	----	1.79	----	----	----	----	1.79
1.85	0.00	176.31	----	----	----	----	1.76	----	----	----	----	1.76
1.87	0.00	176.31	----	----	----	----	1.73	----	----	----	----	1.73
1.88	0.00	176.31	----	----	----	----	1.69	----	----	----	----	1.69
1.90	0.00	176.30	----	----	----	----	1.66	----	----	----	----	1.66
1.92	0.00	176.30	----	----	----	----	1.63	----	----	----	----	1.63
1.93	0.00	176.30	----	----	----	----	1.61	----	----	----	----	1.61
1.95	0.00	176.29	----	----	----	----	1.58	----	----	----	----	1.58
1.97	0.00	176.29	----	----	----	----	1.56	----	----	----	----	1.56
1.98	0.00	176.29	----	----	----	----	1.53	----	----	----	----	1.53
2.00	0.00	176.28	----	----	----	----	1.51	----	----	----	----	1.51
2.02	0.00	176.28	----	----	----	----	1.48	----	----	----	----	1.48
2.03	0.00	176.28	----	----	----	----	1.46	----	----	----	----	1.46

...End

# Reservoir Report

## Reservoir No. 1 - Detention concept 1

Hydraflow Hydrographs by Intelisolve

### Pond Data

Pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	175.00	25,461	0.000	0.000
1.00	176.00	27,385	0.607	0.607
2.00	177.00	29,365	0.651	1.258
3.00	178.00	31,401	0.697	1.955
4.00	179.00	33,495	0.745	2.700

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 3.00	0.00	0.00	0.00
Crest El. ft	= 176.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	175.00	---	---	---	---	0.00	---	---	---	---	0.00
1.00	0.607	176.00	---	---	---	---	0.00	---	---	---	---	0.00
2.00	1.258	177.00	---	---	---	---	9.99	---	---	---	---	9.99
3.00	1.955	178.00	---	---	---	---	28.26	---	---	---	---	28.26
4.00	2.700	179.00	---	---	---	---	51.91	---	---	---	---	51.91

# Hydrograph Report

## Hyd. No. 1

Area A - 5-Year Storm

Hydrograph type = Rational  
Storm frequency = 5 yrs  
Drainage area = 19.9 ac  
Intensity = 3.570 in/hr  
IDF Curve = Sedgwick County.IDF

Peak discharge = 29.16 cfs  
Time interval = 1 min  
Runoff coeff. = 0.41  
Time of conc. (Tc) = 25 min  
Asc/Rec limb fact = 1/1

Hydrograph Volume = 1.004 acft

## Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
0.08 5.83	0.65 12.83
0.10 7.00	0.67 11.66
0.12 8.16	0.68 10.50
0.13 9.33	0.70 9.33
0.15 10.50	0.72 8.16
0.17 11.66	0.73 7.00
0.18 12.83	
0.20 14.00	
0.22 15.16	...End
0.23 16.33	
0.25 17.49	
0.27 18.66	
0.28 19.83	
0.30 20.99	
0.32 22.16	
0.33 23.33	
0.35 24.49	
0.37 25.66	
0.38 26.82	
0.40 27.99	
0.42 29.16 <<	
0.43 27.99	
0.45 26.82	
0.47 25.66	
0.48 24.49	
0.50 23.33	
0.52 22.16	
0.53 20.99	
0.55 19.83	
0.57 18.66	
0.58 17.49	
0.60 16.33	
0.62 15.16	
0.63 14.00	

# Hydrograph Report

## Hyd. No. 2

### Detention Pond Routing

Hydrograph type = Reservoir  
 Storm frequency = 5 yrs  
 Inflow hyd. No. = 1  
 Max. Elevation = 177.05 ft

Peak discharge = 10.74 cfs  
 Time interval = 1 min  
 Reservoir name = Detention concept  
 Max. Storage = 1.292 acft

Storage Indication method used.

Outflow hydrograph volume = 1.004 acft

### Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.30	20.99	176.38	----	----	----	----	2.32	----	----	----	----	2.32
0.32	22.16	176.42	----	----	----	----	2.69	----	----	----	----	2.69
0.33	23.33	176.46	----	----	----	----	3.11	----	----	----	----	3.11
0.35	24.49	176.50	----	----	----	----	3.55	----	----	----	----	3.55
0.37	25.66	176.55	----	----	----	----	4.05	----	----	----	----	4.05
0.38	26.82	176.59	----	----	----	----	4.57	----	----	----	----	4.57
0.40	27.99	176.64	----	----	----	----	5.14	----	----	----	----	5.14
0.42	29.16 <<	176.69	----	----	----	----	5.73	----	----	----	----	5.73
0.43	27.99	176.74	----	----	----	----	6.34	----	----	----	----	6.34
0.45	26.82	176.78	----	----	----	----	6.91	----	----	----	----	6.91
0.47	25.66	176.82	----	----	----	----	7.45	----	----	----	----	7.45
0.48	24.49	176.86	----	----	----	----	7.96	----	----	----	----	7.96
0.50	23.33	176.89	----	----	----	----	8.42	----	----	----	----	8.42
0.52	22.16	176.92	----	----	----	----	8.85	----	----	----	----	8.85
0.53	20.99	176.95	----	----	----	----	9.23	----	----	----	----	9.23
0.55	19.83	176.97	----	----	----	----	9.57	----	----	----	----	9.57
0.57	18.66	176.99	----	----	----	----	9.87	----	----	----	----	9.87
0.58	17.49	177.01	----	----	----	----	10.11	----	----	----	----	10.11
0.60	16.33	177.02	----	----	----	----	10.32	----	----	----	----	10.32
0.62	15.16	177.03	----	----	----	----	10.48	----	----	----	----	10.48
0.63	14.00	177.04	----	----	----	----	10.60	----	----	----	----	10.60
0.65	12.83	177.05	----	----	----	----	10.69	----	----	----	----	10.69
0.67	11.66	177.05	----	----	----	----	10.73	----	----	----	----	10.73
0.68	10.50	177.05 <<	----	----	----	----	10.74	----	----	----	----	10.74 <<
0.70	9.33	177.05	----	----	----	----	10.72	----	----	----	----	10.72
0.72	8.16	177.04	----	----	----	----	10.66	----	----	----	----	10.66
0.73	7.00	177.04	----	----	----	----	10.57	----	----	----	----	10.57
0.75	5.83	177.03	----	----	----	----	10.44	----	----	----	----	10.44
0.77	4.67	177.02	----	----	----	----	10.29	----	----	----	----	10.29
0.78	3.50	177.01	----	----	----	----	10.10	----	----	----	----	10.10
0.80	2.33	176.99	----	----	----	----	9.89	----	----	----	----	9.89
0.82	1.17	176.98	----	----	----	----	9.64	----	----	----	----	9.64
0.83	0.00	176.96	----	----	----	----	9.36	----	----	----	----	9.36
0.85	0.00	176.94	----	----	----	----	9.08	----	----	----	----	9.08
0.87	0.00	176.92	----	----	----	----	8.80	----	----	----	----	8.80
0.88	0.00	176.90	----	----	----	----	8.54	----	----	----	----	8.54
0.90	0.00	176.88	----	----	----	----	8.29	----	----	----	----	8.29
0.92	0.00	176.87	----	----	----	----	8.05	----	----	----	----	8.05

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**Hydrograph Discharge Table**

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.93	0.00	176.85	----	----	----	----	7.82	----	----	----	----	7.82
0.95	0.00	176.83	----	----	----	----	7.59	----	----	----	----	7.59
0.97	0.00	176.82	----	----	----	----	7.38	----	----	----	----	7.38
0.98	0.00	176.80	----	----	----	----	7.16	----	----	----	----	7.16
1.00	0.00	176.79	----	----	----	----	6.97	----	----	----	----	6.97
1.02	0.00	176.77	----	----	----	----	6.78	----	----	----	----	6.78
1.03	0.00	176.76	----	----	----	----	6.60	----	----	----	----	6.60
1.05	0.00	176.74	----	----	----	----	6.42	----	----	----	----	6.42
1.07	0.00	176.73	----	----	----	----	6.24	----	----	----	----	6.24
1.08	0.00	176.72	----	----	----	----	6.07	----	----	----	----	6.07
1.10	0.00	176.70	----	----	----	----	5.91	----	----	----	----	5.91
1.12	0.00	176.69	----	----	----	----	5.76	----	----	----	----	5.76
1.13	0.00	176.68	----	----	----	----	5.61	----	----	----	----	5.61
1.15	0.00	176.67	----	----	----	----	5.47	----	----	----	----	5.47
1.17	0.00	176.66	----	----	----	----	5.33	----	----	----	----	5.33
1.18	0.00	176.65	----	----	----	----	5.20	----	----	----	----	5.20
1.20	0.00	176.64	----	----	----	----	5.07	----	----	----	----	5.07
1.22	0.00	176.62	----	----	----	----	4.94	----	----	----	----	4.94
1.23	0.00	176.61	----	----	----	----	4.81	----	----	----	----	4.81
1.25	0.00	176.60	----	----	----	----	4.69	----	----	----	----	4.69
1.27	0.00	176.59	----	----	----	----	4.58	----	----	----	----	4.58
1.28	0.00	176.58	----	----	----	----	4.47	----	----	----	----	4.47
1.30	0.00	176.58	----	----	----	----	4.37	----	----	----	----	4.37
1.32	0.00	176.57	----	----	----	----	4.27	----	----	----	----	4.27
1.33	0.00	176.56	----	----	----	----	4.17	----	----	----	----	4.17
1.35	0.00	176.55	----	----	----	----	4.07	----	----	----	----	4.07
1.37	0.00	176.54	----	----	----	----	3.98	----	----	----	----	3.98
1.38	0.00	176.53	----	----	----	----	3.89	----	----	----	----	3.89
1.40	0.00	176.52	----	----	----	----	3.80	----	----	----	----	3.80
1.42	0.00	176.52	----	----	----	----	3.71	----	----	----	----	3.71
1.43	0.00	176.51	----	----	----	----	3.62	----	----	----	----	3.62
1.45	0.00	176.50	----	----	----	----	3.54	----	----	----	----	3.54
1.47	0.00	176.49	----	----	----	----	3.46	----	----	----	----	3.46
1.48	0.00	176.49	----	----	----	----	3.39	----	----	----	----	3.39
1.50	0.00	176.48	----	----	----	----	3.32	----	----	----	----	3.32
1.52	0.00	176.47	----	----	----	----	3.25	----	----	----	----	3.25
1.53	0.00	176.47	----	----	----	----	3.18	----	----	----	----	3.18
1.55	0.00	176.46	----	----	----	----	3.11	----	----	----	----	3.11
1.57	0.00	176.45	----	----	----	----	3.05	----	----	----	----	3.05
1.58	0.00	176.45	----	----	----	----	2.98	----	----	----	----	2.98
1.60	0.00	176.44	----	----	----	----	2.92	----	----	----	----	2.92
1.62	0.00	176.43	----	----	----	----	2.86	----	----	----	----	2.86
1.63	0.00	176.43	----	----	----	----	2.80	----	----	----	----	2.80
1.65	0.00	176.42	----	----	----	----	2.74	----	----	----	----	2.74
1.67	0.00	176.42	----	----	----	----	2.68	----	----	----	----	2.68
1.68	0.00	176.41	----	----	----	----	2.63	----	----	----	----	2.63
1.70	0.00	176.40	----	----	----	----	2.57	----	----	----	----	2.57
1.72	0.00	176.40	----	----	----	----	2.52	----	----	----	----	2.52
1.73	0.00	176.39	----	----	----	----	2.47	----	----	----	----	2.47
1.75	0.00	176.39	----	----	----	----	2.43	----	----	----	----	2.43
1.77	0.00	176.38	----	----	----	----	2.38	----	----	----	----	2.38

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**Hydrograph Discharge Table**

<b>Time (hrs)</b>	<b>Inflow cfs</b>	<b>Elevation ft</b>	<b>Clv A cfs</b>	<b>Clv B cfs</b>	<b>Clv C cfs</b>	<b>Clv D cfs</b>	<b>Wr A cfs</b>	<b>Wr B cfs</b>	<b>Wr C cfs</b>	<b>Wr D cfs</b>	<b>Exfil cfs</b>	<b>Outflow cfs</b>
1.78	0.00	176.38	----	----	----	----	2.34	----	----	----	----	2.34
1.80	0.00	176.37	----	----	----	----	2.29	----	----	----	----	2.29
1.82	0.00	176.37	----	----	----	----	2.25	----	----	----	----	2.25
1.83	0.00	176.36	----	----	----	----	2.21	----	----	----	----	2.21
1.85	0.00	176.36	----	----	----	----	2.17	----	----	----	----	2.17

...End

# Reservoir Report

## Reservoir No. 1 - Detention concept 1

Hydraflow Hydrographs by Intelisolve

### Pond Data

Pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	175.00	25,461	0.000	0.000
1.00	176.00	27,385	0.607	0.607
2.00	177.00	29,365	0.651	1.258
3.00	178.00	31,401	0.697	1.955
4.00	179.00	33,495	0.745	2.700

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 3.00	0.00	0.00	0.00
Crest El. ft	= 176.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	175.00	---	---	---	---	0.00	---	---	---	---	0.00
1.00	0.607	176.00	---	---	---	---	0.00	---	---	---	---	0.00
2.00	1.258	177.00	---	---	---	---	9.99	---	---	---	---	9.99
3.00	1.955	178.00	---	---	---	---	28.26	---	---	---	---	28.26
4.00	2.700	179.00	---	---	---	---	51.91	---	---	---	---	51.91

# Hydrograph Report

## Hyd. No. 1

Area A - 10-Year Storm

Hydrograph type	= Rational	Peak discharge	= 44.78 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 19.9 ac	Runoff coeff.	= 0.5
Intensity	= 4.496 in/hr	Time of conc. (Tc)	= 21 min
IDF Curve	= Sedgwick County.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 1.295 acft

## Hydrograph Discharge Table

**Time -- Outflow**  
**(hrs      cfs)**

0.08	10.66
0.10	12.79
0.12	14.93
0.13	17.06
0.15	19.19
0.17	21.32
0.18	23.45
0.20	25.59
0.22	27.72
0.23	29.85
0.25	31.98
0.27	34.11
0.28	36.25
0.30	38.38
0.32	40.51
0.33	42.64
0.35	44.78 <<
0.37	42.64
0.38	40.51
0.40	38.38
0.42	36.25
0.43	34.11
0.45	31.98
0.47	29.85
0.48	27.72
0.50	25.59
0.52	23.45
0.53	21.32
0.55	19.19
0.57	17.06
0.58	14.93
0.60	12.79
0.62	10.66

...End

# Hydrograph Report

## Hyd. No. 2

### Detention Pond Routing

Hydrograph type = Reservoir  
 Storm frequency = 10 yrs  
 Inflow hyd. No. = 1  
 Max. Elevation = 177.36 ft

Peak discharge = 15.78 cfs  
 Time interval = 1 min  
 Reservoir name = Detention concept  
 Max. Storage = 1.506 acft

Storage Indication method used.

Outflow hydrograph volume = 1.295 acft

### Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.25	31.98	176.48	----	----	----	----	3.33	----	----	----	----	3.33
0.27	34.11	176.54	----	----	----	----	3.99	----	----	----	----	3.99
0.28	36.25	176.61	----	----	----	----	4.73	----	----	----	----	4.73
0.30	38.38	176.67	----	----	----	----	5.55	----	----	----	----	5.55
0.32	40.51	176.75	----	----	----	----	6.44	----	----	----	----	6.44
0.33	42.64	176.82	----	----	----	----	7.41	----	----	----	----	7.41
0.35	44.78 <<	176.89	----	----	----	----	8.45	----	----	----	----	8.45
0.37	42.64	176.97	----	----	----	----	9.52	----	----	----	----	9.52
0.38	40.51	177.03	----	----	----	----	10.49	----	----	----	----	10.49
0.40	38.38	177.09	----	----	----	----	11.35	----	----	----	----	11.35
0.42	36.25	177.14	----	----	----	----	12.16	----	----	----	----	12.16
0.43	34.11	177.18	----	----	----	----	12.87	----	----	----	----	12.87
0.45	31.98	177.22	----	----	----	----	13.52	----	----	----	----	13.52
0.47	29.85	177.26	----	----	----	----	14.09	----	----	----	----	14.09
0.48	27.72	177.29	----	----	----	----	14.56	----	----	----	----	14.56
0.50	25.59	177.31	----	----	----	----	14.96	----	----	----	----	14.96
0.52	23.45	177.33	----	----	----	----	15.29	----	----	----	----	15.29
0.53	21.32	177.34	----	----	----	----	15.53	----	----	----	----	15.53
0.55	19.19	177.35	----	----	----	----	15.69	----	----	----	----	15.69
0.57	17.06	177.36	----	----	----	----	15.77	----	----	----	----	15.77
0.58	14.93	177.36 <<	----	----	----	----	15.78	----	----	----	----	15.78 <<
0.60	12.79	177.35	----	----	----	----	15.71	----	----	----	----	15.71
0.62	10.66	177.34	----	----	----	----	15.58	----	----	----	----	15.58
0.63	8.53	177.33	----	----	----	----	15.37	----	----	----	----	15.37
0.65	6.40	177.32	----	----	----	----	15.11	----	----	----	----	15.11
0.67	4.26	177.30	----	----	----	----	14.78	----	----	----	----	14.78
0.68	2.13	177.28	----	----	----	----	14.40	----	----	----	----	14.40
0.70	0.00	177.25	----	----	----	----	13.97	----	----	----	----	13.97
0.72	0.00	177.22	----	----	----	----	13.51	----	----	----	----	13.51
0.73	0.00	177.20	----	----	----	----	13.08	----	----	----	----	13.08
0.75	0.00	177.17	----	----	----	----	12.67	----	----	----	----	12.67
0.77	0.00	177.15	----	----	----	----	12.27	----	----	----	----	12.27
0.78	0.00	177.12	----	----	----	----	11.89	----	----	----	----	11.89
0.80	0.00	177.10	----	----	----	----	11.52	----	----	----	----	11.52
0.82	0.00	177.08	----	----	----	----	11.17	----	----	----	----	11.17
0.83	0.00	177.06	----	----	----	----	10.84	----	----	----	----	10.84
0.85	0.00	177.03	----	----	----	----	10.52	----	----	----	----	10.52
0.87	0.00	177.01	----	----	----	----	10.20	----	----	----	----	10.20

Continues on next page...

**Hydrograph Discharge Table**

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.88	0.00	176.99	----	----	----	----	9.89	----	----	----	----	9.89
0.90	0.00	176.97	----	----	----	----	9.59	----	----	----	----	9.59
0.92	0.00	176.95	----	----	----	----	9.30	----	----	----	----	9.30
0.93	0.00	176.93	----	----	----	----	9.02	----	----	----	----	9.02
0.95	0.00	176.91	----	----	----	----	8.75	----	----	----	----	8.75
0.97	0.00	176.90	----	----	----	----	8.48	----	----	----	----	8.48
0.98	0.00	176.88	----	----	----	----	8.24	----	----	----	----	8.24
1.00	0.00	176.86	----	----	----	----	8.00	----	----	----	----	8.00
1.02	0.00	176.85	----	----	----	----	7.77	----	----	----	----	7.77
1.03	0.00	176.83	----	----	----	----	7.55	----	----	----	----	7.55
1.05	0.00	176.81	----	----	----	----	7.33	----	----	----	----	7.33
1.07	0.00	176.80	----	----	----	----	7.12	----	----	----	----	7.12
1.08	0.00	176.78	----	----	----	----	6.93	----	----	----	----	6.93
1.10	0.00	176.77	----	----	----	----	6.74	----	----	----	----	6.74
1.12	0.00	176.75	----	----	----	----	6.56	----	----	----	----	6.56
1.13	0.00	176.74	----	----	----	----	6.38	----	----	----	----	6.38
1.15	0.00	176.73	----	----	----	----	6.21	----	----	----	----	6.21
1.17	0.00	176.71	----	----	----	----	6.04	----	----	----	----	6.04
1.18	0.00	176.70	----	----	----	----	5.88	----	----	----	----	5.88
1.20	0.00	176.69	----	----	----	----	5.73	----	----	----	----	5.73
1.22	0.00	176.68	----	----	----	----	5.58	----	----	----	----	5.58
1.23	0.00	176.67	----	----	----	----	5.44	----	----	----	----	5.44
1.25	0.00	176.65	----	----	----	----	5.30	----	----	----	----	5.30
1.27	0.00	176.64	----	----	----	----	5.17	----	----	----	----	5.17
1.28	0.00	176.63	----	----	----	----	5.04	----	----	----	----	5.04
1.30	0.00	176.62	----	----	----	----	4.91	----	----	----	----	4.91
1.32	0.00	176.61	----	----	----	----	4.79	----	----	----	----	4.79
1.33	0.00	176.60	----	----	----	----	4.67	----	----	----	----	4.67
1.35	0.00	176.59	----	----	----	----	4.56	----	----	----	----	4.56
1.37	0.00	176.58	----	----	----	----	4.45	----	----	----	----	4.45
1.38	0.00	176.57	----	----	----	----	4.35	----	----	----	----	4.35
1.40	0.00	176.56	----	----	----	----	4.25	----	----	----	----	4.25
1.42	0.00	176.56	----	----	----	----	4.15	----	----	----	----	4.15
1.43	0.00	176.55	----	----	----	----	4.05	----	----	----	----	4.05
1.45	0.00	176.54	----	----	----	----	3.96	----	----	----	----	3.96
1.47	0.00	176.53	----	----	----	----	3.87	----	----	----	----	3.87
1.48	0.00	176.52	----	----	----	----	3.78	----	----	----	----	3.78
1.50	0.00	176.51	----	----	----	----	3.69	----	----	----	----	3.69
1.52	0.00	176.51	----	----	----	----	3.60	----	----	----	----	3.60
1.53	0.00	176.50	----	----	----	----	3.52	----	----	----	----	3.52
1.55	0.00	176.49	----	----	----	----	3.45	----	----	----	----	3.45
1.57	0.00	176.48	----	----	----	----	3.37	----	----	----	----	3.37
1.58	0.00	176.48	----	----	----	----	3.30	----	----	----	----	3.30
1.60	0.00	176.47	----	----	----	----	3.23	----	----	----	----	3.23
1.62	0.00	176.46	----	----	----	----	3.17	----	----	----	----	3.17

...End

# Reservoir Report

## Reservoir No. 1 - Detention concept 1

### Pond Data

Pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	175.00	25,461	0.000	0.000
1.00	176.00	27,385	0.607	0.607
2.00	177.00	29,365	0.651	1.258
3.00	178.00	31,401	0.697	1.955
4.00	179.00	33,495	0.745	2.700

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 3.00	0.00	0.00	0.00
Crest El. ft	= 176.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	175.00	---	---	---	---	0.00	---	---	---	---	0.00
1.00	0.607	176.00	---	---	---	---	0.00	---	---	---	---	0.00
2.00	1.258	177.00	---	---	---	---	9.99	---	---	---	---	9.99
3.00	1.955	178.00	---	---	---	---	28.26	---	---	---	---	28.26
4.00	2.700	179.00	---	---	---	---	51.91	---	---	---	---	51.91

# Hydrograph Report

## Hyd. No. 1

Area A - 100-Year Storm

Hydrograph type	= Rational	Peak discharge	= 94.36 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 19.9 ac	Runoff coeff.	= 0.66
Intensity	= 7.177 in/hr	Time of conc. (Tc)	= 16 min
IDF Curve	= Sedgwick County.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 2.079 acft

## Hydrograph Discharge Table

**Time -- Outflow**  
**(hrs      cfs)**

0.07	23.59
0.08	29.49
0.10	35.38
0.12	41.28
0.13	47.18
0.15	53.08
0.17	58.97
0.18	64.87
0.20	70.77
0.22	76.66
0.23	82.56
0.25	88.46
0.27	94.36 <<
0.28	88.46
0.30	82.56
0.32	76.66
0.33	70.77
0.35	64.87
0.37	58.97
0.38	53.08
0.40	47.18
0.42	41.28
0.43	35.38
0.45	29.49
0.47	23.59

...End

# Hydrograph Report

## Hyd. No. 2

### Detention Pond Routing

Hydrograph type = Reservoir  
 Storm frequency = 100 yrs  
 Inflow hyd. No. = 1  
 Max. Elevation = 178.16 ft

Peak discharge = 31.76 cfs  
 Time interval = 1 min  
 Reservoir name = Detention concept  
 Max. Storage = 2.076 acft

Storage Indication method used.

Outflow hydrograph volume = 2.079 acft

### Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.20	70.77	176.85	----	----	----	----	7.79	----	----	----	----	7.79
0.22	76.66	176.98	----	----	----	----	9.75	----	----	----	----	9.75
0.23	82.56	177.12	----	----	----	----	11.86	----	----	----	----	11.86
0.25	88.46	177.26	----	----	----	----	14.20	----	----	----	----	14.20
0.27	94.36 <<	177.41	----	----	----	----	16.80	----	----	----	----	16.80
0.28	88.46	177.56	----	----	----	----	19.44	----	----	----	----	19.44
0.30	82.56	177.69	----	----	----	----	21.88	----	----	----	----	21.88
0.32	76.66	177.80	----	----	----	----	24.09	----	----	----	----	24.09
0.33	70.77	177.89	----	----	----	----	26.05	----	----	----	----	26.05
0.35	64.87	177.98	----	----	----	----	27.74	----	----	----	----	27.74
0.37	58.97	178.04	----	----	----	----	29.09	----	----	----	----	29.09
0.38	53.08	178.09	----	----	----	----	30.14	----	----	----	----	30.14
0.40	47.18	178.12	----	----	----	----	30.92	----	----	----	----	30.92
0.42	41.28	178.15	----	----	----	----	31.45	----	----	----	----	31.45
0.43	35.38	178.16	----	----	----	----	31.73	----	----	----	----	31.73
0.45	29.49	178.16 <<	----	----	----	----	31.76	----	----	----	----	31.76 <<
0.47	23.59	178.15	----	----	----	----	31.55	----	----	----	----	31.55
0.48	17.69	178.13	----	----	----	----	31.11	----	----	----	----	31.11
0.50	11.79	178.10	----	----	----	----	30.46	----	----	----	----	30.46
0.52	5.90	178.06	----	----	----	----	29.62	----	----	----	----	29.62
0.53	0.00	178.02	----	----	----	----	28.58	----	----	----	----	28.58
0.55	0.00	177.96	----	----	----	----	27.44	----	----	----	----	27.44
0.57	0.00	177.91	----	----	----	----	26.33	----	----	----	----	26.33
0.58	0.00	177.86	----	----	----	----	25.29	----	----	----	----	25.29
0.60	0.00	177.81	----	----	----	----	24.29	----	----	----	----	24.29
0.62	0.00	177.76	----	----	----	----	23.35	----	----	----	----	23.35
0.63	0.00	177.72	----	----	----	----	22.45	----	----	----	----	22.45
0.65	0.00	177.67	----	----	----	----	21.61	----	----	----	----	21.61
0.67	0.00	177.63	----	----	----	----	20.80	----	----	----	----	20.80
0.68	0.00	177.59	----	----	----	----	20.03	----	----	----	----	20.03
0.70	0.00	177.55	----	----	----	----	19.31	----	----	----	----	19.31
0.72	0.00	177.51	----	----	----	----	18.61	----	----	----	----	18.61
0.73	0.00	177.48	----	----	----	----	17.95	----	----	----	----	17.95
0.75	0.00	177.44	----	----	----	----	17.32	----	----	----	----	17.32
0.77	0.00	177.41	----	----	----	----	16.71	----	----	----	----	16.71
0.78	0.00	177.38	----	----	----	----	16.14	----	----	----	----	16.14
0.80	0.00	177.35	----	----	----	----	15.60	----	----	----	----	15.60
0.82	0.00	177.32	----	----	----	----	15.07	----	----	----	----	15.07

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**Hydrograph Discharge Table**

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.83	0.00	177.29	----	----	----	----	14.57	----	----	----	----	14.57
0.85	0.00	177.26	----	----	----	----	14.10	----	----	----	----	14.10
0.87	0.00	177.23	----	----	----	----	13.64	----	----	----	----	13.64
0.88	0.00	177.20	----	----	----	----	13.19	----	----	----	----	13.19
0.90	0.00	177.18	----	----	----	----	12.78	----	----	----	----	12.78
0.92	0.00	177.15	----	----	----	----	12.38	----	----	----	----	12.38
0.93	0.00	177.13	----	----	----	----	11.99	----	----	----	----	11.99
0.95	0.00	177.11	----	----	----	----	11.62	----	----	----	----	11.62
0.97	0.00	177.08	----	----	----	----	11.27	----	----	----	----	11.27
0.98	0.00	177.06	----	----	----	----	10.93	----	----	----	----	10.93
1.00	0.00	177.04	----	----	----	----	10.60	----	----	----	----	10.60
1.02	0.00	177.02	----	----	----	----	10.29	----	----	----	----	10.29
1.03	0.00	177.00	----	----	----	----	9.98	----	----	----	----	9.98
1.05	0.00	176.98	----	----	----	----	9.68	----	----	----	----	9.68
1.07	0.00	176.96	----	----	----	----	9.38	----	----	----	----	9.38
1.08	0.00	176.94	----	----	----	----	9.10	----	----	----	----	9.10
1.10	0.00	176.92	----	----	----	----	8.82	----	----	----	----	8.82
1.12	0.00	176.90	----	----	----	----	8.55	----	----	----	----	8.55
1.13	0.00	176.88	----	----	----	----	8.31	----	----	----	----	8.31
1.15	0.00	176.87	----	----	----	----	8.07	----	----	----	----	8.07
1.17	0.00	176.85	----	----	----	----	7.83	----	----	----	----	7.83
1.18	0.00	176.83	----	----	----	----	7.61	----	----	----	----	7.61
1.20	0.00	176.82	----	----	----	----	7.39	----	----	----	----	7.39
1.22	0.00	176.80	----	----	----	----	7.18	----	----	----	----	7.18
1.23	0.00	176.79	----	----	----	----	6.98	----	----	----	----	6.98
1.25	0.00	176.77	----	----	----	----	6.79	----	----	----	----	6.79
1.27	0.00	176.76	----	----	----	----	6.61	----	----	----	----	6.61
1.28	0.00	176.74	----	----	----	----	6.43	----	----	----	----	6.43

...End

# Reservoir Report

## Reservoir No. 1 - Detention concept 1

Hydraflow Hydrographs by Intelisolve

### Pond Data

Pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	175.00	25,461	0.000	0.000
1.00	176.00	27,385	0.607	0.607
2.00	177.00	29,365	0.651	1.258
3.00	178.00	31,401	0.697	1.955
4.00	179.00	33,495	0.745	2.700

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 3.00	0.00	0.00	0.00
Crest El. ft	= 176.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	175.00	---	---	---	---	0.00	---	---	---	---	0.00
1.00	0.607	176.00	---	---	---	---	0.00	---	---	---	---	0.00
2.00	1.258	177.00	---	---	---	---	9.99	---	---	---	---	9.99
3.00	1.955	178.00	---	---	---	---	28.26	---	---	---	---	28.26
4.00	2.700	179.00	---	---	---	---	51.91	---	---	---	---	51.91

## Detention Pond for Northeast Elementary School Addition Wichita, Kansas

The proposed dry detention pond will have a bottom elevation of 176.0. The top of the dam will be at an elevation of 180.7. A 24" concrete pipe with a flow line of 176.0 will be the outlet structure. The pond elevation will be 179.7 in the 100-year event. Table 1 shows runoff prior to any development. Table 2 shows runoff after development without the use of the detention pond. Table 3 shows the post-development runoff after routing through the proposed detention pond.

Table 1: Pre-development runoff.

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	8.53	12.71	19.84	47.89
B	2.64	3.70	5.91	14.24
C	2.77	3.73	5.87	13.47
D	6.30	8.93	14.65	35.93
TOTAL	20.25	29.07	46.26	111.53

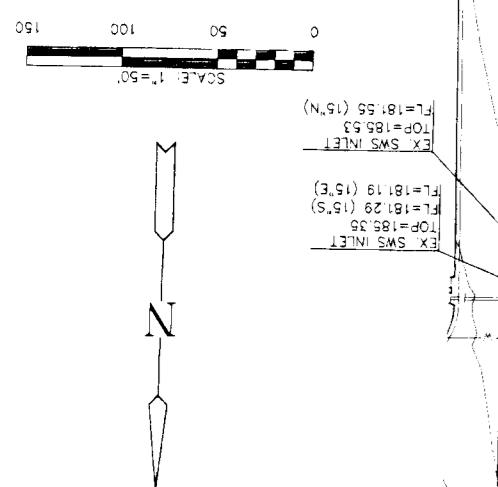
Table 2: Post-development runoff.

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	20.80	29.81	44.82	104.24
B	6.55	8.33	11.44	21.92
C	2.77	3.73	5.87	13.47
D	9.17	12.50	19.07	42.54
TOTAL	39.29	54.38	81.20	182.16

Table 3: Post-development runoff w/ Detention Pond

Drainage Area	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
A	19.47	21.21	22.17	24.90
B	6.55	8.33	11.44	21.92
C	2.77	3.73	5.87	13.47
D	9.17	12.50	19.07	42.54
TOTAL	25.7	35.3	52.16	109.69

- LEGEND**
- PROPOSED SPOT ELEVATION
  - FUTURE BLDG.
  - SILT FENCE
  - STRAW BALE DIKE
  - CURB SEDIMENT TRAPS
  - CURB INLET FILTER
  - INLET FILTER
  - CONSTRUCTION ENTRANCE/  
WASH DOWN PAD
  - EXCESS EXCAVATION PLACEMENT  
(COMPACT TO 95% STD.)
  - APPROXIMATE LIMITS OF  
CONSTRUCTION
  - EARTHWORK SPOLS/BERM



EX SWS INLET  
 TOP=185.25  
 FL=181.29 (15'S)  
 FL=181.19 (15'E)

EX SWS INLET  
 TOP=185.53  
 FL=181.55 (15'N)

