MID-KANSAS ENGINEERING
CONSULTANTS P.A.
3500 NORTH ROCK ROAD BLDG. #800
WICHITA, KANSAS 67226 1-316-682 6561

CALCULATIONS & SKETCHES

Proj. No. _____
By FBN Date 9/23/86
Chkd By _____ Date _____
Sheet 1 Of _____

Location Woodland Estates 2nd
Reference Lakes East of Woodland Estates 2nd

Drainage Area = 73.5 acres = 0.115 sq. mi.

CN = 87.0 T_c by SCS: $T_c = \frac{\ell^{0.8}(S+1)^{0.7}}{1,900\, Y^{0.5}}$

ℓ = hydraulic length of watershed in ft. = 3300'

$S = \frac{1000}{CN'} - 10$ (where CN' = retardance factor = CN)

$= \frac{1000}{87} - 10 = 1.49$

Y = aver. watershed Land slope in percent = 2.0%

From Fig. 3-3, SCS TR-55 Urban Hydrology for Small Watersheds:

L = 0.46 hrs HLM = 100% IMP = 38%

$F_{HLM} = 0.57$, $F_{IMP} = 0.83$

$T_c = \frac{60L}{0.6} \times F_{HLM} \times F_{IMP} = \frac{60 \times .46}{0.6} \times .57 \times .83 = 22$ min = 0.36 hr

By Rational Formula w/ T_c = 22 min, I_{100} = 6.26 in/hr, C_{100} = 0.76

$Q_{100} = (0.76)(6.26)(73.5) = 349.69$

for Broadcrested Weir from Merritt, Std. Handbook for Civil Engineers

p. 21-79 $Q = C\, L\, H^{3/2}$

for H = 1.5', C = 3.08', $L = \frac{350}{1.5^{1.5} \times 3.08} = 69.6' \approx 64'$

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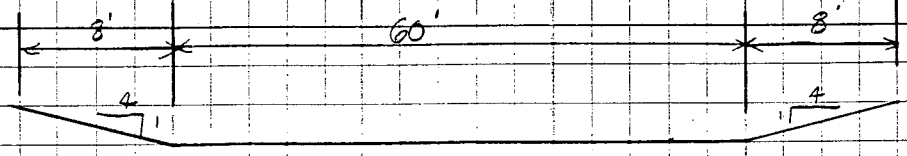
CALCULATIONS & SKETCHES

Proj. No.
By FBN Date 9/23/86
Chkd By Date
Sheet 2 Of

Location Woodland Estates 2nd
Reference Lakes East of Woodland Estates 2nd

Proposed Weir Configuration



Water Surface Elev North Lake	Water Surface Elev South Lake	H ft	L ft	C	Q cfs	Storage acre-ft North Lake	Storage acre-ft South Lake
168.00	165.00	0	60		0	0	0
168.50	165.5	0.5	64	2.67	60.4	0.40	0.51
169.00	166.00	1.0	68	2.83	192.4	0.90	1.07
169.50	166.50	1.5	72	3.08	407.4	1.37	1.52
170.00	167.00	2.0	76	3.12	670.7	1.93	2.27

Based on SCS TR-20 Run, Q = 486 cfs

$L = \frac{441}{1.5^{1.5} \times 3.05} = 77.93'$ Revise 60' to 75'

Check 80'

H	L	Q	H	L	Q
0.5	79	74.6	0.5	84	79.3
1.0	83	234.9	1.0	88	249.0
1.5	87	492.3	1.5	92	520.6
2.0	91	803.0	2.0	96	847.2

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CALCULATIONS & SKETCHES

Proj. No.
By FBN Date 9/23/22
Chkd By Date
Sheet 3 Of

Location Woodland Estates 2nd
Reference Lakes East of Woodlands Estates 2nd

L of Weir, ft	Max Water Surface from TR-20 Elev N. Lake	S. Lake	Top of Dam, Elev N. Lake	S. Lake	Freeboard, ft N. Lake	S. Lake
60	169.54	166.72	170	167	0.46	0.28
75	169.39	166.39	170	167	0.61	0.61
80	169.35	166.35	170	167	0.65	0.65

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**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

JOB TR-20                        FULLPRINT          SUMMARY   NOPLOTS          10
TITLE 001 LAKEPOINT, N.W. LAKES:  100 YEAR, 24 HOUR EVENT USING SCS          20
TITLE     TR-20, CURVE 2  60 FOOT WEIR
 3 STRUCT      01                                                             40
 8                          168.00       0.00        0.0                     50
 8                          168.50       60.4        0.40                    60
 8                          169.00      192.40       0.90                    70
 8                          169.50      407.4        1.37                    80
 8                          170.00      670.70       1.93                    90
 9 ENDTBL                                                                   100
 3 STRUCT      02                                                           110
 8                          165.00       0.00        0.0                     120
 8                          165.50       60.4        0.51                    130
 8                          166.00      192.4        1.07                    140
 8                          166.50      407.4        1.52                    150
 8                          170.00      670.70       2.27                    160
 9 ENDTBL                                                                   170
 6 RUNOFF 1    01     5      0.115      87.0        0.36   1 1   1   1       180
 6 RESVOR 2    01 5   6    168.00                         1 1 1 1   1       190
 6 RESVOR 2    02 6   5    165.00                         1 1 1 1   1       200
   ENDATA                                                                   210
 7 INCREM 6                  0.10                                           220
 7 COMPUT 7    01    02               7.8        1.0    2 2  01  06         230
   ENDCMP 1                                                                 240
   ENDJOB 2                                                                 250

**********END OF 80-80 LIST**********
```

FILE NO. 1

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20. CHANGES FROM THE 2/14/74 VERSION INCLUDE:

REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD. INPUT DATA PREPARED FOR PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH. IT IS RECOMMENDED THAT THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED. THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M" VALUES USED IN THE ROUTING PROCEDURE.

GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS MANUAL. SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT HYDROGRAPH HAVE BEEN IMPROVED. PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION. OUTPUT HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

STRUCTURE DATA, STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	168.00	.00	.00
8	168.50	60.40	.40
8	169.00	192.40	.90
8	169.50	407.40	1.37
8	170.00	670.70	1.93

9 ENDTBL

STRUCTURE DATA, STRUCTURE NO. 2

	ELEVATION	DISCHARGE	STORAGE
8	165.00	.00	.00
8	165.50	60.40	.51
8	166.00	192.40	1.07
8	166.50	407.40	1.52
8	170.00	670.70	2.27

9 ENDTBL

STANDARD CONTROL OPERATION RUNOFF STRUCTURE 1 RECORD ID 180
OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = .1150 87.0000 .3600
OUTPUT OPTIONS IN EFFECT PEAK HYD VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 1 RECORD ID 190
INPUT HYDROGRAPH = 5 OUTPUT HYDROGRAPH = 6 DATA FIELD VALUES = 168.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 2 RECORD ID 200
INPUT HYDROGRAPH = 6 OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = 165.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS RECORD ID 220

EXECUTIVE CONTROL OPERATION COMPUT FROM STRUCTURE 1 TO STRUCTURE 2 RECORD ID 230
STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 6 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF STRUCTURE 1
OUTPUT HYDROGRAPH= 5
AREA= .12 SQ MI INPUT RUNOFF CURVE= 87. TIME OF CONCENTRATION= .36 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0480 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.10	441.15	(RUNOFF)
17.65	11.20	(RUNOFF)
19.65	8.98	(RUNOFF)
23.65	6.75	(RUNOFF)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .12 SQ.MI.

.00	DISCHG	.00	.00	.00	.00	.00	.03	.07	.14	.21	.32
4.00	DISCHG	.45	.60	.74	.88	1.01	1.14	1.27	1.39	1.51	1.63
5.00	DISCHG	1.74	1.85	1.96	2.07	2.18	2.28	2.38	2.48	2.57	2.67
6.00	DISCHG	2.76	2.90	3.19	3.52	3.78	3.97	4.13	4.27	4.40	4.52
7.00	DISCHG	4.63	4.75	4.85	4.96	5.06	5.16	5.26	5.36	5.45	5.54
8.00	DISCHG	5.64	5.82	6.20	6.67	7.20	7.80	8.30	8.63	8.86	9.05
9.00	DISCHG	9.21	9.46	9.94	10.48	10.89	11.17	11.49	12.04	12.65	13.09
10.00	DISCHG	13.40	13.75	14.33	15.04	16.03	17.32	18.77	20.71	22.74	24.92
11.00	DISCHG	27.32	29.63	32.15	34.74	37.87	42.15	56.58	95.79	149.77	240.06
12.00	DISCHG	368.73	441.13	373.31	256.14	170.21	120.70	91.02	73.37	62.40	54.63
13.00	DISCHG	48.19	43.30	39.56	36.69	34.15	31.98	30.11	28.21	26.47	25.07
14.00	DISCHG	23.90	22.92	21.94	21.04	20.16	19.23	18.38	17.46	16.63	16.11
15.00	DISCHG	15.86	15.73	15.67	15.59	15.22	14.55	13.99	13.69	13.55	13.47
16.00	DISCHG	13.44	13.42	13.41	13.41	13.41	13.40	13.24	12.69	12.03	11.61
17.00	DISCHG	11.40	11.29	11.24	11.21	11.20	11.19	11.19	11.19	11.15	10.79
18.00	DISCHG	10.12	9.56	9.26	9.11	9.04	9.00	8.98	8.97	8.97	8.97
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.92	8.56
20.00	DISCHG	7.90	7.34	7.04	6.89	6.81	6.77	6.75	6.74	6.74	6.74
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.70	6.34
24.00	DISCHG	5.67	4.79	3.34	1.87	.93	.47	.23	.11	.05	.02
25.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 464.45 CFS-HRS, 38.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 168.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.13	430.66	169.54
19.65	8.97	168.07
23.65	6.75	168.06

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.12 SQ.MI.
3.00	DISCHG	.00	.00	.00	.00	.00	.01	.04	.09	.16	.24
3.00	ELEV	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00
4.00	DISCHG	.35	.49	.63	.77	.91	1.04	1.17	1.29	1.41	1.53
4.00	ELEV	168.00	168.00	168.01	168.01	168.01	168.01	168.01	168.01	168.01	168.01
5.00	DISCHG	1.65	1.76	1.88	1.98	2.09	2.20	2.30	2.40	2.49	2.59
5.00	ELEV	168.01	168.01	168.02	168.02	168.02	168.02	168.02	168.02	168.02	168.02
6.00	DISCHG	2.68	2.80	2.99	3.27	3.56	3.80	4.00	4.15	4.29	4.42
6.00	ELEV	168.02	168.02	168.02	168.03	168.03	168.03	168.03	168.03	168.04	168.04
7.00	DISCHG	4.54	4.66	4.77	4.88	4.98	5.08	5.18	5.28	5.38	5.47
7.00	ELEV	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.05
8.00	DISCHG	5.56	5.69	5.93	6.32	6.79	7.33	7.88	8.33	8.65	8.89
8.00	ELEV	168.05	168.05	168.05	168.05	168.06	168.06	168.07	168.07	168.07	168.07
9.00	DISCHG	9.07	9.28	9.61	10.07	10.55	10.92	11.24	11.64	12.18	12.71
9.00	ELEV	168.08	168.08	168.08	168.08	168.09	168.09	168.09	168.10	168.10	168.11
10.00	DISCHG	13.12	13.47	13.91	14.50	15.30	16.36	17.66	19.26	21.15	23.21
10.00	ELEV	168.11	168.11	168.12	168.12	168.13	168.14	168.15	168.16	168.18	168.19
11.00	DISCHG	25.45	27.77	30.17	32.69	35.47	38.96	46.96	72.65	124.96	199.36
11.00	ELEV	168.21	168.23	168.25	168.27	168.29	168.32	168.39	168.55	168.74	169.02
12.00	DISCHG	336.74	426.11	401.23	288.08	190.57	143.50	104.23	81.24	67.31	58.73
12.00	ELEV	169.34	169.54	169.49	169.22	168.99	168.81	168.67	168.58	168.53	168.49
13.00	DISCHG	53.11	47.45	42.83	39.18	36.26	33.81	31.68	29.74	27.90	26.26
13.00	ELEV	168.44	168.39	168.35	168.32	168.30	168.28	168.26	168.25	168.23	168.22
14.00	DISCHG	24.90	23.75	22.74	21.78	20.87	19.96	19.07	18.18	17.31	16.59
14.00	ELEV	168.21	168.20	168.19	168.18	168.17	168.17	168.16	168.15	168.14	168.14
15.00	DISCHG	16.13	15.87	15.74	15.66	15.46	15.02	14.45	13.98	13.70	13.55
15.00	ELEV	168.13	168.13	168.13	168.13	168.13	168.12	168.12	168.12	168.11	168.11
16.00	DISCHG	13.48	13.44	13.42	13.41	13.41	13.41	13.34	13.05	12.52	11.98
16.00	ELEV	168.11	168.11	168.11	168.11	168.11	168.11	168.11	168.11	168.10	168.10
17.00	DISCHG	11.61	11.41	11.30	11.24	11.22	11.20	11.20	11.19	11.18	11.02
17.00	ELEV	168.10	168.09	168.09	168.09	168.09	168.09	168.09	168.09	168.09	168.09
18.00	DISCHG	10.59	10.02	9.55	9.27	9.12	9.04	9.00	8.98	8.97	8.97
18.00	ELEV	168.09	168.08	168.08	168.08	168.08	168.07	168.07	168.07	168.07	168.07
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.95	8.79
19.00	ELEV	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07
20.00	DISCHG	8.36	7.79	7.33	7.05	6.89	6.81	6.77	6.75	6.74	6.74
20.00	ELEV	168.07	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	ELEV	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.73	6.57

23.00	ELEV	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.05
24.00	DISCHG	6.14	5.44	4.38	3.02	1.78	.95	.49	.25	.12	.06
24.00	ELEV	168.05	168.05	168.04	168.02	168.01	168.01	168.00	168.00	168.00	168.00
25.00	DISCHG	.03	.01	.00							
25.00	ELEV	168.00	168.00	168.00							

RUNOFF VOLUME ABOVE BASEFLOW = 6.25 WATERSHED INCHES, 463.90 CFS-HRS, 38.34 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 165.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.15	424.32	166.72
19.66	8.97	165.07
23.66	6.75	165.06

FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .12 SQ.MI.

TIME(HRS)											
3.00	DISCHG	.00	.00	.00	.00	.00	.00	.02	.05	.10	.16
3.00	ELEV	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00
4.00	DISCHG	.25	.36	.49	.63	.77	.90	1.03	1.16	1.29	1.41
4.00	ELEV	165.00	165.00	165.00	165.01	165.01	165.01	165.01	165.01	165.01	165.01
5.00	DISCHG	1.53	1.65	1.76	1.87	1.98	2.09	2.19	2.29	2.39	2.49
5.00	ELEV	165.01	165.01	165.01	165.02	165.02	165.02	165.02	165.02	165.02	165.02
6.00	DISCHG	2.59	2.69	2.82	3.02	3.28	3.55	3.78	3.97	4.14	4.28
6.00	ELEV	165.02	165.02	165.02	165.03	165.03	165.03	165.03	165.03	165.03	165.04
7.00	DISCHG	4.41	4.53	4.65	4.76	4.87	4.98	5.08	5.18	5.28	5.37
7.00	ELEV	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04
8.00	DISCHG	5.47	5.57	5.73	5.99	6.36	6.82	7.34	7.84	8.27	8.60
8.00	ELEV	165.05	165.05	165.05	165.05	165.05	165.06	165.06	165.06	165.07	165.07
9.00	DISCHG	8.85	9.06	9.31	9.66	10.09	10.51	10.88	11.25	11.69	12.19
9.00	ELEV	165.07	165.08	165.08	165.08	165.08	165.09	165.09	165.09	165.10	165.10
10.00	DISCHG	12.67	13.08	13.48	13.96	14.58	15.40	16.46	17.77	19.37	21.22
10.00	ELEV	165.10	165.11	165.11	165.12	165.12	165.13	165.14	165.15	165.16	165.18
11.00	DISCHG	23.26	25.46	27.77	30.17	32.74	35.68	40.46	53.17	94.58	161.27
11.00	ELEV	165.19	165.21	165.23	165.25	165.27	165.30	165.33	165.44	165.63	165.88
12.00	DISCHG	292.28	410.28	414.29	322.68	212.02	162.59	124.37	93.15	74.52	63.17
12.00	ELEV	166.23	166.54	166.59	166.30	166.05	165.89	165.74	165.62	165.55	165.51
13.00	DISCHG	57.48	52.75	47.75	43.32	39.64	36.61	34.07	31.86	29.86	28.03
13.00	ELEV	165.48	165.44	165.40	165.36	165.33	165.30	165.28	165.26	165.25	165.23
14.00	DISCHG	26.42	25.04	23.86	22.81	21.83	20.90	19.99	19.10	18.21	17.38
14.00	ELEV	165.22	165.21	165.20	165.19	165.18	165.17	165.17	165.16	165.15	165.14
15.00	DISCHG	16.71	16.24	15.96	15.79	15.64	15.38	14.95	14.47	14.06	13.78
15.00	ELEV	165.14	165.13	165.13	165.13	165.13	165.13	165.12	165.12	165.12	165.11
16.00	DISCHG	13.61	13.51	13.46	13.43	13.42	13.41	13.39	13.26	12.95	12.49
16.00	ELEV	165.11	165.11	165.11	165.11	165.11	165.11	165.11	165.11	165.11	165.10
17.00	DISCHG	12.04	11.69	11.47	11.34	11.27	11.23	11.21	11.20	11.19	11.13
17.00	ELEV	165.10	165.10	165.09	165.09	165.09	165.09	165.09	165.09	165.09	165.09
18.00	DISCHG	10.91	10.51	10.03	9.63	9.34	9.17	9.07	9.02	8.99	8.98

18.00	ELEV	165.09	165.09	165.08	165.08	165.08	165.08	165.08	165.07	165.07	165.07
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.96	8.90
19.00	ELEV	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07
20.00	DISCHG	8.69	8.29	7.81	7.40	7.12	6.94	6.85	6.79	6.76	6.75
20.00	ELEV	165.07	165.07	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
23.00	DISCHG	6.74	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.74	6.68
23.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
24.00	DISCHG	6.47	6.02	5.29	4.25	3.03	1.94	1.14	.63	.34	.18
24.00	ELEV	165.05	165.05	165.04	165.04	165.03	165.02	165.01	165.01	165.00	165.00
25.00	DISCHG	.09	.04	.02	.01	.00					
25.00	ELEV	165.00	165.00	165.00	165.00	165.00					

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 464.32 CFS-HRS, 38.37 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID 240

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID 250

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 6													
STRUCTURE 1	RUNOFF	.12	2	2	.10	.0	7.00	24.00	6.26	---	12.10	441.15	3836.1
STRUCTURE 1	RESVOR	.12	2	2	.10	.0	7.00	24.00	6.25	169.54	12.13	430.66	3744.8
STRUCTURE 2	RESVOR	.12	2	2	.10	.0	7.00	24.00	6.26	166.72	12.15	424.32	3689.8

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.......... 6
STRUCTURE 2	12	
ALTERNATE 1		424.32
STRUCTURE 1	12	
ALTERNATE 1		430.66

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**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

JOB TR-20                    FULLPRINT          SUMMARY   NOPLOTS          10
TITLE 003 LAKEPOINT, N.W. LAKES:  100 YEAR, 24 HOUR EVENT USING SCS        20
TITLE     TR-20, CURVE 2   75-FOOT WEIR                                    30
 3 STRUCT      01                                                          40
 8                        168.00        0.00        0.0                   50
 8                        168.50        74.6        0.40                  60
 8                        169.00       234.9        0.90                  70
 8                        169.50       492.8        1.37                  80
 8                        170.00       803.0        1.93                  90
 9 ENDTBL                                                                100
 3 STRUCT      02                                                         110
 8                        165.00        0.00        0.0                   120
 8                        165.50        74.6        0.51                  130
 8                        166.00       234.90       1.07                  140
 8                        165.50       492.3        1.52                  150
 8                        167.00       803.00       2.27                  160
 9 ENDTBL                                                                170
 6 RUNOFF 1    01     5     0.115      87.0        0.36   1 1   1   1     180
 6 RESVOR 2    01 5   6   168.00                        1 1 1 1   1      190
 6 RESVOR 2    02 6   5   165.00                        1 1 1 1   1      200
   ENDATA                                                                210
 7 INCREM 6                 0.10                                         220
 7 COMPUT 7    01    02              7.8        1.0    2 2  01  06        230
   ENDCMP 1                                                              240
      JOB 2                                                              250

**********END OF 80-80 LIST**********
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FILE NO. 3

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20. CHANGES FROM THE 2/14/74 VERSION INCLUDE:

REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD. INPUT DATA PREPARED FOR PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH. IT IS RECOMMENDED THAT THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED. THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M" VALUES USED IN THE ROUTING PROCEDURE.

GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS MANUAL. SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT HYDROGRAPH HAVE BEEN IMPROVED. PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION. OUTPUT HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

STRUCTURE DATA, STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	168.00	.00	.00
8	168.50	74.60	.40
8	169.00	234.90	.90
8	169.50	492.80	1.37
8	170.00	803.00	1.93

9 ENDTBL

STRUCTURE DATA, STRUCTURE NO. 2

	ELEVATION	DISCHARGE	STORAGE
8	165.00	.00	.00
8	165.50	74.60	.51
8	166.00	234.90	1.07
8	166.50	492.30	1.52
8	167.00	803.00	2.27

9 [illegible]TBL

STANDARD CONTROL OPERATION RUNOFF STRUCTURE 1 RECORD ID 180
OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = .1150 87.0000 .3600
OUTPUT OPTIONS IN EFFECT PEAK HYD VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 1 RECORD ID 190
INPUT HYDROGRAPH = 5 OUTPUT HYDROGRAPH = 6 DATA FIELD VALUES = 168.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 2 RECORD ID 200
INPUT HYDROGRAPH = 6 OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = 165.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS RECORD ID 220

EXECUTIVE CONTROL OPERATION COMPUT FROM STRUCTURE 1 TO STRUCTURE 2 RECORD ID 230
STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 6 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF STRUCTURE 1
OUTPUT HYDROGRAPH= 5
AREA= .12 SQ MI INPUT RUNOFF CURVE= 87. TIME OF CONCENTRATION= .36 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0480 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.10	441.15	(RUNOFF)
17.65	11.20	(RUNOFF)
19.65	8.98	(RUNOFF)
23.65	6.75	(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.12 SQ.MI.
.00	DISCHG	.00	.00	.00	.00	.00	.03	.07	.14	.21	.32
4.00	DISCHG	.45	.60	.74	.88	1.01	1.14	1.27	1.39	1.51	1.63
5.00	DISCHG	1.74	1.85	1.96	2.07	2.18	2.28	2.38	2.48	2.57	2.67
6.00	DISCHG	2.76	2.90	3.19	3.52	3.78	3.97	4.13	4.27	4.40	4.52
7.00	DISCHG	4.63	4.75	4.85	4.96	5.06	5.16	5.26	5.36	5.45	5.54
8.00	DISCHG	5.64	5.82	6.20	6.67	7.20	7.80	8.30	8.63	8.86	9.05
9.00	DISCHG	9.21	9.46	9.94	10.48	10.89	11.17	11.49	12.04	12.65	13.09
10.00	DISCHG	13.40	13.75	14.33	15.04	16.03	17.32	18.77	20.71	22.74	24.92
11.00	DISCHG	27.32	29.63	32.15	34.74	37.87	42.15	56.58	95.79	149.77	240.06
12.00	DISCHG	368.73	441.13	373.31	256.14	170.21	120.70	91.02	73.37	62.40	54.63
13.00	DISCHG	48.19	43.30	39.56	36.60	34.15	31.98	30.11	28.21	26.47	25.07
14.00	DISCHG	23.90	22.92	21.94	21.04	20.16	19.23	18.38	17.46	16.63	16.11
15.00	DISCHG	15.86	15.73	15.67	15.59	15.22	14.55	13.99	13.69	13.55	13.47
16.00	DISCHG	13.44	13.42	13.41	13.41	13.41	13.40	13.24	12.69	12.03	11.61
17.00	DISCHG	11.40	11.29	11.24	11.21	11.20	11.19	11.19	11.19	11.15	10.79
18.00	DISCHG	10.12	9.56	9.26	9.11	9.04	9.00	8.98	8.97	8.97	8.97
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.92	8.56
20.00	DISCHG	7.90	7.34	7.04	6.89	6.81	6.77	6.75	6.74	6.74	6.74
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.70	6.34
24.00	DISCHG	5.67	4.79	3.34	1.87	.93	.47	.23	.11	.05	.02
25.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 464.45 CFS-HRS, 39.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 168.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.12	435.09	169.39
19.65	8.97	168.06
23.65	6.75	168.05

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.12 SQ.MI.
3.00	DISCHG	.00	.00	.00	.00	.00	.01	.04	.10	.17	.25
3.00	ELEV	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00
4.00	DISCHG	.37	.51	.65	.79	.93	1.06	1.19	1.31	1.43	1.55
4.00	ELEV	168.00	168.00	168.00	168.01	168.01	168.01	168.01	168.01	168.01	168.01
5.00	DISCHG	1.67	1.78	1.89	2.00	2.11	2.21	2.31	2.41	2.51	2.60
5.00	ELEV	168.01	168.01	168.01	168.01	168.01	168.01	168.02	168.02	168.02	168.02
6.00	DISCHG	2.70	2.81	3.02	3.31	3.61	3.84	4.03	4.18	4.31	4.44
6.00	ELEV	168.02	168.02	168.02	168.02	168.02	168.03	168.03	168.03	168.03	168.03
7.00	DISCHG	4.56	4.67	4.78	4.89	5.00	5.10	5.20	5.30	5.39	5.48
7.00	ELEV	168.03	168.03	168.03	168.03	168.03	168.03	168.03	168.04	168.04	168.04
8.00	DISCHG	5.58	5.71	5.97	6.37	6.86	7.42	7.97	8.40	8.70	8.92
8.00	ELEV	168.04	168.04	168.04	168.04	168.05	168.05	168.05	168.06	168.06	168.06
9.00	DISCHG	9.11	9.31	9.65	10.14	10.62	10.98	11.29	11.70	12.26	12.79
9.00	ELEV	168.06	168.06	168.06	168.07	168.07	168.07	168.08	168.08	168.08	168.09
10.00	DISCHG	13.19	13.52	13.97	14.59	15.41	16.51	17.85	19.49	21.44	23.52
10.00	ELEV	168.09	168.09	168.09	168.10	168.10	168.11	168.12	168.13	168.14	168.16
11.00	DISCHG	25.79	28.13	30.53	33.07	35.88	39.48	48.09	72.55	129.16	204.10
11.00	ELEV	168.17	168.19	168.20	168.22	168.24	168.26	168.32	168.49	168.67	168.90
12.00	DISCHG	336.59	431.44	397.83	282.49	194.98	138.54	101.30	79.53	68.23	59.78
12.00	ELEV	169.20	169.38	169.32	169.09	168.88	168.70	168.58	168.52	168.46	168.40
13.00	DISCHG	52.49	46.62	42.11	38.60	35.79	33.42	31.35	29.44	27.61	26.01
13.00	ELEV	168.35	168.31	168.28	168.26	168.24	168.22	168.21	168.20	168.19	168.17
14.00	DISCHG	24.68	23.57	22.58	21.63	20.73	19.83	18.93	18.05	17.17	16.47
14.00	ELEV	168.17	168.16	168.15	168.14	168.14	168.13	168.13	168.12	168.12	168.11
15.00	DISCHG	16.05	15.83	15.72	15.64	15.44	14.95	14.36	13.91	13.66	13.53
15.00	ELEV	168.11	168.11	168.11	168.10	168.10	168.10	168.10	168.09	168.09	168.09
16.00	DISCHG	13.46	13.43	13.42	13.41	13.41	13.41	13.33	13.01	12.44	11.90
16.00	ELEV	168.09	168.09	168.09	168.09	168.09	168.09	168.09	168.09	168.08	168.08
17.00	DISCHG	11.55	11.37	11.28	11.23	11.21	11.20	11.19	11.19	11.17	11.00
17.00	ELEV	168.08	168.08	168.08	168.08	168.08	168.08	168.08	168.08	168.07	168.07
18.00	DISCHG	10.53	9.93	9.48	9.23	9.10	9.03	9.00	8.98	8.97	8.97
18.00	ELEV	168.07	168.07	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.95	8.77
19.00	ELEV	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
20.00	DISCHG	8.30	7.71	7.26	7.00	6.87	6.80	6.77	6.75	6.74	6.74
20.00	ELEV	168.06	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	ELEV	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.73	6.55

23.00	ELEV	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.05	168.04
24.00	DISCHG	6.00	5.34	4.23	2.82	1.59	.82	.41	.21	.10	.05
24.00	ELEV	168.04	168.04	168.03	168.02	168.01	168.01	168.00	168.00	168.00	168.00
25.00	DISCHG	.02	.01	.00							
25.00	ELEV	168.00	168.00	168.00							

RUNOFF VOLUME ABOVE BASEFLOW = 6.25 WATERSHED INCHES, 463.73 CFS-HRS, 38.32 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 165.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.14	434.48	166.39
19.66	8.97	165.06
23.66	6.75	165.05

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .12 SQ.MI.

3.00	DISCHG	.00	.00	.00	.00	.00	.00	.02	.06	.11	.19
3.00	ELEV	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00
4.00	DISCHG	.28	.40	.54	.68	.81	.95	1.08	1.21	1.33	1.45
[illegible]	ELEV	165.00	165.00	165.00	165.00	165.01	165.01	165.01	165.01	165.01	165.01
5.00	DISCHG	1.57	1.69	1.80	1.91	2.02	2.12	2.23	2.33	2.43	2.53
5.00	ELEV	165.01	165.01	165.01	165.01	165.01	165.01	165.01	165.02	165.02	165.02
6.00	DISCHG	2.62	2.72	2.87	3.09	3.37	3.64	3.86	4.04	4.20	4.33
6.00	ELEV	165.02	165.02	165.02	165.02	165.02	165.02	165.03	165.03	165.03	165.03
7.00	DISCHG	4.46	4.58	4.69	4.80	4.91	5.01	5.12	5.21	5.31	5.41
7.00	ELEV	165.03	165.03	165.03	165.03	165.03	165.03	165.03	165.03	165.04	165.04
8.00	DISCHG	5.50	5.61	5.78	6.07	6.48	6.98	7.51	8.02	8.42	8.71
8.00	ELEV	165.04	165.04	165.04	165.04	165.04	165.05	165.05	165.05	165.06	165.06
9.00	DISCHG	8.94	9.14	9.40	9.77	10.23	10.66	11.02	11.38	11.83	12.36
9.00	ELEV	165.06	165.06	165.06	165.07	165.07	165.07	165.07	165.08	165.08	165.08
10.00	DISCHG	12.83	13.23	13.62	14.12	14.78	15.67	16.81	18.21	19.91	21.85
10.00	ELEV	165.09	165.09	165.09	165.09	165.10	165.11	165.11	165.12	165.13	165.15
11.00	DISCHG	23.96	26.22	28.56	31.00	33.62	36.68	42.03	55.81	96.39	172.52
11.00	ELEV	165.16	165.18	165.19	165.21	165.23	165.25	165.28	165.37	165.57	165.81
12.00	DISCHG	291.49	421.52	411.84	311.10	215.23	162.70	116.33	88.24	73.26	66.29
12.00	ELEV	166.11	166.36	166.34	166.15	165.94	165.77	165.63	165.54	165.49	165.44
13.00	DISCHG	58.64	51.80	46.20	41.79	38.33	35.53	33.16	31.08	29.16	27.39
13.00	ELEV	165.39	165.35	165.31	165.28	165.26	165.24	165.22	165.21	165.20	165.18
14.00	DISCHG	25.85	24.55	23.44	22.43	21.49	20.58	19.68	18.78	17.90	17.09
14.00	ELEV	165.17	165.16	165.16	165.15	165.14	165.14	165.13	165.13	165.12	165.11
15.00	DISCHG	16.47	16.07	15.85	15.72	15.58	15.29	14.82	14.30	13.91	13.67
15.00	ELEV	165.11	165.11	165.11	165.11	165.10	165.10	165.10	165.10	165.09	165.09
16.00	DISCHG	13.54	13.47	13.44	13.42	13.41	13.41	13.38	13.22	12.85	12.34
16.00	ELEV	165.09	165.09	165.09	165.09	165.09	165.09	165.09	165.09	165.09	165.08
[illegible]	DISCHG	11.88	11.57	11.39	11.29	11.24	11.21	11.20	11.20	11.19	11.11
[illegible].00	ELEV	165.08	165.08	165.08	165.08	165.08	165.08	165.08	165.08	165.07	165.07
18.00	DISCHG	10.85	10.38	9.87	9.48	9.24	9.11	9.04	9.00	8.98	8.97

18.00	ELEV	165.07	165.07	165.07	165.06	165.06	165.06	165.06	165.06	165.06	165.06
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.96	8.88
19.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
20.00	DISCHG	8.62	8.16	7.65	7.26	7.01	6.88	6.81	6.77	6.75	6.74
20.00	ELEV	165.06	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	ELEV	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05
23.00	DISCHG	6.74	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.74	6.66
23.00	ELEV	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.05	165.04
24.00	DISCHG	6.40	5.88	5.05	3.90	2.62	1.55	.85	.44	.22	.11
24.00	ELEV	165.04	165.04	165.03	165.03	165.02	165.01	165.01	165.00	165.00	165.00
25.00	DISCHG	.05	.02	.01	.00						
25.00	ELEV	165.00	165.00	165.00	165.00						

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 454.88 CFS-HRS, 38.42 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID 240

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID 250

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 6													
STRUCTURE 1	RUNOFF	.12	2	2	.10	.0	7.80	24.00	6.26	---	12.10	441.15	3836.1
STRUCTURE 1	RESVOR	.12	2	2	.10	.0	7.80	24.00	6.25	169.39	12.12	435.09	3783.4
STRUCTURE 2	RESVOR	.12	2	2	.10	.0	7.80	24.00	6.26	166.39	12.14	434.48	3778.1

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 6
STRUCTURE 2		.12	
	ALTERNATE 1		434.48
STRUCTURE 1		.12	
	ALTERNATE 1		435.09

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**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

JOB TR-20                    FULLPRINT          SUMMARY   NOPLOTS          10
TITLE 003 LAKEPOINT, N.W. LAKES:  100 YEAR, 24 HOUR EVENT USING SCS        20
TITLE     TR-20, CURVE 2   80-FOOT WEIR                                    30
 3 STRUCT      01                                                          40
 8                         168.00        0.00        0.0                  50
 8                         168.50        79.3        0.40                 60
 8                         169.00       249.0        0.90                 70
 8                         169.50       520.6        1.37                 80
 8                         170.00       847.2        1.93                 90
 9 ENDTBL                                                                 100
 3 STRUCT      02                                                         110
 8                         165.00        0.00        0.0                  120
 8                         165.50        79.3        0.51                 130
 8                         166.00      249.00        1.07                 140
 8                         166.50       520.6        1.52                 150
 8                         167.00      847.20        2.27                 160
 9 ENDTBL                                                                 170
 6 RUNOFF 1    01     5     0.115       87.0        0.36   1 1   1   1     180
 6 RESVOR 2    01 5   6   168.00                          1 1 1 1   1     190
 6 RESVOR 2    02 6   5   165.00                          1 1 1 1   1     200
   ENDATA                                                                 210
 7 INCREM 6                 0.10                                         220
 7 COMPUT 7    01    02                7.8        1.0    2 2  01  06      230
   ENDCMP 1                                                               240
   ENJOB 2                                                                250

**********END OF 80-80 LIST**********
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FILE NO. 3

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20. CHANGES FROM THE 2/14/74 VERSION INCLUDE:

REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD. INPUT DATA PREPARED FOR PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH. IT IS RECOMMENDED THAT THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED. THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M" VALUES USED IN THE ROUTING PROCEDURE.

GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS MANUAL. SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT HYDROGRAPH HAVE BEEN IMPROVED. PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION. OUTPUT HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

STRUCTURE DATA, STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	168.00	.00	.00
8	168.50	79.30	.40
8	169.00	249.00	.90
8	169.50	520.60	1.37
8	170.00	847.20	1.93

9 ENDTBL

STRUCTURE DATA, STRUCTURE NO. 2

	ELEVATION	DISCHARGE	STORAGE
8	165.00	.00	.00
8	165.50	79.30	.51
8	166.00	249.00	1.07
8	166.50	520.60	1.52
8	167.00	847.20	2.27

9 ENDTBL

STANDARD CONTROL OPERATION RUNOFF STRUCTURE 1 RECORD ID 100
OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = .1150 87.0000 .3600
OUTPUT OPTIONS IN EFFECT PEAK HYD VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 1 RECORD ID 150
INPUT HYDROGRAPH = 5 OUTPUT HYDROGRAPH = 6 DATA FIELD VALUES = 168.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

STANDARD CONTROL OPERATION RESVOR STRUCTURE 2 RECORD ID 200
INPUT HYDROGRAPH = 6 OUTPUT HYDROGRAPH = 5 DATA FIELD VALUES = 165.0000 .0000 .0000
OUTPUT OPTIONS IN EFFECT PEAK HYD ELEV VOL SUM

LAKEPOINT, N.W. LAKES: 100 YEAR, 24 HOUR EVENT USING SCS 20 JOB 1 PASS 1
TR-20, CURVE 2 80-FOOT WEIR 30 PAGE 3

EXECUTIVE CONTROL OPERATION INCREM MAIN TIME INCREMENT = .10 HOURS RECORD ID 220

EXECUTIVE CONTROL OPERATION COMPUT FROM STRUCTURE 1 TO STRUCTURE 2 RECORD ID 230
STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 6 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF STRUCTURE 1
OUTPUT HYDROGRAPH= 5
AREA= .12 SQ MI INPUT RUNOFF CURVE= 87. TIME OF CONCENTRATION= .36 HOURS
INTERNAL HYDROGRAPH TIME INCREMENT= .0480 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.10	441.15	(RUNOFF)
17.65	11.20	(RUNOFF)
19.65	8.98	(RUNOFF)
23.65	6.75	(RUNOFF)

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA = .12 SQ.MI.		
.00	DISCHG	.00	.00	.00	.00	.00	.03	.07	.14	.21	.32
4.00	DISCHG	.45	.60	.74	.88	1.01	1.14	1.27	1.39	1.51	1.63
5.00	DISCHG	1.74	1.85	1.96	2.07	2.18	2.28	2.38	2.48	2.57	2.67
6.00	DISCHG	2.76	2.90	3.19	3.52	3.78	3.97	4.13	4.27	4.40	4.52
7.00	DISCHG	4.63	4.75	4.85	4.96	5.06	5.16	5.26	5.36	5.45	5.54
8.00	DISCHG	5.64	5.82	6.20	6.67	7.20	7.80	8.30	8.63	8.86	9.05
9.00	DISCHG	9.21	9.46	9.94	10.48	10.89	11.17	11.49	12.04	12.65	13.09
10.00	DISCHG	13.40	13.75	14.33	15.04	16.03	17.32	18.77	20.71	22.74	24.92
11.00	DISCHG	27.32	29.63	32.15	34.74	37.87	42.15	56.58	95.79	149.77	240.06
12.00	DISCHG	368.73	441.13	373.31	256.14	170.21	120.70	91.02	73.37	62.40	54.63
13.00	DISCHG	48.19	43.30	39.56	36.60	34.15	31.98	30.11	28.21	26.47	25.07
14.00	DISCHG	23.90	22.92	21.94	21.04	20.16	19.23	18.38	17.46	16.63	16.11
15.00	DISCHG	15.86	15.73	15.67	15.59	15.22	14.55	13.99	13.69	13.55	13.47
16.00	DISCHG	13.44	13.42	13.41	13.41	13.41	13.40	13.24	12.69	12.03	11.61
17.00	DISCHG	11.40	11.29	11.24	11.21	11.20	11.19	11.19	11.19	11.15	10.79
18.00	DISCHG	10.12	9.56	9.26	9.11	9.04	9.00	8.98	8.97	8.97	8.97
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.92	8.56
20.00	DISCHG	7.90	7.34	7.04	6.89	6.81	6.77	6.75	6.74	6.74	6.74
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.70	6.34
24.00	DISCHG	5.67	4.79	3.34	1.87	.93	.47	.23	.11	.05	.02
25.00	DISCHG	.01	.00								

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 464.45 CFS-HRS, 38.38 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 1

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 6
SURFACE ELEVATION= 168.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.12	436.69	169.35
19.65	8.97	168.06
23.65	6.75	168.04

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .10 HOURS			DRAINAGE AREA =		.12 SQ.MI.
3.00	DISCHG	.00	.00	.00	.00	.00	.01	.05	.10	.17	.26
3.00	ELEV	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00	168.00
4.00	DISCHG	.37	.51	.66	.80	.93	1.06	1.19	1.32	1.44	1.56
4.00	ELEV	168.00	168.00	168.00	168.01	168.01	168.01	168.01	168.01	168.01	168.01
5.00	DISCHG	1.67	1.79	1.90	2.01	2.11	2.22	2.32	2.42	2.51	2.61
5.00	ELEV	168.01	168.01	168.01	168.01	168.01	168.01	168.01	168.02	168.02	168.02
6.00	DISCHG	2.70	2.82	3.02	3.32	3.62	3.85	4.03	4.18	4.32	4.44
6.00	ELEV	168.02	168.02	168.02	168.02	168.02	168.02	168.03	168.03	168.03	168.03
7.00	DISCHG	4.56	4.68	4.79	4.90	5.00	5.10	5.20	5.30	5.40	5.49
7.00	ELEV	168.03	168.03	168.03	168.03	168.03	168.03	168.03	168.03	168.03	168.03
8.00	DISCHG	5.58	5.71	5.98	6.39	6.88	7.44	7.99	8.41	8.71	8.93
8.00	ELEV	168.04	168.04	168.04	168.04	168.04	168.05	168.05	168.05	168.05	168.06
9.00	DISCHG	9.11	9.32	9.67	10.16	10.64	11.00	11.30	11.72	12.28	12.81
[illegible]	ELEV	168.06	168.06	168.06	168.06	168.07	168.07	168.07	168.07	168.08	168.08
10.00	DISCHG	13.20	13.54	13.99	14.61	15.44	16.55	17.90	19.56	21.51	23.69
10.00	ELEV	168.08	168.09	168.09	168.09	168.10	168.10	168.11	168.12	168.14	168.15
11.00	DISCHG	25.87	28.22	30.63	33.16	35.99	39.61	48.40	73.42	129.31	205.90
11.00	ELEV	168.16	168.18	168.19	168.21	168.23	168.25	168.31	168.46	168.65	168.87
12.00	DISCHG	335.80	433.25	396.56	281.20	196.25	136.95	100.66	79.15	69.01	59.56
12.00	ELEV	169.16	169.34	169.27	169.06	168.84	168.67	168.56	168.50	168.44	168.38
13.00	DISCHG	52.22	46.39	41.93	38.46	35.68	33.33	31.27	29.37	27.54	25.95
13.00	ELEV	168.33	168.29	168.26	168.24	168.22	168.21	168.20	168.19	168.17	168.16
14.00	DISCHG	24.63	23.53	22.54	21.59	20.79	19.79	18.90	18.01	17.14	16.45
14.00	ELEV	168.16	168.15	168.14	168.14	168.13	168.12	168.12	168.11	168.11	168.10
15.00	DISCHG	16.03	15.82	15.71	15.64	15.43	14.94	14.34	13.89	13.65	13.52
15.00	ELEV	168.10	168.10	168.10	168.10	168.10	168.09	168.09	168.09	168.09	168.09
16.00	DISCHG	13.46	13.43	13.42	13.41	13.41	13.41	13.33	13.00	12.42	11.88
16.00	ELEV	168.08	168.08	168.08	168.08	168.08	168.08	168.08	168.08	168.08	168.07
17.00	DISCHG	11.54	11.37	11.28	11.23	11.21	11.20	11.19	11.19	11.17	10.99
17.00	ELEV	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07	168.07
18.00	DISCHG	10.51	9.91	9.46	9.22	9.09	9.03	8.99	8.98	8.97	8.97
18.00	ELEV	168.07	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.95	8.76
19.00	ELEV	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06	168.06
20.00	DISCHG	8.28	7.69	7.24	6.99	6.86	6.80	6.76	6.75	6.74	6.74
20.00	ELEV	168.05	168.05	168.05	168.04	168.04	168.04	168.04	168.04	168.04	168.04
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04
[illegible]	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
[illegible].00	ELEV	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04
23.00	DISCHG	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.75	6.73	6.54

23.00	ELEV	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04	168.04
24.00	DISCHG	6.06	5.31	4.19	2.76	1.54	.79	.40	.20	.10	.04
24.00	ELEV	168.04	168.03	168.03	168.02	168.01	168.00	168.00	168.00	168.00	168.00
25.00	DISCHG	.02	.01	.00							
25.00	ELEV	168.00	168.00	168.00							

RUNOFF VOLUME ABOVE BASEFLOW = 6.25 WATERSHED INCHES, 463.78 CFS-HRS, 38.33 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION RESVOR STRUCTURE 2
INPUT HYDROGRAPH= 6 OUTPUT HYDROGRAPH= 5
SURFACE ELEVATION= 165.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.14	436.80	166.35
19.66	8.97	165.06
23.66	6.75	165.04

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .12 SQ.MI.

3.00	DISCHG	.00	.00	.00	.00	.00	.00	.02	.06	.12	.19
3.00	ELEV	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00
4.00	DISCHG	.29	.41	.55	.69	.83	.96	1.09	1.22	1.34	1.46
4.00	ELEV	165.00	165.00	165.00	165.00	165.01	165.01	165.01	165.01	165.01	165.01
5.00	DISCHG	1.58	1.70	1.81	1.92	2.03	2.13	2.24	2.34	2.44	2.53
5.00	ELEV	165.01	165.01	165.01	165.01	165.01	165.01	165.01	165.01	165.02	165.02
6.00	DISCHG	2.63	2.73	2.88	3.11	3.39	3.66	3.88	4.06	4.21	4.34
6.00	ELEV	165.02	165.02	165.02	165.02	165.02	165.02	165.02	165.03	165.03	165.03
7.00	DISCHG	4.47	4.59	4.70	4.81	4.92	5.02	5.12	5.22	5.32	5.42
7.00	ELEV	165.03	165.03	165.03	165.03	165.03	165.03	165.03	165.03	165.03	165.03
8.00	DISCHG	5.51	5.62	5.80	6.10	6.52	7.02	7.56	8.06	8.45	8.74
8.00	ELEV	165.03	165.04	165.04	165.04	165.04	165.04	165.05	165.05	165.05	165.06
9.00	DISCHG	8.96	9.16	9.42	9.80	10.27	10.70	11.05	11.41	11.87	12.40
9.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.07	165.07	165.07	165.07	165.08
10.00	DISCHG	12.88	13.26	13.65	14.16	14.84	15.75	16.90	18.33	20.05	22.01
10.00	ELEV	165.08	165.08	165.09	165.09	165.09	165.10	165.11	165.12	165.13	165.14
11.00	DISCHG	24.14	26.41	28.77	31.21	33.85	36.94	42.47	56.90	96.91	175.52
11.00	ELEV	165.15	165.17	165.18	165.20	165.21	165.23	165.27	165.36	165.55	165.78
12.00	DISCHG	290.76	424.62	410.75	388.15	217.87	160.86	114.09	87.19	74.59	66.53
12.00	ELEV	166.00	166.32	166.30	166.11	165.91	165.74	165.60	165.52	165.47	165.42
13.00	DISCHG	59.20	51.24	45.70	41.39	38.01	35.27	32.94	30.89	28.98	27.23
13.00	ELEV	165.37	165.32	165.29	165.26	165.24	165.22	165.21	165.19	165.18	165.17
14.00	DISCHG	25.71	24.43	23.34	22.34	21.41	20.50	19.60	18.71	17.82	17.02
14.00	ELEV	165.16	165.15	165.15	165.14	165.13	165.13	165.12	165.12	165.11	165.11
15.00	DISCHG	16.41	16.03	15.82	15.71	15.57	15.27	14.78	14.26	13.88	13.65
15.00	ELEV	165.10	165.10	165.10	165.10	165.10	165.10	165.09	165.09	165.09	165.09
16.00	DISCHG	13.53	13.46	13.43	13.42	13.41	13.41	13.38	13.21	12.82	12.30
16.00	ELEV	165.09	165.08	165.08	165.08	165.08	165.08	165.08	165.08	165.08	165.08
17.00	DISCHG	11.84	11.54	11.37	11.28	11.23	11.21	11.20	11.19	11.19	11.10
17.00	ELEV	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07	165.07
18.00	DISCHG	10.83	10.34	9.83	9.45	9.22	9.09	9.03	9.00	8.98	8.97

18.00	ELEV	165.07	165.07	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
19.00	DISCHG	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.97	8.96	8.88
19.00	ELEV	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06	165.06
20.00	DISCHG	8.60	8.12	7.61	7.22	6.99	6.86	6.80	6.77	6.75	6.74
20.00	ELEV	165.05	165.05	165.05	165.05	165.04	165.04	165.04	165.04	165.04	165.04
21.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
21.00	ELEV	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04
22.00	DISCHG	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
22.00	ELEV	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04
23.00	DISCHG	6.74	6.74	6.74	6.74	6.75	6.75	6.75	6.75	6.74	6.66
23.00	ELEV	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04	165.04
24.00	DISCHG	6.38	5.84	4.99	3.80	2.51	1.46	.78	.40	.20	.10
24.00	ELEV	165.04	165.04	165.03	165.02	165.02	165.01	165.00	165.00	165.00	165.00
25.00	DISCHG	.05	.02	.01	.00						
25.00	ELEV	165.00	165.00	165.00	165.00						

RUNOFF VOLUME ABOVE BASEFLOW = 6.26 WATERSHED INCHES, 464.92 CFS-HRS, 38.42 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP COMPUTATIONS COMPLETED FOR PASS 1 RECORD ID 240

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID 250

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION			RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
						BEGIN (HR)	AMOUNT (IN)	DURATION (HR)		ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 6													
STRUCTURE 1	RUNOFF	.12	2	2	.10	.0	7.00	24.00	6.26	---	12.10	441.15	3836.1
STRUCTURE 1	RESVOR	.12	2	2	.10	.0	7.00	24.00	6.25	169.35	12.12	436.69	3797.3
STRUCTURE 2	RESVOR	.12	2	2	.10	.0	7.00	24.00	6.26	166.35	12.14	436.80	3798.3

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 6
STRUCTURE 2		.12	
ALTERNATE	1		436.80
STRUCTURE 1		.12	
ALTERNATE	1		436.69

PROFESSIONAL ENGINEERING CONSULTANTS, PA
1440 E. English
WICHITA, KANSAS 67211

(316) 262-2691

LETTER OF TRANSMITTAL

DATE 8/31/87	JOB NO.
ATTENTION Carl Gipson	
RE: Autumn Chase Storm Sewer Revisions Street Revisions	

TO City Engineer
455 N. Main - City Hall
Wichita, Ks

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☑ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ Comps & Quantity Changes

COPIES	DATE	NO.	DESCRIPTION
1			· Office Check Plans (full set)
1			· Final tracings (Streets) - revised
1			Final tracings (SWS) - revised
—	—	—	Autumn Chase / Lake Point Drainage Studies
			Street Revisron (Prints of Sh. 7, 7A, & 8)

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☑ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS This material reflects the proposed changes to the referenced S.W.S. improvement. Supporting drainage comps are enclosed for your review.

COPY TO File

SIGNED: Brent E Rensberg

$390,000
4-1-87
1% × 5 = 5%
$409,500

SWS No 337
Project No: 468-76-245-81683-000-000-001

Quantity		Item		Unit Cost	Ext.
840	LF	54" RCP			
130	LF	42" RCP			
330	LF	36" RCP			
90	LF	30" RCP			
100	LF	27" RCP			
(190)	LF	24" RCP	− 151.3 = 38.7		
90	LF	21" RCP			
(20)	LF	18" RCP	+ 151.3 = 171.3		
(410)	LF	15" RCP	− 185.7 − 174.4 + 140.6 = 190.5		
(4)	ea	Curb Inlet, Type 1A (W = 4'4", L = 6'4")	−1 +1 = 4		
(3)	ea	Curb Inlet, Type 1A (W = 5'4", L = 6'4")	−1 = 2		
1	ea	Curb Inlet, Type 1A (W = 6'4", L = 6'4")			
3	ea	Curb Inlet, Type 1A (W = 4'4", L = 11'4")			
3	ea	Curb Inlet, Type 1A (W = 5'4", L = 11'4")			
1	ea	Curb Inlet, Type 1A (W = 6'4", L = 11'4")			
1	ea	Curb Inlet, Type 1A (W = 7'4", L = 11'4")			
1	ea	Special Ditch Inlet			
2	ea	Reinforced Concrete Manhole			
1	ea	Ditch Inlet, Type 1A			
1	ea	Special Area Inlet			
	LS	South weir			
	LS	North weir			
180	SY	Light Stone Riprap			
1030	SY	Heavy stone Riprap			
710	SF	Stone wall			
1675	CY	Excavation			
35	CY	Compacted Fill			
65	LF	Remove 8" Sanitary Sewer			
(85) (27)	SY	Remove Concrete pavement			
7	ea	Remove Large Trees			
23	ea	Remove small trees			
		Eng & Inspection			
		Administration			
		Publication			
		Total			

MKEC $23,425
Eng & Insp (23,425 + 7%)

To be bid 8-

20 day Start
45 working days

STORM WATER COLLECTION

PROJ. NO.: _____

AREA: _____ DATE: _____

COMPUTED BY: _____ C'K'D BY: _____

DR. AREA	INLET		HYDROLOGY (Q = CIA)								GUTTER FLOW & INLET INTERCEPTION						
NO.	NO.	LOCATION	S (%)	L (FEET)	T_C (MIN.)	C	A (ACRE)	CA	I (IN/HR.)	Q (CFS)	Q_G	GUTTER SLOPE %	PAV'T SLOPE/FT	W	D	Q_{IN}	BYPASS
102	102									2.58	2.58	0.66	3/8	7.4	0.23	1.0	1.60
											(L_T = 17)(W/L_T = 0.26)(E = 0.41)						
103	103									1.02	2.62	sump				2.62	
105	105		(A: 1+4+5)				4.12 + 2.42 + 3.63			=	10.17	sump				~~10.17~~	
						+ Q by 106				=	10.87					10.87	
106	109									1.62	1.62	0.36	3/8	6.7	0.21	0.9	0.70
											(L_T = 14)(W/L_T = 0.36)(E = 0.54)						
107	107									7.27	7.27	1.6	3/8	9.3	0.29	1.53	5.74
											(L_T = 40)(W/L_T = 0.13)(E = 0.21)						
108	108									2.06	7.80	2.0	3/8	8.6	0.27	1.5	6.30
											(L_T = 44)(W/L_T = 0.11)(E = 0.19)						

STORM WATER COLLECTION

PROJ. NO.: _____

AREA: _____ DATE: _____

COMPUTED BY: _____ C'K'D BY: _____

DR. AREA	INLET		HYDROLOGY (Q = CIA)								GUTTER FLOW & INLET INTERCEPTION						
NO.	NO.	LOCATION	S (%)	L (FEET)	T_C (MIN.)	C	A (ACRE)	CA	I (IN/HR.)	Q (CFS)	Q_G	GUTTER SLOPE %	PAV'T SLOPE/FT	W	D	Q_{IN}	BYPASS
109	109									0.52	6.8	0.40	3/8	12.2	0.38	2.10	4.70
											(LT = 26)(Y/L = 0.19)(E = 0.31)						
110	110									0.51	5.20	0.40	3/8	10.6	0.33	1.70	3.50
											(LT = 25)(Y/L = 0.20)(E = 0.32)						
111	111									0.51	4.0	SUMP					4.0

a = 57.46 m = 0.82 b = 12.2 HYDRO-35 IDF FORMULA

SOIL GROUP NO. 80

NO.	AREA	LEN	Y	%IMP	%HLM	CN	S	LAG	Fi	Fh	Tc	i	RI	C	Q
101	2.4	1060	1.12	40	90	87.20	1.47	0.25	0.82	0.60	15.00	3.83	2	0.45	4.12
102	1.5	900	1.21	40	90	87.20	1.47	0.21	0.82	0.60	15.00	3.83	2	0.45	2.58
103	0.6	450	0.56	40	95	87.20	1.47	0.18	0.82	0.58	15.00	3.83	2	0.44	1.02
104	1.4	650	1.77	40	85	87.20	1.47	0.13	0.82	0.63	15.00	3.83	2	0.45	2.42
105	2.1	750	1.67	40	90	87.20	1.47	0.15	0.82	0.60	15.00	3.83	2	0.45	3.63
106	0.9	750	1.60	40	95	87.20	1.47	0.16	0.82	0.58	15.00	3.83	2	0.45	1.62
107	4.2	650	1.77	40	50	87.20	1.47	0.13	0.82	0.78	15.00	3.83	2	0.45	7.27
108	1.2	450	1.09	40	50	87.20	1.47	0.13	0.82	0.78	15.00	3.83	2	0.45	2.06
109	0.3	200	1.78	40	75	87.20	1.47	0.05	0.82	0.67	15.00	3.83	2	0.45	0.52
110	0.3	150	0.50	40	95	87.20	1.47	0.08	0.82	0.58	15.00	3.83	2	0.44	0.51
111	0.3	150	1.00	40	95	87.20	1.47	0.05	0.82	0.58	15.00	3.83	2	0.45	0.51

```
100 j,  164.6000  200    1    9    8
110 t,STORM SEWER FOR AUTUMN CHASE REPLAT
120 i,  107     0.00     0.00     0.00     0.00     1.50    15.00   172.45
130 i,  108     0.00     0.00     0.00     0.00     1.50    15.00   169.30
140 i,  106     0.00     0.00     0.00     0.00     0.90    15.00   168.60
150 i,  109     0.00     0.00     0.00     0.00     2.10    15.00   168.50
160 i,  105     0.00     0.00     0.00     0.00    10.90    15.00   168.10
170 i,  110     0.00     0.00     0.00     0.00     3.50    15.00   168.20
180 i,  103     0.00     0.00     0.00     0.00     2.60    15.00   167.50
190 i,  111     0.00     0.00     0.00     0.00     4.00    15.00   167.50
200 m,  200   165.00
210 p,  111  200   108.00   36 0.013  90.00   0.00
220 p,  103  111    38.00   24 0.013  90.00   0.00
230 p,  110  111    90.00   30 0.013   9.00   0.00
240 p,  105  110   115.00   24 0.013 115.00   0.00
250 p,  109  110    69.00   27 0.013   0.00   0.00
260 p,  106  109    43.00   15 0.013  45.00   0.00
270 p,  108  109   192.00   18 0.013   0.00   0.00
280 p,  107  108   141.00   15 0.013  45.00   0.00
290 e
```

Date: 08-28-1987
Time: 15:34:31

Input File: chaseswS

STORM SEWER FOR AUTUMN CHASE REPLAT

Storm Frequency = 2-Year

* * * HYDROLOGY * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(Ø) (Min)	I(Ø) (In/Hr)	Q(Ø) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
111	200	0.00	0.00	0.00	0.0	15.00	4.06	4.00	20.05	3.62	3.57	24.73	36"	3.50	100.00	0.51	20.56
103	111	0.00	0.00	0.00	0.0	15.00	4.06	2.60	15.00	4.06	2.60	2.60	24"	0.83	38.00	0.77	15.77
110	111	0.00	0.00	0.00	0.0	15.00	4.06	3.50	19.65	3.65	3.15	18.79	30"	3.83	90.00	0.39	20.05
105	110	0.00	0.00	0.00	0.0	15.00	4.06	10.90	15.00	4.06	10.90	10.90	24"	3.47	115.00	0.55	15.55
109	110	0.00	0.00	0.00	0.0	15.00	4.06	2.10	18.85	3.71	1.92	5.70	27"	1.43	69.00	0.80	19.65
106	109	0.00	0.00	0.00	0.0	15.00	4.06	0.90	15.00	4.06	0.90	0.90	15"	0.73	43.00	0.98	15.98
108	109	0.00	0.00	0.00	0.0	15.00	4.06	1.50	16.92	3.87	1.43	2.93	18"	1.66	192.00	1.93	18.85
107	108	0.00	0.00	0.00	0.0	15.00	4.06	1.50	15.00	4.06	1.50	1.50	15"	1.22	141.00	1.92	16.92

Date: 08-28-1987
Time: 15:34:31

Input File: chaseswe

STORM SEWER FOR AUTUMN CHASE REPLAT

Storm Frequency = 2-Year

* * * HYDRAULICS * * *

Node	Hyd-Slope (Ft/Ft)	Friction (Ft)	Bend (Ft)	Transition (Ft)	Manhole (Ft)	Deflection (Ft)	Junction (Ft)	Total (Ft)	Hyd-Gl Elevation	Desired Elevation	Diff. (Ft)
107	0.00054	0.0760	0.0000	0.0000	0.0000	0.0000	0.0000	0.0760	165.7358	172.4500	6.71
108	0.00078	0.1495	0.0000	0.0020	0.0000	0.0050	0.0662	0.2227	165.6597	169.3000	3.64
106	0.00019	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0083	165.4454	168.6000	3.15
109	0.00034	0.0233	0.0000	0.0022	0.0000	0.0000	0.0335	0.0590	165.4370	168.5300	3.06
105	0.00232	0.2670	0.0000	0.0000	0.0000	0.0000	0.0000	0.2670	165.6450	168.1000	2.45
110	0.00219	0.1890	0.0000	0.0041	0.0000	0.1254	0.2119	0.5304	165.3781	168.2000	2.82
103	0.00013	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	164.8527	167.5000	2.65
111	0.00138	0.1485	0.0000	0.0075	0.0000	0.0072	0.0845	0.2477	164.8477	167.5000	2.65
200	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	164.6000	165.0000	0.40

MID-KANSAS ENGINEERING
CONSULTANTS P.A.
3500 NORTH ROCK ROAD, BLDG. #600
WICHITA, KANSAS 67226 1-316-682-65[illegible]

CALCULATIONS & SKETCHES

Proj. No. ____
By KLS Date 12/12/96
Chkd By ____ Date ____
Sheet 1 Of ____

Location ____

Reference ____

Check of Cantilever Retaining Wall @ Woodland Est.

Soil $\gamma = 125$ pcf

$p_a = k_a \gamma h$

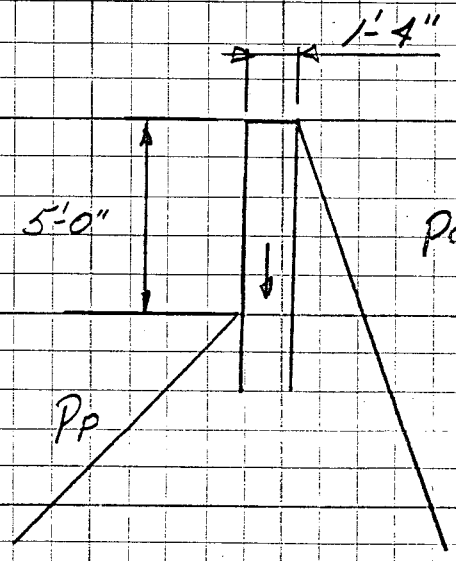
$k_a (\phi = 35, \delta = 10) = 0.25$

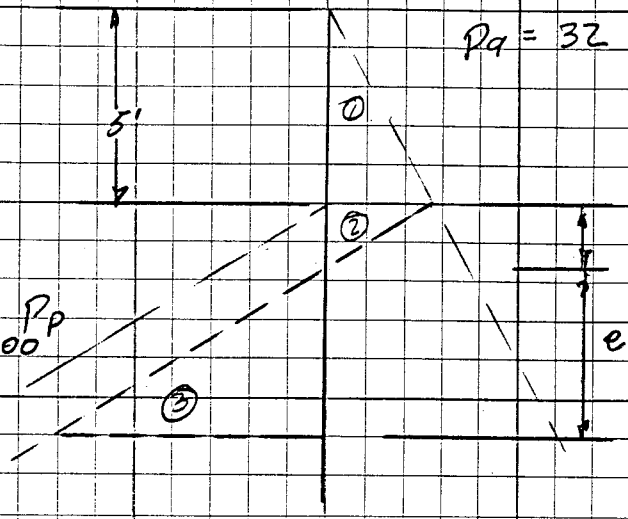
$p_a = .25 \cdot 125 = 32$ pcf

$p_p = k_p \gamma h$

$k_p (35, 10) = 4.8$

$p_p = 4.8 \cdot 125 = 600$ pcf





$5 \cdot 32 + d \cdot 32 = d \cdot 600$

$568\,d = 160$; $d = \underline{0.28'} = \frac{160}{568}$

$\Sigma M_{@bot} = 0$

$① + ② - ③ = 0$

$(d + e + \frac{5}{3}) \cdot (\frac{5^2}{2} \cdot 32)$

$+ (d + e - \frac{.28}{3}) \cdot (\frac{.28^2}{2} \cdot 568)$

$- (\frac{e}{3}) \cdot (\frac{e^2}{2} \cdot 576\, e) = 0$

$(e + 1.95)(400) + (e + .19) \cdot (22)$

$- \frac{1}{2}(\frac{e}{3})(e^2 \cdot 2304) = 0$

$400e + 780 + 22e + 4.2$

$- e^3 95 = 0$

$422e + 784 - e^3 95 = 0$

@ 1.0 $\underline{e = 2.73 \text{ Ft}}$

@ Fac=2.0 $e = 3.66$ Ft

pt. of zero shear

$\Sigma F = 0$

① + ② − ③ = 0

$\frac{5^2}{2} \cdot 32 + \frac{.20^2}{2} \cdot 568$

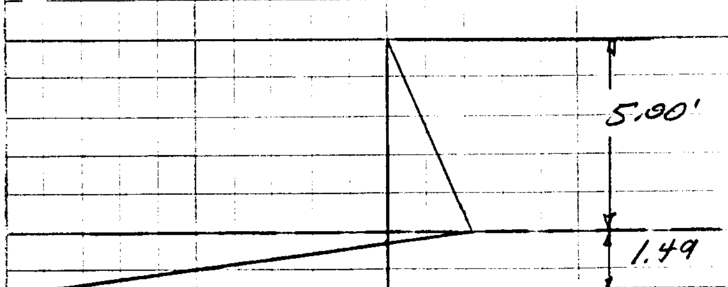
$- \frac{z^2}{2} \cdot 568 = 0$

$400 + 18 - z^2\ 284 = 0$

$z^2 = \frac{418}{284}$

$z = \pm 1.21 = 1.21'$

Max. Moment in wall



$\left(\frac{5}{3} + 1.49\right) \cdot 400 + 1.40 \cdot 18$

$- \frac{1.21}{3} \cdot \frac{1.21^2}{2} \cdot 568 = M_{max}$

1263 + 25 − 168 = 1120 lb·Ft

M = 13.4 kin

$A_s = \frac{13.4}{1.44 \cdot 13} = 0.72 \square'' Ft$

$A_{s\,ult.} = \frac{13.4 \cdot 1.7}{4 \cdot 13} = 0.34 \square''/Ft.$

#5 @ ~~12~~ 10" o.c. adequate.

Check restoring moment of wall

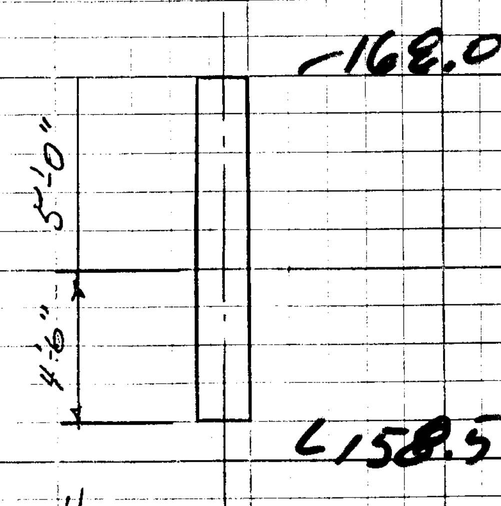
$t_w = 1.33'$

$8 \cdot 1.33 \cdot .15 = 1.60\ ^k/Ft$

$M_R = 1600 \cdot .67 = \underline{1072\ lb\text{-}Ft}$

M_{ot} @ max. bending pt.

1263 + 25 = <u>1288 lb-Ft</u>



add 1'-6" to previous design

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CALCULATIONS & SKETCHES

Proj. No. _____
By FBN Date 2/26/97
Chkd By _____ Date _____
Sheet 1 Of _____

Location: Wood Land Estates 2nd
Reference Lake - between W.E. & W.E. 2nd

Q_{100}

	Q_{100}	T_c
Vic Ridge	56.3	15 min
Area H, Woodland Estates	27.2	17 min
Woodland Estates 2nd	71.6	17 min

Total = $(56.3)\frac{7.00}{7.37} + 27.2 + 71.6 = 152.3$ cfs

from Golf Course; $Q_{100} = 43.8$ cfs $T_c = 45$ min

Total W/ Golf Course: $Q_{100} = \frac{4.38}{7.00}(155.1) + 43.8 = 140.9$ cfs

Use $Q_{100} = 152.3$ cfs

Use 2 - 48" RCP's @ 0.30%

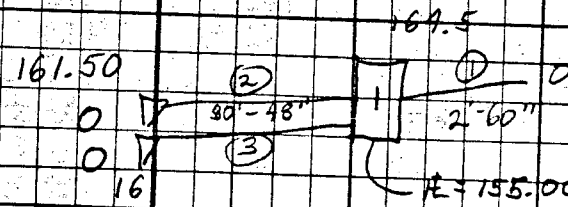
Check Reqd. Opening for Head = 164.5 - 162 = 2.5' by Orifice Formula

$Q_i = .6A\sqrt{2gh} \Rightarrow A = \frac{152.3}{.6\sqrt{64.4 \times 2.5}} = 20.00$ sq. ft

Min Width = $2\left(\frac{48+70}{12}\right) + 2' + 2(.5) = 12.67'$

Length = $\frac{2000}{12.67} = 1.58'$

Check Pipe Size



Based on PIPES Run - Go w/ 48" RCP's for Estimate
WDEST4K.OUT

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CALCULATIONS & SKETCHES

Proj. No. ____
By FBN Date 3/19/97
Chkd By ____ Date ____
Sheet 2 Of ____

Location Woodland Estates 2nd
Reference Lake between W.E. & W.E. 2nd

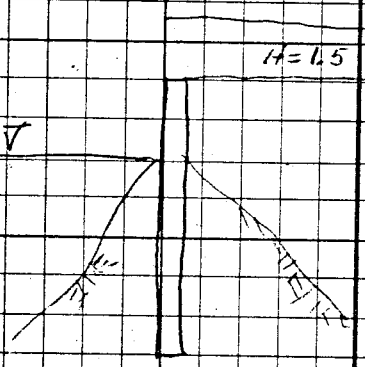
Weir Design Water Surface 163.5
Normal Water Surface 162.0

H = 1.5'

Elev.'s of N. Lake between Gatewood' & Woodland' Estates

Normal Water Surface = 160

Design Water Surface = 161.45



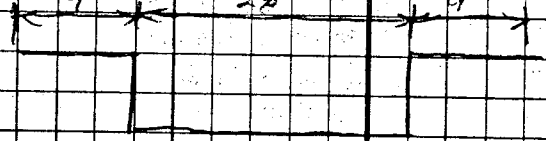
From Merritt, Std. Handbook for Civil Engineers, p. 21-79

Broadcrested weir formula: $Q = C L H^{3/2}$

For Breadth of Weir = 1.33' & H = 1.5', C = 3.08

$Q_{100} = 152.3$ cfs $\quad L = \frac{152.3}{1.5^{3/2} \times 3.08} = 26.9'$

For Contracted Weir, $L = 26.9 + (.1)(2)(1.5) = 27.2' \approx 28'$



Total $L = 28 + 2(9) = 46'$