

DETENTION CALCULATIONS
MEL HAMBELTON
ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

 **BAUGHMAN COMPANY, P.A.**
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March 26, 2001



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* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* MAY 1991
* VERSION 4.0.1E
* Lahey F77L-EM/32 version 5.01
* Dodson & Associates, Inc.
* RUN DATE 03/26/01 TIME 16:17:54
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* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 551-1748
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID OVERALL DRAINAGE BASIN
  * proposed conditions
  * this plan assumes that no overland capacity is available
  * to the east of the development
  * at this time
2 IT 5 26MAR01 0000 300 2001
3 IO 3 0
4 JR PREC 1.0000 1.3143 1.5143 1.7714 2.0000 2.2286
  *DIAGRAM
  *
5 KK SITE
6 BA .05
7 PB 3.5
8 IN 60
9 PC 0 0.011 0.022 0.035 0.048 0.063 0.080 0.098 0.120 0.147
10 PC 0.181 0.235 0.663 0.772 0.820 0.854 0.880 0.902 0.921 0.937
11 PC 0.952 0.965 0.978 0.989 1.000
12 UD .15
13 LS 0 98
  *
14 KK POND
15 RS 1 ELEV 134
16 SA 1.5 3.3
17 SE 134 140
18 SQ 4.5 4.5
19 SE 134.1 148
  *
20 ZZ

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SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT



LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
 NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
 5 SITE
 V
 V
 14 POND

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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OVERALL DRAINAGE BASIN

3 IO OUTPUT CONTROL VARIABLES
 IPRNT 3 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE
 IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 26MAR 1 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 27MAR 1 ENDING DATE
 NDTIME 0055 ENDING TIME
 ICENT 20 CENTURY MARK
 COMPUTATION INTERVAL 0.08 HOURS
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-FEET
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS
 JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 1.00 1.31 1.51 1.77 2.00 2.23

*** **

 * SITE *
 * *

8 IN TIME DATA FOR INPUT TIME SERIES





*** *** *** *** ***

HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.50, TOTAL LOSS = 0.23, TOTAL EXCESS = 3.27

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR	24.92-HR
+ 48.	12.00	13.	4.	4.	4.	4.
		(INCHES) 2.424	3.266	3.266	3.266	3.266
		(AC-FT) 6.	9.	9.	9.	9.

CUMULATIVE AREA = 0.05 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 1.31

TOTAL RAINFALL = 4.60, TOTAL LOSS = 0.24, TOTAL EXCESS = 4.36

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR	24.92-HR
+ 63.	12.00	17.	6.	6.	6.	6.
		(INCHES) 3.209	4.364	4.364	4.364	4.364
		(AC-FT) 9.	12.	12.	12.	12.

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 1.51

TOTAL RAINFALL = 5.30, TOTAL LOSS = 0.24, TOTAL EXCESS = 5.06

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR	24.92-HR
+ 73.	12.00	20.	7.	7.	7.	7.
		(INCHES) 3.708	5.063	5.063	5.063	5.063
		(AC-FT) 10.	14.	14.	14.	14.

CUMULATIVE AREA = 0.05 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 1.77

TOTAL RAINFALL = 6.20, TOTAL LOSS = 0.24, TOTAL EXCESS = 5.96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	(CFS)	6-HR	24-HR	72-HR	24.92-HR
+ 85.	12.00	23.	8.	8.	8.	8.
		(INCHES) 4.348	5.962	5.962	5.962	5.962
		(AC-FT) 12.	16.	16.	16.	16.

CUMULATIVE AREA = 0.05 SQ MI



*** *** *** *** ***

HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 2.00

TOTAL RAINFALL = 7.00, TOTAL LOSS = 0.24, TOTAL EXCESS = 6.76

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
96.	12.00	(CFS)	26.	9.	9.	9.
		(INCHES)	4.916	6.761	6.761	6.761
		(AC-FT)	13.	18.	18.	18.

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION SITE
FOR PLAN 1, RATIO = 2.23

TOTAL RAINFALL = 7.80, TOTAL LOSS = 0.24, TOTAL EXCESS = 7.56

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
108.	12.00	(CFS)	29.	10.	10.	10.
		(INCHES)	5.483	7.560	7.560	7.560
		(AC-FT)	15.	20.	20.	20.

CUMULATIVE AREA = 0.05 SQ MI

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*****
*           *
14 KK      * POND *
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HYDROGRAPH ROUTING DATA

15 RS	STORAGE ROUTING		
	NSTPS	1	NUMBER OF SUBREACHES
	ITYP	ELEV	TYPE OF INITIAL CONDITION
	RSVRIC	134.00	INITIAL CONDITION
	X	0.00	WORKING R AND D COEFFICIENT
16 SA	AREA	1.5	3.3
17 SE	ELEVATION	134.00	140.00
18 SQ	DISCHARGE	5.	5.
19 SE	ELEVATION	134.10	148.00

COMPUTED STORAGE-ELEVATION DATA

STORAGE	0.00	14.05
ELEVATION	134.00	140.00



COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.15	14.05	53.58
OUTFLOW	4.50	4.50	4.50	4.50
ELEVATION	134.00	134.10	140.00	148.00

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 5.	0.08	(CFS)	5.	5.	5.	5.
		(INCHES)	0.837	3.347	3.475	3.475
		(AC-FT)	2.	9.	9.	9.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
+ (AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 4.	14.17		4.	2.	2.	2.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
+ (FEET)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 135.88	14.17		135.79	134.85	134.82	134.82

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.31

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 5.	0.08	(CFS)	5.	5.	5.	5.
		(INCHES)	0.837	3.347	3.475	3.475
		(AC-FT)	2.	9.	9.	9.
PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
+ (AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 6.	15.17		6.	3.	3.	3.
PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
+ (FEET)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 136.72	15.17		136.65	135.35	135.30	135.30

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.51

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
+ (CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
+ 5.	0.08	(CFS)	5.	5.	5.	5.
		(INCHES)	0.837	3.347	3.475	3.475
		(AC-FT)	2.	9.	9.	9.



PEAK STORAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
8.	15.33	8.	4.	4.	4.

PEAK STAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
137.28	15.50	137.23	135.69	135.63	135.63

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.77

PEAK FLOW	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
5.	0.08	5.	5.	5.	5.
(INCHES)		0.837	3.347	3.475	3.475
(AC-FT)		2.	9.	9.	9.

PEAK STORAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
9.	16.25	9.	5.	5.	5.

PEAK STAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
138.05	16.33	138.01	136.13	136.05	136.05

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 2.00

PEAK FLOW	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
5.	0.08	5.	5.	5.	5.
(INCHES)		0.837	3.347	3.475	3.475
(AC-FT)		2.	9.	9.	9.

PEAK STORAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
11.	17.17	11.	6.	6.	6.

PEAK STAGE	TIME	6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
138.77	17.25	138.73	136.54	136.44	136.44

CUMULATIVE AREA = 0.05 SQ MI

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HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 2.23



PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
+ 5.	0.08	5.	5.	5.	5.
	(INCHES)	0.837	3.347	3.475	3.475
	(AC-FT)	2.	9.	9.	9.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
+ 13.	18.08	13.	7.	7.	7.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
+ 139.51	18.17	139.48	136.95	136.84	136.84

CUMULATIVE AREA = 0.05 SQ MI

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				1.00	1.31	1.51	1.77	2.00	2.23
+ HYDROGRAPH AT	SITE	0.05	1 FLOW	48.	63.	73.	85.	96.	108.
			TIME	12.00	12.00	12.00	12.00	12.00	12.00
+ ROUTED TO	POND	0.05	1 FLOW	5.	5.	5.	5.	5.	5.
			TIME	0.08	0.08	0.08	0.08	0.08	0.08
			** PEAK STAGES IN FEET **						
			1 STAGE	135.88	136.72	137.28	138.05	138.77	139.51
			TIME	14.17	15.17	15.50	16.33	17.25	18.17

*** NORMAL END OF HEC-1 ***

