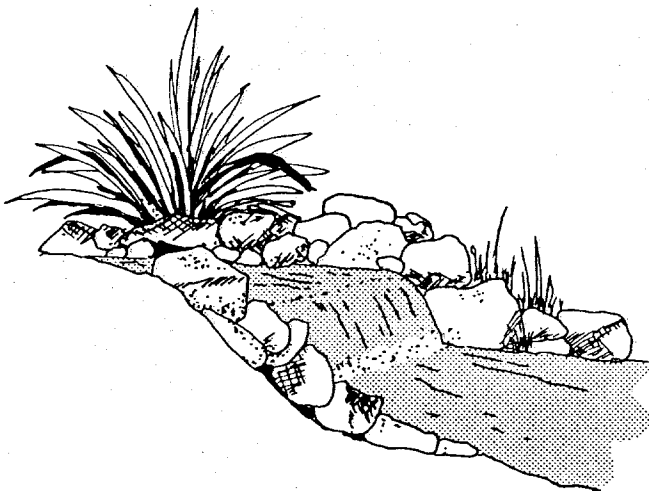


Technical Addendum
Middle Tributary Drainage Basin
Planning Study

City of Colorado Springs
and El Paso County



April, 1987

TECHNICAL ADDENDUM
MIDDLE TRIBUTARY DRAINAGE BASIN
PLANNING STUDY
APRIL 13, 1987
JUNE 22, 1987 (REV.)
AUGUST 6, 1987 (REV.)

PREPARED BY: URS CORPORATION
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URS Corporation Project No. 46375

MIDDLE TRIBUTARY DRAINAGE BASIN PLANNING STUDY

ADDENDUM 1: TR-20 Historic and Recommended Computer Runs

Historic

- o Input File
- o 100-yr. 24-hr.
- o 100-yr. 2-hr.
- o 10-yr. 24-hr.
- o 10-yr. 2-hr.

Recommended

- o Input File
- o 100-yr. 24-hr.

MIDDLE TRIBUTARY DRAINAGE BASIN - PRESENT CONDITIONS

STORM, 1, 0.5, Type 2a 24 storm distribution

0.0000	0.0025	0.0050	0.0075	0.0100
0.0150	0.0200	0.0250	0.0300	0.0500
0.0600	0.0100	0.7000	0.7500	0.7800
0.8000	0.8200	0.8300	0.8400	0.8500
0.8600	0.8650	0.8700	0.8850	0.8900
0.9000	0.9050	0.9100	0.9150	0.9213
0.9275	0.9338	0.9400	0.9450	0.9500
0.9550	0.9600	0.9650	0.9700	0.9750
0.9800	0.9825	0.9850	0.9875	0.9900
0.9925	0.9950	0.9975	1.0000	1.0000

STORM, 2, .0833, Type IIa 2-hour storm distribution

0.00000	0.00865	0.03460	0.07439	0.14360
0.26471	0.48097	0.60208	0.67128	0.72491
0.76817	0.80277	0.83737	0.87197	0.88927
0.90657	0.91696	0.92734	0.93772	0.94810
0.95848	0.96886	0.97924	0.98962	1.00000

C, Input data (el, q, a) for xsectn 1

xsect, 1

6820	0	0
6820.5	53	20
6821	212	50
6821.5	500	90
6822	944	140
6822.5	1566	200
0	0	0

C, Input data (el, q, a) for xsectn 2

xsect, 2

6740	0	0
6740.5	11	2
6741	59	7
6741.5	166	15
6742	348	26
6742.5	622	40
6743	1001	57
0	0	0

C, Input data (el, q, a) for xsectn 3

xsect, 3

6680	0	0
6680.5	28	6
6681	118	16
6681.5	291	30
6682	563	48
6682.5	953	70
6683	1475	96
0	0	0

C, Input data (el, q, a) for xsectn 4

xsect, 4

6630	0	0
6630.5	12	4
6631	38	8
6631.5	73	12
6632	115	16
6632.5	163	20

6633	217	24		
0	0	0		
C, Input data (el, q, a) for xsect 5				
xsect, 5				
6590	0	0		
6591	18	3		
6592	95	10		
6592.5	164	15		
6593	258	21		
6593.5	380	28		
6594	534	36		
6594.5	721	45		
0	0	0		
C, Input data (el, q, a) for xsect 6				
xsect, 6				
6540	0	0		
6540.5	15	3		
6541	42	8		
6541.5	122	17		
6542	259	30		
6543	670	56		
6544	1216	84		
6545	1852	114		
0	0	0		
C, Input data (el, q, a) for xsect 7				
xsect, 7				
6710	0	0		
6710.5	5	1.1		
6711	16	2.1		
6711.5	44	4.6		
6712	84	7.1		
6712.5	131	9.9		
6713	172	11.9		
6713.5	219	14.6		
6714	261	16.9		
6714.5	282	18.6		
0	0	0		
C, Basin A & B & C				
RUNOFF, ABC	1	.314	.42	68
C, Basin D				
RUNOFF, D	2	.088	.20	67
ADD, 1	2	3		
C, Route to D.P. #5				
REACH, 3	3	2	1400	
C, Basin E				
RUNOFF, E	1	.128	.27	66
C, Total D.P. #5				
ADD, 1	2	3		
C, Route D.P. #5 to D.P. #6				
REACH, 5	3	1	2600	
C, Basin F				
RUNOFF, F	2	.117	.31	65
C, Combine DP 5 & F -- Total at DP 6				
ADD, 1	2	3		
CHANGE, 3	6			

C, Basin H & I					
RUNOFF, HI	1	.088	.16	61	
C, Basin G1					
RUNOFF, G1	2	.044	.18	61	
C, Route G1 to DP 9					
REACH, 7	2	3	1100		
C, Basin G2					
RUNOFF, G2	2	.034	.15	61	
REACH, 7	2	4	1100		
C, Combine G1 & G2					
ADD, 3	4	2			
C, Total at DP 9					
ADD, 1	2	3			
C, Route DP 9 to DP 10					
REACH, 4	3	2	2000		
C, Basin K					
RUNOFF, K	1	.081	.16	61	
C, Total at DP 10					
ADD, 1	2	3			
C, Route DP 10 to DP 6					
REACH, 4	3	2	650		
C, Total DP 6					
ADD, 6	2	1			
C, Route DP 6 to DP 11					
REACH, 5	1	2	1400		
C, Basin L1					
RUNOFF, L1	1	.050	.16	61	
C, Total DP 11					
ADD, 1	2	3			
C, Route to DP 12					
REACH, 5	3	2	500		
C, Basin L2					
RUNOFF, L2	1	.017	.27	61	
C, Total DP 12					
ADD, 1	2	7			
C, Basin M					
RUNOFF, M	1	.058	.29	61	
C, Route DP 13 to DP 14					
REACH, 4	1	2	1000		
C, Basin J & N1					
RUNOFF, JN1	1	.097	.25	61	
C, Total DP 14					
ADD, 1	2	3			
C, Basin N2					
RUNOFF, N2	1	.052	.15	61	
C, Route DP 14 to DP 15					
REACH, 4	3	2	1300		
C, Total DP 15					
ADD, 1	2	4			
C, Total DP 16					
ADD, 4	7	3			
C, Route DP 16 to DP 17					
REACH, 6	3	1	2800		
C, Basin O					
RUNOFF, O	2	.156	.34	61	

```

=====
                    program R U N D F F  version 2
=====
08-11-1987      08:50:54

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```

Input file name: b:6375his.dat
MIDDLE TRIBUTARY DRAINAGE BASIN - PRESENT CONDITIONS
100-YEAR 24-HOUR : Project No 46375

```

Time increment .1 hrs

Storm pattern no. 1

time increment= .5 hrs

0.0000	0.0025	0.0050	0.0075	0.0100
0.0150	0.0200	0.0250	0.0300	0.0500
0.0600	0.0100	0.7000	0.7500	0.7800
0.8000	0.8200	0.8300	0.8400	0.8500
0.8600	0.8650	0.8700	0.8850	0.8900
0.9000	0.9050	0.9100	0.9150	0.9213
0.9275	0.9338	0.9400	0.9450	0.9500
0.9550	0.9600	0.9650	0.9700	0.9750
0.9800	0.9825	0.9850	0.9875	0.9900
0.9925	0.9950	0.9975	1.0000	1.0000

Total rain depth 4.6 inches

* Input data (el, q, a) for xsctn 1

Reach no. 1

Elev ft	Q cfs	Area sqft
6820.00	0.0	0.0
6820.50	53.0	20.0
6821.00	212.0	50.0
6821.50	500.0	90.0
6822.00	944.0	140.0
6822.50	1566.0	200.0

* Input data (el, q, a) for xsctn 2

Reach no. 2

Elev ft	Q cfs	Area sqft
6740.00	0.0	0.0
6740.50	11.0	2.0
6741.00	59.0	7.0
6741.50	166.0	15.0
6742.00	348.0	26.0
6742.50	622.0	40.0
6743.00	1001.0	57.0

* Input data (el, q, a) for xsctn 3

Reach no. 3

Elev	Q	Area
------	---	------

ft	cfs	sqft
6680.00	0.0	0.0
6680.50	28.0	6.0
6681.00	118.0	16.0
6681.50	291.0	30.0
6682.00	563.0	48.0
6682.50	953.0	70.0
6683.00	1475.0	96.0

* Input data (el, q, a) for xsctn 4

Reach no. 4

Elev ft	Q cfs	Area sqft
6630.00	0.0	0.0
6630.50	12.0	4.0
6631.00	38.0	8.0
6631.50	73.0	12.0
6632.00	115.0	16.0
6632.50	163.0	20.0
6633.00	217.0	24.0

* Input data (el, q, a) for xsect 5

Reach no. 5

Elev ft	Q cfs	Area sqft
6590.00	0.0	0.0
6591.00	18.0	3.0
6592.00	95.0	10.0
6592.50	164.0	15.0
6593.00	258.0	21.0
6593.50	380.0	28.0
6594.00	534.0	36.0
6594.50	721.0	45.0

* Input data (el, q, a) for xsect 6

Reach no. 6

Elev ft	Q cfs	Area sqft
6540.00	0.0	0.0
6540.50	15.0	3.0
6541.00	42.0	8.0
6541.50	122.0	17.0
6542.00	259.0	30.0
6543.00	670.0	56.0
6544.00	1216.0	84.0
6545.00	1852.0	114.0

* Input data (el, q, a) for xsect 7

Reach no. 7

Elev	Q	Area
------	---	------

ft	cfs	sqft
6710.00	0.0	0.0
6710.50	5.0	1.1
6711.00	16.0	2.1
6711.50	44.0	4.6
6712.00	84.0	7.1
6712.50	131.0	9.9
6713.00	172.0	11.9
6713.50	219.0	14.6
6714.00	261.0	16.9
6714.50	282.0	18.6

* Basin A & B & C

Calculate the hydrograph for basin no. 0 to unit 1
 area= .314 sq. miles tc= .42 hours cn= 68
 total volume= 26.73588 acre-ft
 peak flow = 333.6011 cfs

* Basin D

Calculate the hydrograph for basin no. 0 to unit 2
 area= .088 sq. miles tc= .2 hours cn= 67
 total volume= 7.150322 acre-ft
 peak flow = 124.6221 cfs

Add the hydrographs in units 1 and 2 to unit 3

total volume= 33.88619 acre-ft
 peak flow = 441.2829 cfs

* Route to D.P. #5

Route the hydrograph in unit 3 through reach 3 to unit 2

total volume= 33.88621 acre-ft
 peak flow = 440.3685 cfs

* Basin E

Calculate the hydrograph for basin no. 0 to unit 1
 area= .128 sq. miles tc= .27 hours cn= 66
 total volume= 9.952596 acre-ft
 peak flow = 161.9833 cfs

* Total D.P. #5

Add the hydrographs in units 1 and 2 to unit 3

total volume= 43.8388 acre-ft
peak flow = 545.8508 cfs

* Route D.P. #5 to D.P. #6

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 43.83877 acre-ft
peak flow = 544.9003 cfs

* Basin F

Calculate the hydrograph for basin no. 0 to unit 2
area= .117 sq. miles tc= .31 hours cn= 65

total volume= 8.672853 acre-ft
peak flow = 131.3136 cfs

* Combine DP 5 & F -- Total at DP 6

Add the hydrographs in units 1 and 2 to unit 3

total volume= 52.51163 acre-ft
peak flow = 603.5908 cfs

Hydrograph in unit 3 placed in unit 6

* Basin H & I

Calculate the hydrograph for basin no. 0 to unit 1
area= .088 sq. miles tc= .16 hours cn= 61

total volume= 5.307687 acre-ft
peak flow = 98.30391 cfs

* Basin G1

Calculate the hydrograph for basin no. 0 to unit 2
area= .044 sq. miles tc= .18 hours cn= 61

total volume= 2.653031 acre-ft
peak flow = 45.48502 cfs

* Route G1 to DP 9

Route the hydrograph in unit 2 through reach 7 to unit 3

total volume= 2.653031 acre-ft

peak flow = 45.33938 cfs

* Basin G2

Calculate the hydrograph for basin no. 0 to unit 2
area= .034 sq. miles tc= .15 hours cn= 61

total volume= 2.049564 acre-ft
peak flow = 39.1999 cfs

Route the hydrograph in unit 2 through reach 7 to unit 4

total volume= 2.049563 acre-ft
peak flow = 39.056 cfs

* Combine G1 & G2

Add the hydrographs in units 3 and 4 to unit 2

total volume= 4.702596 acre-ft
peak flow = 84.39537 cfs

* Total at DP 9

Add the hydrographs in units 1 and 2 to unit 3

total volume= 10.01028 acre-ft
peak flow = 161.6364 cfs

* Route DP 9 to DP 10

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 10.01028 acre-ft
peak flow = 159.3661 cfs

* Basin K

Calculate the hydrograph for basin no. 0 to unit 1
area= .081 sq. miles tc= .16 hours cn= 61

total volume= 4.885483 acre-ft
peak flow = 90.48428 cfs

* Total at DP 10

Add the hydrographs in units 1 and 2 to unit 3

total volume= 14.89576 acre-ft

peak flow = 206.4348 cfs

* Route DP 10 to DP 6

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 14.89577 acre-ft
peak flow = 206.3779 cfs

* Total DP 6

Add the hydrographs in units 6 and 2 to unit 1

total volume= 67.40739 acre-ft
peak flow = 805.6547 cfs

* Route DP 6 to DP 11

Route the hydrograph in unit 1 through reach 5 to unit 2

total volume= 67.4074 acre-ft
peak flow = 805.5594 cfs

* Basin L1

Calculate the hydrograph for basin no. 0 to unit 1
area= .05 sq. miles tc= .16 hours cn= 61

total volume= 3.01573 acre-ft
peak flow = 55.8545 cfs

* Total DP 11

Add the hydrographs in units 1 and 2 to unit 3

total volume= 70.42316 acre-ft
peak flow = 813.6632 cfs

* Route to DP 12

Route the hydrograph in unit 3 through reach 5 to unit 2

total volume= 70.42316 acre-ft
peak flow = 813.6632 cfs

* Basin L2

Calculate the hydrograph for basin no. 0 to unit 1

area= .017 sq. miles tc= .27 hours cn= 61

total volume= 1.027249 acre-ft
peak flow = 15.99078 cfs

* Total DP 12

Add the hydrographs in units 1 and 2 to unit 7

total volume= 71.45037 acre-ft
peak flow = 817.2111 cfs

* Basin M

Calculate the hydrograph for basin no. 0 to unit 1

area= .058 sq. miles tc= .29 hours cn= 61

total volume= 3.501895 acre-ft
peak flow = 52.29699 cfs

* Route DP 13 to DP 14

Route the hydrograph in unit 1 through reach 4 to unit 2

total volume= 3.501895 acre-ft
peak flow = 51.16163 cfs

* Basin J & N1

Calculate the hydrograph for basin no. 0 to unit 1

area= .097 sq. miles tc= .25 hours cn= 61

total volume= 5.856295 acre-ft
peak flow = 92.70251 cfs

* Total DP 14

Add the hydrographs in units 1 and 2 to unit 3

total volume= 9.358189 acre-ft
peak flow = 128.8472 cfs

* Basin N2

Calculate the hydrograph for basin no. 0 to unit 1

area= .052 sq. miles tc= .15 hours cn= 61

total volume= 3.134627 acre-ft
peak flow = 59.95278 cfs

* Route DP 14 to DP 15

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 9.35819 acre-ft
peak flow = 126.8382 cfs

* Total DP 15

Add the hydrographs in units 1 and 2 to unit 4

total volume= 12.49282 acre-ft
peak flow = 140.8171 cfs

* Total DP 16

Add the hydrographs in units 4 and 7 to unit 3

total volume= 83.94321 acre-ft
peak flow = 894.4504 cfs

* Route DP 16 to DP 17

Route the hydrograph in unit 3 through reach 6 to unit 1

total volume= 83.94318 acre-ft
peak flow = 886.8957 cfs

* Basin 0

Calculate the hydrograph for basin no. 0 to unit 2

area= .156 sq. miles tc= .34 hours cn= 61

total volume= 9.430344 acre-ft
peak flow = 125.5229 cfs

* Total DP 17

Add the hydrographs in units 1 and 2 to unit 3

total volume= 93.37357 acre-ft
peak flow = 918.6962 cfs

End of computation 08:52:50

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=====
                    program R U N O F F version 2
=====
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08-11-1987 08:05:34

Input file name: b:6375his.dat
MIDDLE TRIBUTARY DRAINAGE BASIN - PRESENT CONDITIONS
100-YEAR 2-HOUR STORM :Project No 46375

Time increment .02 hrs

Storm pattern no. 2

time increment= .0833 hrs

0.0000	0.0087	0.0346	0.0744	0.1436
0.2647	0.4810	0.6021	0.6713	0.7249
0.7682	0.8028	0.8374	0.8720	0.8893
0.9066	0.9170	0.9273	0.9377	0.9481
0.9585	0.9689	0.9792	0.9896	1.0000

Total rain depth 3 inches

* Input data (el, q, a) for xsctn 1

Reach no. 1

Elev ft	Q cfs	Area sqft
6820.00	0.0	0.0
6820.50	53.0	20.0
6821.00	212.0	50.0
6821.50	500.0	90.0
6822.00	944.0	140.0
6822.50	1566.0	200.0

* Input data (el, q, a) for xsctn 2

Reach no. 2

Elev ft	Q cfs	Area sqft
6740.00	0.0	0.0
6740.50	11.0	2.0
6741.00	59.0	7.0
6741.50	166.0	15.0
6742.00	348.0	26.0
6742.50	622.0	40.0
6743.00	1001.0	57.0

* Input data (el, q, a) for xsctn 3

Reach no. 3

Elev ft	Q cfs	Area sqft
6680.00	0.0	0.0
6680.50	28.0	6.0
6681.00	118.0	16.0
6681.50	291.0	30.0

6682.00	563.0	48.0
6682.50	953.0	70.0
6683.00	1475.0	96.0

* Input data (el, q, a) for xsctn 4

Reach no. 4

Elev ft	Q cfs	Area sqft
6630.00	0.0	0.0
6630.50	12.0	4.0
6631.00	38.0	8.0
6631.50	73.0	12.0
6632.00	115.0	16.0
6632.50	163.0	20.0
6633.00	217.0	24.0

* Input data (el, q, a) for xsect 5

Reach no. 5

Elev ft	Q cfs	Area sqft
6590.00	0.0	0.0
6591.00	18.0	3.0
6592.00	95.0	10.0
6592.50	164.0	15.0
6593.00	258.0	21.0
6593.50	380.0	28.0
6594.00	534.0	36.0
6594.50	721.0	45.0

* Input data (el, q, a) for xsect 6

Reach no. 6

Elev ft	Q cfs	Area sqft
6540.00	0.0	0.0
6540.50	15.0	3.0
6541.00	42.0	8.0
6541.50	122.0	17.0
6542.00	259.0	30.0
6543.00	670.0	56.0
6544.00	1216.0	84.0
6545.00	1852.0	114.0

* Input data (el, q, a) for xsect 7

Reach no. 7

Elev ft	Q cfs	Area sqft
6710.00	0.0	0.0
6710.50	5.0	1.1
6711.00	16.0	2.1
6711.50	44.0	4.6

6712.00	84.0	7.1
6712.50	131.0	9.9
6713.00	172.0	11.9
6713.50	219.0	14.6
6714.00	261.0	16.9
6714.50	282.0	18.6

* Basin A & B & C

Calculate the hydrograph for basin no. 0 to unit 1

area= .314 sq. miles tc= .42 hours cn= 68

total volume= 10.45983 acre-ft

peak flow = 128.3393 cfs

* Basin D

Calculate the hydrograph for basin no. 0 to unit 2

area= .088 sq. miles tc= .2 hours cn= 67

total volume= 2.73676 acre-ft

peak flow = 41.45067 cfs

Add the hydrographs in units 1 and 2 to unit 3

total volume= 13.19659 acre-ft

peak flow = 162.4023 cfs

* Route to D.P. #5

Route the hydrograph in unit 3 through reach 3 to unit 2

total volume= 13.19659 acre-ft

peak flow = 161.95 cfs

* Basin E

Calculate the hydrograph for basin no. 0 to unit 1

area= .128 sq. miles tc= .27 hours cn= 66

total volume= 3.707299 acre-ft

peak flow = 50.5453 cfs

* Total D.P. #5

Add the hydrographs in units 1 and 2 to unit 3

total volume= 16.90389 acre-ft

peak flow = 207.6448 cfs

* Route D.F. #5 to D.F. #6

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 16.90389 acre-ft
peak flow = 207.4927 cfs

* Basin F

Calculate the hydrograph for basin no. 0 to unit 2

area= .117 sq. miles tc= .31 hours cn= 65

total volume= 3.148026 acre-ft
peak flow = 40.64266 cfs

* Combine DF 5 & F -- Total at DF 6

Add the hydrographs in units 1 and 2 to unit 3

total volume= 20.05191 acre-ft
peak flow = 245.0492 cfs

Hydrograph in unit 3 placed in unit 6

* Basin H & I

Calculate the hydrograph for basin no. 0 to unit 1

area= .088 sq. miles tc= .16 hours cn= 61

total volume= 1.708603 acre-ft
peak flow = 23.27652 cfs

* Basin G1

Calculate the hydrograph for basin no. 0 to unit 2

area= .044 sq. miles tc= .18 hours cn= 61

total volume= .8541014 acre-ft
peak flow = 11.45965 cfs

* Route G1 to DF 9

Route the hydrograph in unit 2 through reach 7 to unit 3

total volume= .8541014 acre-ft
peak flow = 11.43894 cfs

* Basin G2

Calculate the hydrograph for basin no. 0 to unit 2
area= .034 sq. miles tc= .15 hours cn= 61

total volume= .6599816 acre-ft
peak flow = 9.05032 cfs

Route the hydrograph in unit 2 through reach 7 to unit 4

total volume= .6599811 acre-ft
peak flow = 9.033251 cfs

* Combine G1 & G2

Add the hydrographs in units 3 and 4 to unit 2

total volume= 1.514083 acre-ft
peak flow = 20.4563 cfs

* Total at DP 9

Add the hydrographs in units 1 and 2 to unit 3

total volume= 3.222686 acre-ft
peak flow = 43.38414 cfs

* Route DP 9 to DP 10

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 3.222687 acre-ft
peak flow = 43.11602 cfs

* Basin K

Calculate the hydrograph for basin no. 0 to unit 1
area= .081 sq. miles tc= .16 hours cn= 61

total volume= 1.572692 acre-ft
peak flow = 21.42497 cfs

* Total at DP 10

Add the hydrographs in units 1 and 2 to unit 3

total volume= 4.795378 acre-ft
peak flow = 62.26226 cfs

* Route DP 10 to DP 6

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 4.795376 acre-ft
peak flow = 62.16333 cfs

* Total DP 6

Add the hydrographs in units 6 and 2 to unit 1

total volume= 24.84729 acre-ft
peak flow = 307.013 cfs

* Route DP 6 to DP 11

Route the hydrograph in unit 1 through reach 5 to unit 2

total volume= 24.8473 acre-ft
peak flow = 306.8979 cfs

* Basin L1

Calculate the hydrograph for basin no. 0 to unit 1

area= .05 sq. miles tc= .16 hours cn= 61

total volume= .9707975 acre-ft
peak flow = 13.22529 cfs

* Total DP 11

Add the hydrographs in units 1 and 2 to unit 3

total volume= 25.81809 acre-ft
peak flow = 318.3685 cfs

* Route to DP 12

Route the hydrograph in unit 3 through reach 5 to unit 2

total volume= 25.81809 acre-ft
peak flow = 318.3424 cfs

* Basin L2

Calculate the hydrograph for basin no. 0 to unit 1

area= .017 sq. miles tc= .27 hours cn= 61

total volume= .3299919 acre-ft
peak flow = 4.142868 cfs

* Total DP 12

Add the hydrographs in units 1 and 2 to unit 7

total volume= 26.14808 acre-ft
peak flow = 322.296 cfs

* Basin M

Calculate the hydrograph for basin no. 0 to unit 1
area= .058 sq. miles tc= .29 hours cn= 61

total volume= 1.125707 acre-ft
peak flow = 13.89923 cfs

* Route DP 13 to DP 14

Route the hydrograph in unit 1 through reach 4 to unit 2

total volume= 1.125707 acre-ft
peak flow = 13.83111 cfs

* Basin J & N1

Calculate the hydrograph for basin no. 0 to unit 1
area= .097 sq. miles tc= .25 hours cn= 61

total volume= 1.882888 acre-ft
peak flow = 23.96016 cfs

* Total DP 14

Add the hydrographs in units 1 and 2 to unit 3

total volume= 3.008594 acre-ft
peak flow = 36.90718 cfs

* Basin N2

Calculate the hydrograph for basin no. 0 to unit 1
area= .052 sq. miles tc= .15 hours cn= 61

total volume= 1.009384 acre-ft
peak flow = 13.84166 cfs

* Route DP 14 to DP 15

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 3.008595 acre-ft
peak flow = 36.80493 cfs

* Total DP 15

Add the hydrographs in units 1 and 2 to unit 4

total volume= 4.017976 acre-ft
peak flow = 48.79882 cfs

* Total DP 16

Add the hydrographs in units 4 and 7 to unit 3

total volume= 30.16606 acre-ft
peak flow = 371.0758 cfs

* Route DP 16 to DP 17

Route the hydrograph in unit 3 through reach 6 to unit 1

total volume= 30.16607 acre-ft
peak flow = 370.7638 cfs

* Basin 0

Calculate the hydrograph for basin no. 0 to unit 2

area= .156 sq. miles tc= .34 hours cn= 61

total volume= 3.028232 acre-ft
peak flow = 36.17119 cfs

* Total DP 17

Add the hydrographs in units 1 and 2 to unit 3

total volume= 33.1943 acre-ft
peak flow = 406.2596 cfs

End of computation 09:52:21

```
=====
                    program  R U N O F F  version 2
=====
08-11-1987      08:56:26
```

```
Input file name: b:6375his.dat
MIDDLE TRIBUTARY DRAINAGE BASIN - PRESENT CONDITIONS
10-YEAR 24-HOUR STORM : Project No 46375
```

Time increment .1 hrs

Storm pattern no. 1

time increment= .5 hrs

0.0000	0.0025	0.0050	0.0075	0.0100
0.0150	0.0200	0.0250	0.0300	0.0500
0.0600	0.0100	0.7000	0.7500	0.7800
0.8000	0.8200	0.8300	0.8400	0.8500
0.8600	0.8650	0.8700	0.8850	0.8900
0.9000	0.9050	0.9100	0.9150	0.9213
0.9275	0.9338	0.9400	0.9450	0.9500
0.9550	0.9600	0.9650	0.9700	0.9750
0.9800	0.9825	0.9850	0.9875	0.9900
0.9925	0.9950	0.9975	1.0000	1.0000

Total rain depth 3 inches

* Input data (el, q, a) for xsctn 1

Reach no. 1

Elev ft	Q cfs	Area sqft
6820.00	0.0	0.0
6820.50	53.0	20.0
6821.00	212.0	50.0
6821.50	500.0	90.0
6822.00	944.0	140.0
6822.50	1566.0	200.0

* Input data (el, q, a) for xsctn 2

Reach no. 2

Elev ft	Q cfs	Area sqft
6740.00	0.0	0.0
6740.50	11.0	2.0
6741.00	59.0	7.0
6741.50	166.0	15.0
6742.00	348.0	26.0
6742.50	622.0	40.0
6743.00	1001.0	57.0

* Input data (el, q, a) for xsctn 3

Reach no. 3

Elev	Q	Area
------	---	------

ft	cfs	sqft
6680.00	0.0	0.0
6680.50	28.0	6.0
6681.00	118.0	16.0
6681.50	291.0	30.0
6682.00	563.0	48.0
6682.50	953.0	70.0
6683.00	1475.0	96.0

* Input data (el, q, a) for xsectn 4

Reach no. 4

Elev ft	Q cfs	Area sqft
6630.00	0.0	0.0
6630.50	12.0	4.0
6631.00	38.0	8.0
6631.50	73.0	12.0
6632.00	115.0	16.0
6632.50	163.0	20.0
6633.00	217.0	24.0

* Input data (el, q, a) for xsect 5

Reach no. 5

Elev ft	Q cfs	Area sqft
6590.00	0.0	0.0
6591.00	18.0	3.0
6592.00	95.0	10.0
6592.50	164.0	15.0
6593.00	258.0	21.0
6593.50	380.0	28.0
6594.00	534.0	36.0
6594.50	721.0	45.0

* Input data (el, q, a) for xsect 6

Reach no. 6

Elev ft	Q cfs	Area sqft
6540.00	0.0	0.0
6540.50	15.0	3.0
6541.00	42.0	8.0
6541.50	122.0	17.0
6542.00	259.0	30.0
6543.00	670.0	56.0
6544.00	1216.0	84.0
6545.00	1852.0	114.0

* Input data (el, q, a) for xsect 7

Reach no. 7

Elev	Q	Area
------	---	------

ft	cfs	sqft
6710.00	0.0	0.0
6710.50	5.0	1.1
6711.00	16.0	2.1
6711.50	44.0	4.6
6712.00	84.0	7.1
6712.50	131.0	9.9
6713.00	172.0	11.9
6713.50	219.0	14.6
6714.00	261.0	16.9
6714.50	282.0	18.6

* Basin A & B & C

Calculate the hydrograph for basin no. 0 to unit 1
 area= .314 sq. miles tc= .42 hours cn= 68

 total volume= 10.47082 acre-ft
 peak flow = 114.3795 cfs

* Basin D

Calculate the hydrograph for basin no. 0 to unit 2
 area= .088 sq. miles tc= .2 hours cn= 67

 total volume= 2.73311 acre-ft
 peak flow = 42.62694 cfs

Add the hydrographs in units 1 and 2 to unit 3

total volume= 13.20393 acre-ft
 peak flow = 142.1989 cfs

* Route to D.P. #5

Route the hydrograph in unit 3 through reach 3 to unit 2

total volume= 13.20393 acre-ft
 peak flow = 140.0646 cfs

* Basin E

Calculate the hydrograph for basin no. 0 to unit 1
 area= .128 sq. miles tc= .27 hours cn= 66

 total volume= 3.710713 acre-ft
 peak flow = 52.91322 cfs

* Total D.P. #5

Add the hydrographs in units 1 and 2 to unit 3

total volume= 16.91464 acre-ft
peak flow = 177.0491 cfs

* Route D.P. #5 to D.P. #6

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 16.91464 acre-ft
peak flow = 174.9525 cfs

* Basin F

Calculate the hydrograph for basin no. 0 to unit 2

area= .117 sq. miles tc= .31 hours cn= 65

total volume= 3.149758 acre-ft
peak flow = 38.91805 cfs

* Combine DP 5 & F -- Total at DP 6

Add the hydrographs in units 1 and 2 to unit 3

total volume= 20.06439 acre-ft
peak flow = 194.9938 cfs

Hydrograph in unit 3 placed in unit 6

* Basin H & I

Calculate the hydrograph for basin no. 0 to unit 1

area= .088 sq. miles tc= .16 hours cn= 61

total volume= 1.706244 acre-ft
peak flow = 22.37761 cfs

* Basin G1

Calculate the hydrograph for basin no. 0 to unit 2

area= .044 sq. miles tc= .18 hours cn= 61

total volume= .8532243 acre-ft
peak flow = 11.61237 cfs

* Route G1 to DP 9

Route the hydrograph in unit 2 through reach 7 to unit 3

total volume= .853224 acre-ft

peak flow = 11.53 cfs

* Basin G2

Calculate the hydrograph for basin no. 0 to unit 2

area= .034 sq. miles tc= .15 hours cn= 61

total volume= .6589435 acre-ft

peak flow = 9.026514 cfs

Route the hydrograph in unit 2 through reach 7 to unit 4

total volume= .6589435 acre-ft

peak flow = 8.681745 cfs

* Combine G1 & G2

Add the hydrographs in units 3 and 4 to unit 2

total volume= 1.512168 acre-ft

peak flow = 19.89586 cfs

* Total at DP 9

Add the hydrographs in units 1 and 2 to unit 3

total volume= 3.218413 acre-ft

peak flow = 40.26532 cfs

* Route DP 9 to DP 10

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 3.218412 acre-ft

peak flow = 35.02009 cfs

* Basin K

Calculate the hydrograph for basin no. 0 to unit 1

area= .081 sq. miles tc= .16 hours cn= 61

total volume= 1.570521 acre-ft

peak flow = 20.59758 cfs

* Total at DP 10

Add the hydrographs in units 1 and 2 to unit 3

total volume= 4.788932 acre-ft

peak flow = 42.47717 cfs

* Route DP 10 to DP 6

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 4.788931 acre-ft
peak flow = 42.38744 cfs

* Total DP 6

Add the hydrographs in units 6 and 2 to unit 1

total volume= 24.85334 acre-ft
peak flow = 237.3813 cfs

* Route DP 6 to DP 11

Route the hydrograph in unit 1 through reach 5 to unit 2

total volume= 24.85332 acre-ft
peak flow = 237.2302 cfs

* Basin L1

Calculate the hydrograph for basin no. 0 to unit 1

area= .05 sq. miles tc= .16 hours cn= 61

total volume= .969457 acre-ft
peak flow = 12.71455 cfs

* Total DP 11

Add the hydrographs in units 1 and 2 to unit 3

total volume= 25.8228 acre-ft
peak flow = 239.5828 cfs

* Route to DP 12

Route the hydrograph in unit 3 through reach 5 to unit 2

total volume= 25.8228 acre-ft
peak flow = 239.5828 cfs

* Basin L2

Calculate the hydrograph for basin no. 0 to unit 1

area= .017 sq. miles tc= .27 hours cn= 61

total volume= .3302132 acre-ft
peak flow = 3.87256 cfs

* Total DP 12

Add the hydrographs in units 1 and 2 to unit 7

total volume= 26.15301 acre-ft
peak flow = 240.4942 cfs

* Basin M

Calculate the hydrograph for basin no. 0 to unit 1

area= .058 sq. miles tc= .29 hours cn= 61

total volume= 1.126017 acre-ft
peak flow = 12.19306 cfs

* Route DP 13 to DP 14

Route the hydrograph in unit 1 through reach 4 to unit 2

total volume= 1.126018 acre-ft
peak flow = 10.49167 cfs

* Basin J & N1

Calculate the hydrograph for basin no. 0 to unit 1

area= .097 sq. miles tc= .25 hours cn= 61

total volume= 1.883156 acre-ft
peak flow = 23.13241 cfs

* Total DP 14

Add the hydrographs in units 1 and 2 to unit 3

total volume= 3.009172 acre-ft
peak flow = 27.7698 cfs

* Basin N2

Calculate the hydrograph for basin no. 0 to unit 1

area= .052 sq. miles tc= .15 hours cn= 61

total volume= 1.007796 acre-ft
peak flow = 13.80526 cfs

* Route DP 14 to DP 15

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 3.009173 acre-ft
peak flow = 26.10453 cfs

* Total DP 15

Add the hydrographs in units 1 and 2 to unit 4

total volume= 4.01697 acre-ft
peak flow = 29.20417 cfs

* Total DP 16

Add the hydrographs in units 4 and 7 to unit 3

total volume= 30.16998 acre-ft
peak flow = 257.1948 cfs

* Route DP 16 to DP 17

Route the hydrograph in unit 3 through reach 6 to unit 1

total volume= 30.16996 acre-ft
peak flow = 253.2454 cfs

* Basin 0

Calculate the hydrograph for basin no. 0 to unit 2

area= .156 sq. miles tc= .34 hours cn= 61

total volume= 3.032439 acre-ft
peak flow = 28.34344 cfs

* Total DP 17

Add the hydrographs in units 1 and 2 to unit 3

total volume= 33.20242 acre-ft
peak flow = 261.5455 cfs

End of computation 08:58:18

=====

program R U N O F F version 2

=====

08-11-1987 08:10:45

Input file name: b:6375his.dat
MIDDLE TRIBUTARY DRAINAGE BASIN - PRESENT CONDITIONS
10-YEAR 2-HOUR STORM : Project no 46375

Time increment .02 hrs

Storm pattern no. 2

time increment= .0833 hrs

0.0000	0.0087	0.0346	0.0744	0.1436
0.2647	0.4810	0.6021	0.6713	0.7249
0.7682	0.8028	0.8374	0.8720	0.8893
0.9066	0.9170	0.9273	0.9377	0.9481
0.9585	0.9689	0.9792	0.9896	1.0000

Total rain depth 2 inches

* Input data (el, q, a) for xsctn 1

Reach no. 1

Elev ft	Q cfs	Area sqft
6820.00	0.0	0.0
6820.50	53.0	20.0
6821.00	212.0	50.0
6821.50	500.0	90.0
6822.00	944.0	140.0
6822.50	1566.0	200.0

* Input data (el, q, a) for xsctn 2

Reach no. 2

Elev ft	Q cfs	Area sqft
6740.00	0.0	0.0
6740.50	11.0	2.0
6741.00	59.0	7.0
6741.50	166.0	15.0
6742.00	348.0	26.0
6742.50	622.0	40.0
6743.00	1001.0	57.0

* Input data (el, q, a) for xsctn 3

Reach no. 3

Elev ft	Q cfs	Area sqft
6680.00	0.0	0.0
6680.50	28.0	6.0
6681.00	118.0	16.0
6681.50	291.0	30.0

6682.00	563.0	48.0
6682.50	953.0	70.0
6683.00	1475.0	96.0

* Input data (el, q, a) for xsctn 4

Reach no. 4

Elev ft	Q cfs	Area sqft
6630.00	0.0	0.0
6630.50	12.0	4.0
6631.00	38.0	8.0
6631.50	73.0	12.0
6632.00	115.0	16.0
6632.50	163.0	20.0
6633.00	217.0	24.0

* Input data (el, q, a) for xssect 5

Reach no. 5

Elev ft	Q cfs	Area sqft
6590.00	0.0	0.0
6591.00	18.0	3.0
6592.00	95.0	10.0
6592.50	164.0	15.0
6593.00	258.0	21.0
6593.50	380.0	28.0
6594.00	534.0	36.0
6594.50	721.0	45.0

* Input data (el, q, a) for xssect 6

Reach no. 6

Elev ft	Q cfs	Area sqft
6540.00	0.0	0.0
6540.50	15.0	3.0
6541.00	42.0	8.0
6541.50	122.0	17.0
6542.00	259.0	30.0
6543.00	670.0	56.0
6544.00	1216.0	84.0
6545.00	1852.0	114.0

* Input data (el, q, a) for xssect 7

Reach no. 7

Elev ft	Q cfs	Area sqft
6710.00	0.0	0.0
6710.50	5.0	1.1
6711.00	16.0	2.1
6711.50	44.0	4.6

6712.00	84.0	7.1
6712.50	131.0	9.9
6713.00	172.0	11.9
6713.50	219.0	14.6
6714.00	261.0	16.9
6714.50	282.0	18.6

* Basin A & B & C

Calculate the hydrograph for basin no. 0 to unit 1

area= .314 sq. miles tc= .42 hours cn= 68

total volume= 3.246483 acre-ft

peak flow = 37.76417 cfs

* Basin D

Calculate the hydrograph for basin no. 0 to unit 2

area= .088 sq. miles tc= .2 hours cn= 67

total volume= .8112456 acre-ft

peak flow = 10.42262 cfs

Add the hydrographs in units 1 and 2 to unit 3

total volume= 4.057728 acre-ft

peak flow = 47.9212 cfs

* Route to D.P. #5

Route the hydrograph in unit 3 through reach 3 to unit 2

total volume= 4.057729 acre-ft

peak flow = 47.80093 cfs

* Basin E

Calculate the hydrograph for basin no. 0 to unit 1

area= .128 sq. miles tc= .27 hours cn= 66

total volume= 1.045339 acre-ft

peak flow = 13.30527 cfs

* Total D.P. #5

Add the hydrographs in units 1 and 2 to unit 3

total volume= 5.103067 acre-ft

peak flow = 60.61333 cfs

* Route D.P. #5 to D.P. #6

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 5.103068 acre-ft
peak flow = 60.49563 cfs

* Basin F

Calculate the hydrograph for basin no. 0 to unit 2

area= .117 sq. miles tc= .31 hours cn= 65

total volume= .8402015 acre-ft
peak flow = 10.59532 cfs

* Combine DP 5 & F -- Total at DP 6

Add the hydrographs in units 1 and 2 to unit 3

total volume= 5.943269 acre-ft
peak flow = 70.1306 cfs

Hydrograph in unit 3 placed in unit 6

* Basin H & I

Calculate the hydrograph for basin no. 0 to unit 1

area= .088 sq. miles tc= .16 hours cn= 61

total volume= .3421062 acre-ft
peak flow = 5.106082 cfs

* Basin G1

Calculate the hydrograph for basin no. 0 to unit 2

area= .044 sq. miles tc= .18 hours cn= 61

total volume= .1710598 acre-ft
peak flow = 2.493092 cfs

* Route G1 to DP 9

Route the hydrograph in unit 2 through reach 7 to unit 3

total volume= .1710598 acre-ft
peak flow = 2.471529 cfs

* Basin G2

Calculate the hydrograph for basin no. 0 to unit 2
area= .034 sq. miles tc= .15 hours cn= 61

total volume= .1321825 acre-ft
peak flow = 1.994369 cfs

Route the hydrograph in unit 2 through reach 7 to unit 4

total volume= .1321825 acre-ft
peak flow = 1.964386 cfs

* Combine G1 & G2

Add the hydrographs in units 3 and 4 to unit 2

total volume= .3032424 acre-ft
peak flow = 4.435915 cfs

* Total at DP 9

Add the hydrographs in units 1 and 2 to unit 3

total volume= .6453484 acre-ft
peak flow = 9.182271 cfs

* Route DP 9 to DP 10

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= .6453484 acre-ft
peak flow = 8.887818 cfs

* Basin K

Calculate the hydrograph for basin no. 0 to unit 1
area= .081 sq. miles tc= .16 hours cn= 61

total volume= .3148932 acre-ft
peak flow = 4.699916 cfs

* Total at DP 10

Add the hydrographs in units 1 and 2 to unit 3

total volume= .9602416 acre-ft
peak flow = 11.95272 cfs

* Route DP 10 to DP 6

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= .9602419 acre-ft
peak flow = 11.87622 cfs

* Total DP 6

Add the hydrographs in units 6 and 2 to unit 1

total volume= 6.903511 acre-ft
peak flow = 81.44753 cfs

* Route DP 6 to DP 11

Route the hydrograph in unit 1 through reach 5 to unit 2

total volume= 6.903507 acre-ft
peak flow = 81.38236 cfs

* Basin L1

Calculate the hydrograph for basin no. 0 to unit 1

area= .05 sq. miles tc= .16 hours cn= 61

total volume= .1943786 acre-ft
peak flow = 2.901183 cfs

* Total DP 11

Add the hydrographs in units 1 and 2 to unit 3

total volume= 7.097887 acre-ft
peak flow = 83.30706 cfs

* Route to DP 12

Route the hydrograph in unit 3 through reach 5 to unit 2

total volume= 7.097889 acre-ft
peak flow = 83.28481 cfs

* Basin L2

Calculate the hydrograph for basin no. 0 to unit 1

area= .017 sq. miles tc= .27 hours cn= 61

total volume= 6.609115E-02 acre-ft
peak flow = .8830597 cfs

* Total DP 12

Add the hydrographs in units 1 and 2 to unit 7

total volume= 7.163979 acre-ft
peak flow = 84.02294 cfs

* Basin M

Calculate the hydrograph for basin no. 0 to unit 1

area= .058 sq. miles tc= .29 hours cn= 61

total volume= .2255072 acre-ft
peak flow = 2.956121 cfs

* Route DP 13 to DP 14

Route the hydrograph in unit 1 through reach 4 to unit 2

total volume= .2255072 acre-ft
peak flow = 2.919368 cfs

* Basin J & N1

Calculate the hydrograph for basin no. 0 to unit 1

area= .097 sq. miles tc= .25 hours cn= 61

total volume= .3771098 acre-ft
peak flow = 5.130214 cfs

* Total DP 14

Add the hydrographs in units 1 and 2 to unit 3

total volume= .6026171 acre-ft
peak flow = 7.743672 cfs

* Basin N2

Calculate the hydrograph for basin no. 0 to unit 1

area= .052 sq. miles tc= .15 hours cn= 61

total volume= .2021615 acre-ft
peak flow = 3.05021 cfs

* Route DP 14 to DP 15

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= .6026169 acre-ft
peak flow = 7.633573 cfs

* Total DP 15

Add the hydrographs in units 1 and 2 to unit 4

total volume= .8047782 acre-ft
peak flow = 9.578964 cfs

* Total DP 16

Add the hydrographs in units 4 and 7 to unit 3

total volume= 7.968759 acre-ft
peak flow = 93.54376 cfs

* Route DP 16 to DP 17

Route the hydrograph in unit 3 through reach 6 to unit 1

total volume= 7.968759 acre-ft
peak flow = 93.23488 cfs

* Basin 0

Calculate the hydrograph for basin no. 0 to unit 2

area= .156 sq. miles tc= .34 hours cn= 61

total volume= .6064982 acre-ft
peak flow = 7.614032 cfs

* Total DP 17

Add the hydrographs in units 1 and 2 to unit 3

total volume= 8.575263 acre-ft
peak flow = 99.0037 cfs

End of computation 10:02:08

MIDDLE TRIBUTARY DRAINAGE BASIN (R3) - DEVELOPED with DETENTION FACIL
STORM, 1, 0.5, Type IIa 24 storm distribution

0.0000	0.0025	0.0050	0.0075	0.0100
0.0150	0.0200	0.0250	0.0300	0.0500
0.0600	0.0100	0.7000	0.7500	0.7800
0.8000	0.8200	0.8300	0.8400	0.8500
0.8600	0.8650	0.8700	0.8850	0.8900
0.9000	0.9050	0.9100	0.9150	0.9213
0.9275	0.9338	0.9400	0.9450	0.9500
0.9550	0.9600	0.9650	0.9700	0.9750
0.9800	0.9825	0.9850	0.9875	0.9900
0.9925	0.9950	0.9975	1.0000	1.0000

STORM, 2, .0833, Type IIa 2-hour storm distribution

0.0000	0.0087	0.0346	0.0744	0.1436
0.2647	0.4810	0.6021	0.6713	0.7249
0.7682	0.8028	0.8374	0.8720	0.8893
0.9066	0.9170	0.9273	0.9377	0.9481
0.9585	0.9689	0.9792	0.9896	1.0000

C, Input data (El, Q, Vol) for Res 1

STRUCT, 1

6900	0	0
6902	10	0.9
6904	40	2.6
6906	100	5.1
0	0	0

C, INPUT DATA (EL, Q, VOL) FOR RES 2

STRUCT, 2

6800	0	0
6802	51	3.9
6804	144	8.6
6806	258	18.6
6808	360	20.0
6810	569	25.8
0	0	0

C, Input data (El, Q, Vol) for Res 3

STRUCT, 3

6790	0	0
6792	30	3.2
6794	70	4.8
6796	110	9.6
6798	140	11.2
0	0	0

C, Input data (El, Q, Vol) for Res 4

STRUCT, 4

6720	0	0
6722	20.0	1.8
6724	50	2.7
6726	135	4.8
6728	180	6.6
0	0	0

C, Input data (El, Q, Vol) for Res 5

STRUCT, 5

6700	0	0
6702	15	1.5
6704	30	2.5

6706	45	4.0
6708	55	5.5
0	0	0
C, Input data (El, Q, Vol) for Res 6 (3,10-4)		
STRUCT, 6		
6660	0	0
6662	20	2.0
6664	50	3.1
6666	165	5.5
6668	335	7.7
0	0	0
C, Input data (el, q, a) for xsctn 1		
xsct, 1		
6820	0	0
6820.5	38	14
6821	124	29
6821.5	251	47
6822	420	66
6822.5	631	88
0	0	0
C, Input data (el, q, a) for xsctn 2 (VOID)		
xsct, 2		
6740	0	0
6740.5	11	2
6741	59	7
6741.5	166	15
6742	348	26
6742.5	622	40
6743	1001	57
0	0	0
C, Input data (el, q, a) for xsctn 3		
xsct, 3		
6680	0	0
6680.5	38	14
6681	124	29
6681.5	251	47
6682	420	66
6682.5	631	88
0	0	0
C, Input data (el, q, a) for xsctn 4		
xsct, 4		
6630	0	0
6630.5	16	6
6631	55	14
6631.5	117	24
6632	206	36
6632.5	324	50
6633	473	66
6633.5	657	84
0	0	0
C, Input data (el, q, a) for xsct 5		
xsct, 5		
6590	0	0
6591	124	29
6592	420	66

6592.5	631	88
6593	888	111
6593.5	1187	137
0	0	0

C, Input data (el, q, a) for xsect 7
xsect, 7

6710	0	0
6710.5	5	1.1
6711	16	2.1
6711.5	44	4.6
6712	84	7.1
6712.5	131	9.9
6713	172	11.9
6713.5	219	14.6
6714	261	16.9
6714.5	282	18.6
0	0	0

C, Basins A & B & C

RUNOFF,	ABC	1	.314	.27	83
---------	-----	---	------	-----	----

C, Basin D

RUNOFF,	D	2	.088	.12	81
---------	---	---	------	-----	----

ADD,	1	2	3
------	---	---	---

C, Reservoir at DP 4

C, PRHYD,	3		
RESVOR,	2	3	5 6800

C, PRHYD,	5		
CHANGE,	5	3	

C, Route to D.P. #5

REACH,	3	3	2 1400
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C, Basin E

RUNOFF,	E	1	.128	.11	79
---------	---	---	------	-----	----

C, Reservoir at DP 5

C, PRHYD,	1		
RESVOR,	4	1	5 6720

C, PRHYD,	5		
CHANGE,	5	1	

C, Total D.P. #5

ADD,	1	2	3
------	---	---	---

C, Route D.P. #5 to D.P. #6

REACH,	5	3	1 2600
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C, Basin F

RUNOFF,	F	2	.117	.17	82
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C, Combine DP 5 & F -- Total at DP 6

ADD,	1	2	3
------	---	---	---

CHANGE,	3	6	
---------	---	---	--

C, Basin H & I

RUNOFF,	HI	1	.088	.10	83
---------	----	---	------	-----	----

C, Reservoir at DP 9

C, PRHYD,	1		
RESVOR,	1	1	5 6900

C, PRHYD,	5		
CHANGE,	5	1	

C, Basin G1

RUNOFF,	G1	2	.044	.10	83
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C, Reservoir at DP 7

C, PRHYD,	2				
RESVOR,	5	2	5	6700	
C, PRHYD,	5				
CHANGE,	5	2			
C, Route G1 to DP 9					
REACH,	7	2	3	1100	
C, Basin G2					
RUNOFF,	G2	2	.034	.10	83
C, Reservoir at DP 8					
C, PRHYD,	2				
RESVOR,	5	2	5	6700	
C, PRHYD,	5				
CHANGE,	5	2			
REACH,	7	2	4	1100	
C, Combine G1 & G2					
ADD,	3	4	2		
C, Total at DP 9					
ADD,	1	2	3		
CHANGE,	3	7			
C, Basin K					
RUNOFF,	K	1	.081	.10	83
C, Total at DP 10					
ADD,	1	7	3		
C, Reservoir at DP 10					
C, PRHYD,	3				
RESVOR,	6	3	5	6660	
C, PRHYD,	5				
CHANGE,	5	3			
C, Route DP 10 to DP 6					
REACH,	4	3	2	650	
C, Total DP 6					
ADD,	6	2	1		
C, Route DP 6 to DP 11					
REACH,	5	1	2	1400	
C, Basin L1					
RUNOFF,	L1	1	.050	.10	82
C, Total DP 11					
ADD,	1	2	3		
C, Route to DP 12					
REACH,	5	3	2	500	
C, Basin L2					
RUNOFF,	L2	1	.017	.27	61
C, Total DP 12					
ADD,	1	2	7		
C, Basin M					
RUNOFF,	M	1	.058	.11	83
C, Route DP 13 to DP 14					
REACH,	4	1	2	1000	
C, Basin J & N1					
RUNOFF,	JN1	1	.097	.12	83
C, Total DP 14					
ADD,	1	2	3		
C, Reservoir at DP 14					
C, PRHYD,	3				
RESVOR,	3	3	5	6790	

C, PRHYD,	5				
CHANGE,	5	3			
C, Basin N2					
RUNOFF,	N2	1	.052	.10	72
C, Route DP 14 to DP 15					
REACH,	4	3	2	1300	
C, Total DP 15					
ADD,	1	2	4		
C, Total DP 16					
ADD,	4	7	3		
C, Route DP 16 to DP 17					
REACH,	5	3	1	2800	
C, Basin O					
RUNOFF,	0	2	.156	.34	61
C, Total DP 17					
ADD,	1	2	3		

=====

program R U N D F F version 2

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08-11-1987 09:01:08

Input file name: b:r3devp.dat

MIDDLE TRIBUTARY DRAINAGE BASIN (R3) - DEVELOPED with DETENTION FACILITIES

100-YEAR 24-HOUR STORM : Project No 46375

Time increment .1 hrs

Storm pattern no. 1

time increment= .5 hrs

0.0000	0.0025	0.0050	0.0075	0.0100
0.0150	0.0200	0.0250	0.0300	0.0500
0.0600	0.0100	0.7000	0.7500	0.7800
0.8000	0.8200	0.8300	0.8400	0.8500
0.8600	0.8650	0.8700	0.8850	0.8900
0.9000	0.9050	0.9100	0.9150	0.9213
0.9275	0.9338	0.9400	0.9450	0.9500
0.9550	0.9600	0.9650	0.9700	0.9750
0.9800	0.9825	0.9850	0.9875	0.9900
0.9925	0.9950	0.9975	1.0000	1.0000

Total rain depth 4.6 inches

* Input data (El, Q, Vol) for Res 1

Structure no. 1

Elev	Q	Vol
ft	cfs	acft
6900.00	0.0	0.0
6902.00	10.0	0.9
6904.00	40.0	2.6
6906.00	100.0	5.1

* INPUT DATA (EL, Q, VOL) FOR RES 2

Structure no. 2

Elev	Q	Vol
ft	cfs	acft
6800.00	0.0	0.0
6802.00	51.0	3.9
6804.00	144.0	8.6
6806.00	258.0	18.6
6808.00	360.0	20.0
6810.00	569.0	25.8

* Input data (El, Q, Vol) for Res 3

Structure no. 3

Elev	Q	Vol
ft	cfs	acft
6790.00	0.0	0.0
6792.00	30.0	3.2

6794.00	70.0	4.8
6796.00	110.0	9.6
6798.00	140.0	11.2

* Input data (El, Q, Vol) for Res 4

Structure no. 4

Elev	Q	Vol
ft	cfs	acft
6720.00	0.0	0.0
6722.00	20.0	1.8
6724.00	50.0	2.7
6726.00	135.0	4.8
6728.00	180.0	6.6

* Input data (El, Q, Vol) for Res 5

Structure no. 5

Elev	Q	Vol
ft	cfs	acft
6700.00	0.0	0.0
6702.00	15.0	1.5
6704.00	30.0	2.5
6706.00	45.0	4.0
6708.00	55.0	5.5

* Input data (El, Q, Vol) for Res 6 (3,10-4)

Structure no. 6

Elev	Q	Vol
ft	cfs	acft
6660.00	0.0	0.0
6662.00	20.0	2.0
6664.00	50.0	3.1
6666.00	165.0	5.5
6668.00	335.0	7.7

* Input data (el, q, a) for xsctn 1

Reach no. 1

Elev	Q	Area
ft	cfs	sqft
6820.00	0.0	0.0
6820.50	38.0	14.0
6821.00	124.0	29.0
6821.50	251.0	47.0
6822.00	420.0	66.0
6822.50	631.0	88.0

* Input data (el, q, a) for xsctn 2 (VOID)

Reach no. 2

Elev	Q	Area
ft	cfs	sqft
6740.00	0.0	0.0
6740.50	11.0	2.0
6741.00	59.0	7.0
6741.50	166.0	15.0
6742.00	348.0	26.0
6742.50	622.0	40.0
6743.00	1001.0	57.0

* Input data (el, q, a) for xsctn 3

Reach no. 3

Elev	Q	Area
ft	cfs	sqft
6680.00	0.0	0.0
6680.50	38.0	14.0
6681.00	124.0	29.0
6681.50	251.0	47.0
6682.00	420.0	66.0
6682.50	631.0	88.0

* Input data (el, q, a) for xsctn 4

Reach no. 4

Elev	Q	Area
ft	cfs	sqft
6630.00	0.0	0.0
6630.50	16.0	6.0
6631.00	55.0	14.0
6631.50	117.0	24.0
6632.00	206.0	36.0
6632.50	324.0	50.0
6633.00	473.0	66.0
6633.50	657.0	84.0

* Input data (el, q, a) for xssect 5

Reach no. 5

Elev	Q	Area
ft	cfs	sqft
6590.00	0.0	0.0
6591.00	124.0	29.0
6592.00	420.0	66.0
6592.50	631.0	88.0
6593.00	888.0	111.0
6593.50	1187.0	137.0

* Input data (el, q, a) for xssect 7

Reach no. 7

Elev	Q	Area
ft	cfs	sqft
6710.00	0.0	0.0

6710.50	5.0	1.1
6711.00	16.0	2.1
6711.50	44.0	4.6
6712.00	84.0	7.1
6712.50	131.0	9.9
6713.00	172.0	11.9
6713.50	219.0	14.6
6714.00	261.0	16.9
6714.50	282.0	18.6

* Basins A & B & C

Calculate the hydrograph for basin no. 0 to unit 1
 area= .314 sq. miles tc= .27 hours cn= 83

 total volume= 47.0175 acre-ft
 peak flow = 786.4352 cfs

* Basin D

Calculate the hydrograph for basin no. 0 to unit 2
 area= .088 sq. miles tc= .12 hours cn= 81

 total volume= 12.28413 acre-ft
 peak flow = 259.3465 cfs

Add the hydrographs in units 1 and 2 to unit 3

total volume= 59.30164 acre-ft
 peak flow = 1045.338 cfs

* Reservoir at DP 4

* PRHYD, 3

Route the hydrograph in unit 3 thru structure 2 to unit 5

total volume= 59.38374 acre-ft
 peak flow = 445.5186 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 3

* Route to D.P. #5

Route the hydrograph in unit 3 through reach 3 to unit 2

total volume= 59.38369 acre-ft
 peak flow = 435.5623 cfs

* Basin E

Calculate the hydrograph for basin no. 0 to unit 1
area= .128 sq. miles tc= .11 hours cn= 79

total volume= 16.67087 acre-ft
peak flow = 359.2495 cfs

* Reservoir at DP 5

* PRHYD, 1

Route the hydrograph in unit 1 thru structure 4 to unit 5

total volume= 16.71334 acre-ft
peak flow = 163.6853 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 1

* Total D.P. #5

Add the hydrographs in units 1 and 2 to unit 3

total volume= 76.09579 acre-ft
peak flow = 560.1863 cfs

* Route D.P. #5 to D.P. #6

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 76.09564 acre-ft
peak flow = 540.9523 cfs

* Basin F

Calculate the hydrograph for basin no. 0 to unit 2
area= .117 sq. miles tc= .17 hours cn= 82

total volume= 16.92781 acre-ft
peak flow = 333.8031 cfs

* Combine DP 5 & F -- Total at DP 6

Add the hydrographs in units 1 and 2 to unit 3

total volume= 93.02285 acre-ft
peak flow = 571.8891 cfs

Hydrograph in unit 3 placed in unit 6

* Basin H & I

Calculate the hydrograph for basin no. 0 to unit 1
area= .088 sq. miles tc= .1 hours cn= 83

total volume= 13.10433 acre-ft
peak flow = 278.4287 cfs

* Reservoir at DP 9

* PRHYD, 1

Route the hydrograph in unit 1 thru structure 1 to unit 5

total volume= 13.12304 acre-ft
peak flow = 106.1382 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 1

* Basin G1

Calculate the hydrograph for basin no. 0 to unit 2
area= .044 sq. miles tc= .1 hours cn= 83

total volume= 6.552164 acre-ft
peak flow = 139.2144 cfs

* Reservoir at DP 7

* PRHYD, 2

Route the hydrograph in unit 2 thru structure 5 to unit 5

total volume= 6.590845 acre-ft
peak flow = 35.09766 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 2

* Route G1 to DP 9

Route the hydrograph in unit 2 through reach 7 to unit 3

total volume= 6.590844 acre-ft
peak flow = 35.05459 cfs

* Basin G2

Calculate the hydrograph for basin no. 0 to unit 2

area= .034 sq. miles tc= .1 hours cn= 83

total volume= 5.063033 acre-ft
peak flow = 107.5747 cfs

* Reservoir at DP 8

* PRHYD, 2

Route the hydrograph in unit 2 thru structure 5 to unit 5

total volume= 5.104776 acre-ft
peak flow = 27.60132 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 2

Route the hydrograph in unit 2 through reach 7 to unit 4

total volume= 5.104774 acre-ft
peak flow = 27.52724 cfs

* Combine G1 & G2

Add the hydrographs in units 3 and 4 to unit 2

total volume= 11.69525 acre-ft
peak flow = 62.58183 cfs

* Total at DP 9

Add the hydrographs in units 1 and 2 to unit 3

total volume= 24.81827 acre-ft
peak flow = 161.2342 cfs

Hydrograph in unit 3 placed in unit 7

* Basin K

Calculate the hydrograph for basin no. 0 to unit 1
area= .081 sq. miles tc= .1 hours cn= 83
total volume= 12.06194 acre-ft
peak flow = 256.2809 cfs

* Total at DP 10

Add the hydrographs in units 1 and 7 to unit 3

total volume= 36.88062 acre-ft
peak flow = 376.2873 cfs

* Reservoir at DP 10

* PRHYD, 3

Route the hydrograph in unit 3 thru structure 6 to unit 5

total volume= 36.91343 acre-ft
peak flow = 223.1055 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 3

* Route DP 10 to DP 6

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 36.91344 acre-ft
peak flow = 222.0646 cfs

* Total DP 6

Add the hydrographs in units 6 and 2 to unit 1

total volume= 129.9356 acre-ft
peak flow = 770.1404 cfs

* Route DP 6 to DP 11

Route the hydrograph in unit 1 through reach 5 to unit 2

total volume= 129.9356 acre-ft
peak flow = 767.1238 cfs

* Basin L1

Calculate the hydrograph for basin no. 0 to unit 1

area= .05 sq. miles tc= .1 hours cn= 82

total volume= 7.207424 acre-ft
peak flow = 154.1633 cfs

* Total DP 11

Add the hydrographs in units 1 and 2 to unit 3

total volume= 137.1418 acre-ft
peak flow = 779.2434 cfs

* Route to DP 12

Route the hydrograph in unit 3 through reach 5 to unit 2

total volume= 137.1418 acre-ft
peak flow = 779.2085 cfs

* Basin L2

Calculate the hydrograph for basin no. 0 to unit 1

area= .017 sq. miles tc= .27 hours cn= 61

total volume= 1.027249 acre-ft
peak flow = 15.99078 cfs

* Total DP 12

Add the hydrographs in units 1 and 2 to unit 7

total volume= 138.1679 acre-ft
peak flow = 781.5092 cfs

* Basin M

Calculate the hydrograph for basin no. 0 to unit 1

area= .058 sq. miles tc= .11 hours cn= 83

total volume= 8.635591 acre-ft
peak flow = 182.0774 cfs

* Route DP 13 to DP 14

Route the hydrograph in unit 1 through reach 4 to unit 2

total volume= 8.635586 acre-ft
peak flow = 180.7458 cfs

* Basin J & N1

Calculate the hydrograph for basin no. 0 to unit 1

area= .097 sq. miles tc= .12 hours cn= 83

total volume= 14.4617 acre-ft
peak flow = 302.1332 cfs

* Total DP 14

Add the hydrographs in units 1 and 2 to unit 3

total volume= 23.09728 acre-ft
peak flow = 461.0801 cfs

* Reservoir at DP 14

* PRHYD, 3

Route the hydrograph in unit 3 thru structure 3 to unit 5

total volume= 23.16376 acre-ft
peak flow = 123.6523 cfs

* PRHYD, 5

Hydrograph in unit 5 placed in unit 3

* Basin N2

Calculate the hydrograph for basin no. 0 to unit 1

area= .052 sq. miles tc= .1 hours cn= 72

total volume= 5.214671 acre-ft
peak flow = 116.9305 cfs

* Route DP 14 to DP 15

Route the hydrograph in unit 3 through reach 4 to unit 2

total volume= 23.16368 acre-ft
peak flow = 121.1585 cfs

* Total DP 15

Add the hydrographs in units 1 and 2 to unit 4

total volume= 28.37817 acre-ft
peak flow = 167.0871 cfs

* Total DP 16

Add the hydrographs in units 4 and 7 to unit 3

total volume= 166.5464 acre-ft
peak flow = 893.2481 cfs

* Route DP 16 to DP 17

Route the hydrograph in unit 3 through reach 5 to unit 1

total volume= 166.5461 acre-ft
peak flow = 883.912 cfs

* Basin 0

Calculate the hydrograph for basin no. 0 to unit 2
area= .156 sq. miles tc= .34 hours cn= 61

total volume= 9.430344 acre-ft
peak flow = 125.5229 cfs

* Total DP 17

Add the hydrographs in units 1 and 2 to unit 3

total volume= 175.9748 acre-ft
peak flow = 904.0375 cfs

End of computation 09:03:40