FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Flood C... Property of
...

REPORT ON HYDROLOGY OF TATUM WASH

Prepared for: Planning and Project Management Division

HYDROLOGY BRANCH
ENGINEERING DIVISION

February 27, 1995

PREFACE

This document is the final copy, dated February, 1995, of a hydrological study on the Tatum Wash watershed.

The Flood Control District of Maricopa County disclaims any responsibility or liability for the use, reuse, or misuse of information in this report, and makes no warranty as to the comprehensiveness or completeness of the information contained herein. Any person using this information shall assume all risk and shall indemnify and hold the District harmless for any claims of any kind arising out of the use if the information contained in this report.

List of Project Personnel

Project Manager

Greg Rodzenko, Planning Branch

Hydrologists

Afshin Ahouraiyan, Hydrology Branch
Maximo DeVera, Hydrology Branch
Amir Motamedi, Hydrology Branch

GIS Analyst

Mark Brewer, Hydrologic Information Systems Branch
Steve Bruffy, Hydrologic Information Systems Branch

TABLE OF CONTENTS

	Page
1. Background	1
2. Study Purpose	1
3. Modeling Procedure	1
3.1 Phase 1	
3.1.1 Rainfall	1
3.1.2 Rainfall Losses	2
3.1.3 Hydrograph Generation	2
3.1.4 Routing Parameters	2
3.1.5 Results	3-4
3.2 Phase 2	
Case 1	4
3.2.1 Rainfall	4
3.2.2 Rainfall Losses	5
3.2.3 Hydrograph Generation	5
3.2.4 Routing Parameters	5
3.2.5 Results	5-6
Case 2	6-8
4. Potential Detention Baisn Sites' Peaks and Volumes	8
5. Comparison with Other Studies	8
6. Recommendations	9
Appendix	
List of Tables	
Table 1 - Rainfall Loss Parameters	
Table 2 - Clark Unit Hydrograph Parameters for Phase 1	
Table 3 - Hydrograph Routing Parameters for Phase 1	
Table 4 - Estimated 100-yr Flows and Volumes from 6-hr Storm for Phase 1	
Table 5 - Estimated 100-yr Flows and Volumes from 24-hr Storm for Phase 1	
Table 6 - Clark Unit Hydrograph for Phase 2, Case 1, 6-hour storm	
Table 7 - Hydrograph Routing Parameters for Phase 2, Case1	
Table 8 - Estimated 100-yr Flows and Volumes for Phase 2, Case 1 (Dry)	
Table 9 - Estimated 100-yr flows and Volumes for Phase 2, Case 1 (Normal)	
Table 10- Clark Unit Hydrograph Parameters for Phase 2, Case 2, 6-hr Storm (Normal)	
Table 11- Hydrograph Routing Parameters for Phase 2, Case 2	
Table 12- Estimated 100-yr Flows and Volumes for Phase 2, Case 2	
Table 13- Estimated 100-yr Flows and Volumes for Potential Detention Basins	
Table 13- Peak Discharge Estimates from other Studies	
Copy of HEC-1 model on a diskette	

HYDROLOGY REPORT FOR THE TATUM WASH PROJECT

1. Background

In the past few years, the Northeast Phoenix area has been a scene of major flooding events. The specific area of concern for the flooding problem is the wash crossing Shea Boulevard east of 44th Street. For the purpose of this study, the wash has been named "Tatum Wash," by the Flood Control District's (District) staff.

As part of the November 1988 Squaw Peak Highway Study for the Arizona Department of Transportation (ADOT), Baker Engineering, Inc. has delineated the contributing watershed for Indian Bend Wash. The watershed contributing to Tatum Wash is included within the mentioned delineation. The TR-20 computer modeling and all the necessary parameters were used by the consultant for the ADOT study.

2. Study Purpose

This study was requested by the Planning and Project Management (PPM) Division of the District. It was requested that estimated peak flows and volumes at Shea Boulevard be developed for the 100-year return intervals. The estimated flows will then be used by the PPM staff to determine the location and the size of the detention basins within the watershed to reduce the flows at Shea Boulevard.

3. Modeling Procedure

It was decided to develop the model in two phases since this project was an ongoing project and information was needed at different planning stages.

In phase one of this project, a preliminary model was used to estimate the magnitude of the peak flows and volumes for this watershed. The model was also used for sensitivity analysis so that the effects of storm duration and antecedent moisture condition can be examined.

During Phase two, the watershed boundary was adjusted once the detailed topography was available. Also, based on the possible locations for channel/detention facilities, the watershed was subdivided to provide peak flows and volumes at critical concentration point.

3.1 PHASE 1:

In this phase, the entire watershed area was divided into two subbasins. This allowed for a sensitivity analysis to examine the effects of storm duration and antecedent moisture condition on the estimated peaks and volumes.

The watershed was delineated into two subbasins using the 1982 Sunnyslope and Paradise Valley USGS 7.5′ quadrangles, with concentration points at the boundaries of the Mountain Preserve and at Shea Boulevard. (Figure 1). The 1990 version of the Corps of Engineers' HEC-1 computer model was utilized, with the recommended procedures in the District's Drainage Design Manual, Volume I (Hydrology), as explained below:

3.1.1 Rainfall: The 100-year, 6-hour and 100-year, 24-hour precipitation values of 3.2 inches and 3.8 inches were estimated from the isopluvial maps provided in the Drainage Design Manual, Hydrology (Figures 2.7 and 2.13). The storm size chosen for Phase 1 is the total area of the watershed above Shea Boulevard. Therefore, according to Figure 2.17 of the District's Drainage Design Manual, Hydrology, a distribution pattern number of 1.92 was used for the 100-year, 6-hour storm. The 100-year, 24-hour storm was also analyzed in order to find which storm produces the highest peak in this area.

3.1.2 Rainfall Losses: The Green and Ampt Loss method was used to predict the rainfall losses. The texture data was collected using the SCS Soil Surveys for Maricopa County. In addition to the SCS soil surveys, aerial photos were also used to estimate percent imperviousness of each subbasin in the watershed. The modeling was done using two different initial moisture deficits; dry and normal conditions. This was achieved by changing the values of the soil moisture deficit (DTHETA). The hydraulic conductivity (XKSAT) for each subbasin was adjusted based on the percent of vegetation in the area. Table 1 lists the values used for the soil loss parameters.

3.1.3 Hydrograph Generation: The Clark Unit Hydrograph procedure was used for the purpose of hydrograph generation. The Maricopa County Unit Hydrograph Procedure 1 (MCUHP1) program was used to produce the unit hydrograph ordinates. All the necessary parameters used for this procedure are listed in Table 2.

3.1.4 Routing: An estimated cross section was used for the normal depth routing procedure. Table 3 lists the routing reach length used for this case.

TABLE 1

RAINFALL LOSS PARAMETERS

Sub-Basin	Area (sq.mi)	IA (in)	DTHETA (Dry)	DTHETA (Normal)	PSIF (in)	XKSAT (in/hr)	Adj. XKSAT (in/hr)	RTIMP (%)	Veg. (%)
S1	1.92	0.20	0.35	0.25	4.3	0.40	0.50	35	35
S2	0.25	0.10	0.35	0.25	4.3	0.40	0.50	15	35

TABLE 2

CLARK UNIT HYDROGRAPH PARAMETERS

Sub-basin	Area (Acres)	Highest Elev (ft)	Lowest Elev (ft)	Length (mi)	Slope (ft/mi)	Adjusted Slope (ft/mi)	Kb= m(log(A))+b
S1	1228	2608	1570	2.5	415.2	290.0	0.07
S2	160	1570	1390	1.0	180.0	180.0	0.05

Constants m and b are chosen from Table 5.1 in the District's Drainage Design Manual, Volume 1, Hydrology. From this table, subbasin S1 has characteristics that are the same as category C. Subbasin S2 is considered to be under category B.

TABLE 3

HYDROGRAPH ROUTING PARAMETERS	
Routing Reach Name	**Reach Length (mi)**
S1-S2	1.0

3.1.5 Results: The 100-year peak flows and volumes for both the 6-hour and the 24-hour storms are listed in Tables 4 and 5. The hard copy of the hydrologic model for both conditions is included in Appendix 1.

TABLE 4

CP	DA	Q_p^{100}	T_p	V^{100}	Q/A	V/A	Runoff	CN
100-year 6-Hour Dry Conditions								
S1	1.92	1970	4.42	172	1,026	90	1.70	85
RS1	1.92	1891	4.50	172	985	90	1.68	85
S2	0.25	246	4.17	17	984	68	1.29	80
CP2	2.17	2031	4.50	189	936	87	1.63	85
100-Year 6-Hour Normal Conditions								
S1	1.92	2108	4.42	181	1,098	94	1.78	>85
RS1	1.92	2048	4.50	180	1,067	94	1.76	>85
S2	0.25	269	4.17	19	1,076	76	1.40	<85
CP2	2.17	2196	4.50	199	1,012	92	1.72	>85

D.A. = Drainage area in square miles

Q_p^{100} = Peak 100-year flows in cfs

T_p = Time to peak in hours

V^{100} = Total 100-year volume in ac-ft

Q/A = Unit Peak discharge in cfs/sq.mi

V/A = Unit volume discharge in ac-ft/sq.mi

Runoff = Total runoff in inches

CN = Curve Number

TABLE 5

CP	DA	Q_p^{100}	T_p	V^{100}	Q/A	V/A	Runoff	CN
100-Year 24-Hour Dry Conditions								
S1	1.92	1900	12.33	190	990	99	1.87	85
RS1	1.92	1822	12.25	190	949	99	1.86	85
S2	0.25	248	12.08	17	992	68	1.31	80
CP2	2.17	1926	12.42	207	888	95	1.79	85
100-Year 24-Hour Normal Conditions								
S1	1.92	2010	12.33	196	1,047	102	1.92	>85
RS1	1.92	1937	12.42	196	1,009	102	1.91	>85
S2	0.25	267	12.08	8	1,068	32	1.38	<85
CP2	2.17	2044	12.42	214	942	99	1.85	>85

The description from Table 4 holds.

The result from this case showed that the major portion of the peak flow and volume is produced from the mountains in the upper watershed, (Phoenix Mountain Preserve, S1). Although the 24-hour storm produces a higher volume, in general, the 6-hour storm produces a higher peak for this watershed. If the 6-hour volumes are used for the basin design purposes, the changes in the downstream flows will be negligible for a 24-hour storm in this watershed. Consequently, the flows from the 6-hour storm should be considered for any future design purposes.

3.2 PHASE 2

Two cases were examined for the second phase. Case 1 examined the results of a storm cell centered over the Phoenix Mountain Preserve (Subbasin 1), and therefore only the peaks and volumes for Subbasin 1 are considered. Case 2 examines the effects of a storm cell concentrated over the entire drainage area for Tatum Wash above Shea Boulevard., including the drainage area for the Breakout Wash (Subbasin 1 and 2).

The subbbasin for the Phoenix Mountain Preserve was further divided, using the 2´ contour maps from the Area Drainage Master Study (ADMS) for the Arizona Canal Diversion Channel (ACDC). Based on the 2' contour maps, the total area for subbasin 1 was reduced from 1.92 square miles in phase 1 to 1.77 square miles. The division of the subbasin was based on possible locations for detention basins (Figure 2).

3.2.1. CASE 1

The procedures used for Case 1 are as follows:

3.2.1 Rainfall : The storm size for this case was the total area for subbasin S1. As per the result of Phase 1, the frequency chosen for this case is the 100-year, 6-hour storm.

3.2.2 Rainfall Losses: Same parameters as Phase 1.

3.2.3 Hydrograph Generation: The MCUHP1 program was used to generate the unit hydrograph ordinates. Table 6 lists the values used for Case 1.

TABLE 6

CLARK UNIT HYDROGRAPH PARAMETERS							
Subbasin	Area, Acres (sq.mi)	Highest Elev (ft)	Lowest Elev (ft)	Length (mi)	Slope (ft/mi)	Adjusted Slope (ft/mi)	Kb= m(log(A))+b
S1A	212 (0.33)	1940	1610	0.78	424	290	0.09
S1B	150 (0.23)	2590	1630	0.87	1103	310	0.10
S1C	70 (0.11)	2030	1570	0.64	719	310	0.10
S1D	195 (0.31)	2240	1560	0.85	800	310	0.09
S1E	329 (0.51)	2390	1520	1.16	750	310	0.09
S1F	179 (0.28)	2320	1490	1.06	783	310	0.09

3.2.4 Routing: The same procedure was used as for Phase 1 . The cross section for the routing reach was estimated using the 2′ contour map. Table 7 lists the routing lengths used for this case.

TABLE 7

HYDROGRAPH ROUTING PARAMETERS	
Routing Reach Name	Reach Length (mi)
S1A-CP1C	0.38
S1B-CP1C	0.40
CP1C-CP1E	0.68
S1D-CP1E	0.40
CP1E-CP1F	0.43

3.2.5 Results: The results for Case 1 are presented in Tables 8 and 9. As mentioned before, this case was only done for a 100-year, 6-hour storm as the peak flow produced from this storm in

The hard copy of the hydrologic model for this case is included in Appendix 1.

TABLE 8

CP	DA	Q_p^{100}	T_p	V^{100}	Q/A	V/A	Runoff
100-Year 6-Hour Dry Condition							
S1A	0.33	485	4.17	30	1,470	91	1.75
RS1A	0.33	474	4.25	30	1,436	91	1.74
S1B	0.23	293	4.25	21	1,274	91	1.75
RS1B	0.23	284	4.33	21	1,235	91	1.74
S1C	0.11	143	4.17	10	1,300	91	1.75
CP1C	0.67	884	4.25	62	1,319	93	1.74
RCP1C	0.67	856	4.33	62	1,278	94	1.74
S1D	0.31	435	4.17	29	1,403	94	1.75
RS1D	0.31	430	4.25	29	1,387	94	1.74
S1E	0.51	669	4.25	47	1,312	92	1.75
CP1E	1.49	1894	4.33	137	1,271	92	1.74
RCP1E	1.49	1895	4.33	137	1,272	92	1.74
S1F	0.28	343	4.25	26	1,225	93	1.75
CP1F	1.77	2220	4.33	163	1,254	92	1.74

The description from Table 4 holds.

TABLE 9

CP	DA	Q_p^{100}	T_p	V^{100}	Q/A	V/A	Runoff
100-Year 6-Hour Normal Condition							
S1A	0.33	508	4.17	32	1,539	97	1.82
RS1A	0.33	496	4.25	32	1,503	97	1.82
S1B	0.23	307	4.25	22	1,335	96	1.82
RS1B	0.23	298	4.33	22	1,296	96	1.82
S1C	0.11	150	4.17	11	1,364	100	1.82

TABLE 9 (Cont)

CP	DA	$Q_{p\ 100}$	T_p	V^{100}	Q/A	V/A	Runoff
100-Year 6-Hour Normal Condition							
CP1C	0.67	928	4.25	65	1,386	97	1.82
RCP1C	0.67	900	4.33	65	1,343	97	1.81
S1D	0.31	456	4.17	30	1,471	97	1.82
RS1D	0.31	450	4.25	30	1,452	97	1.82
S1E	0.51	702	4.25	49	1,376.	96	1.82
CP1E	1.49	1988	4.33	144	1,334	97	1.81
RCP1E	1.49	1997	4.33	144	1,340	97	1.81
S1F	0.28	360	4.25	27	1,286	96	1.82
CP1F	1.77	2339	4.33	171	1,321	97	1.81

The description from Table 4 holds.

3.2.2 CASE 2

In Case 2, based on new 2' contour maps provided by the PPM division subbasin 2 was further subdivided at critical concentration points. These concentration points were mainly based on possible detention basin locations. Based on the maps, a wash going in an easterly direction to Tatum Boulevard was identified downstream of 40th Street at Fanfol Street. As requested by the PPM division, hydrology for the contributing drainage area for this wash was also included in the scope of work (Figure 3).

The same procedures and assumptions as case 1 were used.

Tables 10 and 11 show the parameters used for case 2.

TABLE 10

CLARK UNIT HYDROGRAPH PARAMETERS							
Sub basin	Area, Acres (sq.mi)	Highest Elev (ft)	Lowest Elev (ft)	Length (mi)	Slope (ft/mi)	Adjusted Slope (ft/mi)	Kb= m(log(A))+b
S2A1	0.056	1980	1466	0.36	1427	330	0.10
S2A2	0.039	1492	1451	0.51	81	81	0.09
S2B	0.027	1465	1440	0.28	89	89	0.06
S2C	0.028	1450	1432	0.27	67	67	0.06

TABLE 10 (Cont)

CLARK UNIT HYDROGRAPH PARAMETERS							
Sub basin	Area, Acres (sq.mi)	Highest Elev (ft)	Lowest Elev (ft)	Length (mi)	Slope (ft/mi)	Adjusted Slope (ft/mi)	Kb= m(log(A))+b
S2D	0.024	1439	1418	0.32	66	66	0.06
S2E	0.033	1428	1396	0.49	65	65	0.06
S2F	0.008	1452	1438	0.21	67	67	0.07
S2G	0.189	1980	1426	0.77	719	310	0.10
S2H	0.049	1438	1398	0.72	56	56	0.06
S2I	0.028	1434	1418	0.32	50	50	0.06
S2J	0.023	1405	1389	0.22	72	72	0.09

For the Kb value calculations, the same assumptions as phase 1 was used. The two subbasins that have the mountainous areas, were considered to be of type C and the rest were considered to be of type B classification. (Table 5.1 of Drainage Design Manual, Hydrology)

TABLE 11

HYDROGRAPH ROUTING PARAMETERS	
Routing Reach Name	Reach Length (mi)
RCS12	0.155
RC1	0.129
RC2	0.197
RC3	0.390
RS2F	0.217
RCIG	0.206
RC6	0.220

The results for Case 2 are shown in Table 12.

TABLE 12

CP	DA	Q_p^{100}	T_p	V^{100}	Q/A	V/A	Runoff
100-Year 6-Hour Normal Condition							
CP2A1	1.83	2219	4.40	173	1213	95	1.78
CP2A2	1.87	2244	4.43	176	1200	94	1.77
CP2B	1.89	2261	4.43	178	1191	94	1.76
CP2C	1.92	2268	4.47	180	1181	94	1.76
CP2DI	1.97	2301	4.47	185	1168	94	1.76
CP2E	2.01	2315	4.50	187	1151	93	1.76
CP1	0.20	237	4.23	17	1185	85	1.60
CP2	0.25	250	4.40	21	1000	84	1.56
CP3	0.27	265	4.43	22	981	81	1.57

The description from Table 4 holds. CP2E is the concentration point at Shea Boulevard. CP3 is the concentration point at Tatum Boulevard.

3.3 Potential Detention Basin Sites

In previous hydrologic studies some concentration points have been identified as possible site for detention basins. The 100-yr peak discharge and runoff volume for 5 selected sites are given in Table 13.

TABLE 13

Potential Site for Detention Basins	C.P. Name	Drainage Area (sq.mi)	Peak Flow (Q) (cfs)	Volume (Ac-Ft)
1	CP1C	0.67	892	63
2	CP1E	1.49	1911	141
3	CP1F	1.77	2212	167
4	CP2A1	1.83	2219	173
5	CP2E	2.01	2315	187

3.4 Comparison with Other Studies

Peak flows estimated by the District's analysis is higher than those estimated by the November 1988 Squaw Peak Study by Baker Engineering, Inc. This can be due to the selection of lag time (or Time of Concentration), and the assumed imperviousness of Phoenix Mountains. Total

volumes are comparable between the studies even though the rainfall duration and the point precipitation values are different between the two studies. Table 14 lists a comparison between the results of the studies .

TABLE 14

	CP	D.A.	Q_p^{100}	V^{100}
BAKER	S1	1.85	1697	183
FCD PHASE1	S1	1.92	2108	181
BAKER	S2	0.39	425	32
FCD PHASE 1	S2	0.25	269	19
BAKER	CP2	2.24	1573	215
FCD PHASE 1	CP2	2.17	2196	199

3.4 Recommendation

The recommended values for Case 1 be utilized for sizing of the detention within the Mountain Preserves (S1) with the normal conditions as noted in Table 9 , and the values for Case 2 be used for sizing of any structures outside of the Phoenix Mountain Preserve as shown in Table 12.

Figures:

Figure 1- Watershed Boundary for Phase 1

Figure 2- Watershed Boundary for Phase 2, Case 1

Figure 3- Watershed Boundary for Phase 2, Case 2

Figure 4- Hydrograph plot for folows at Detention Baisn Site 1 and Site 5.

FIGURES

Shea Blvd
40th St
4th St
Tatum Blvd
Grato Park
Shopping Center
Altadena Park
Cholla Sch
Water Tank
Century Country Club
Indian Bend Wash
PHOENIX MOUNTAINS PRESERVE
PHOENIX MOUNTAINS PRESERVE
Squaw Peak
Mummy Mtn Preserve
Mummy Mtn Observatory
PARADISE VALLEY
PHOENIX CORPORATE PARADISE
DOUBLE TREE RANCH
MOCKINGBIRD LANE
DESERT COVE AVE
CHOLLA ST
CHERYL DR
VIA MONTANA VISTA
CP2
S2
S1
N

FIGURE 1

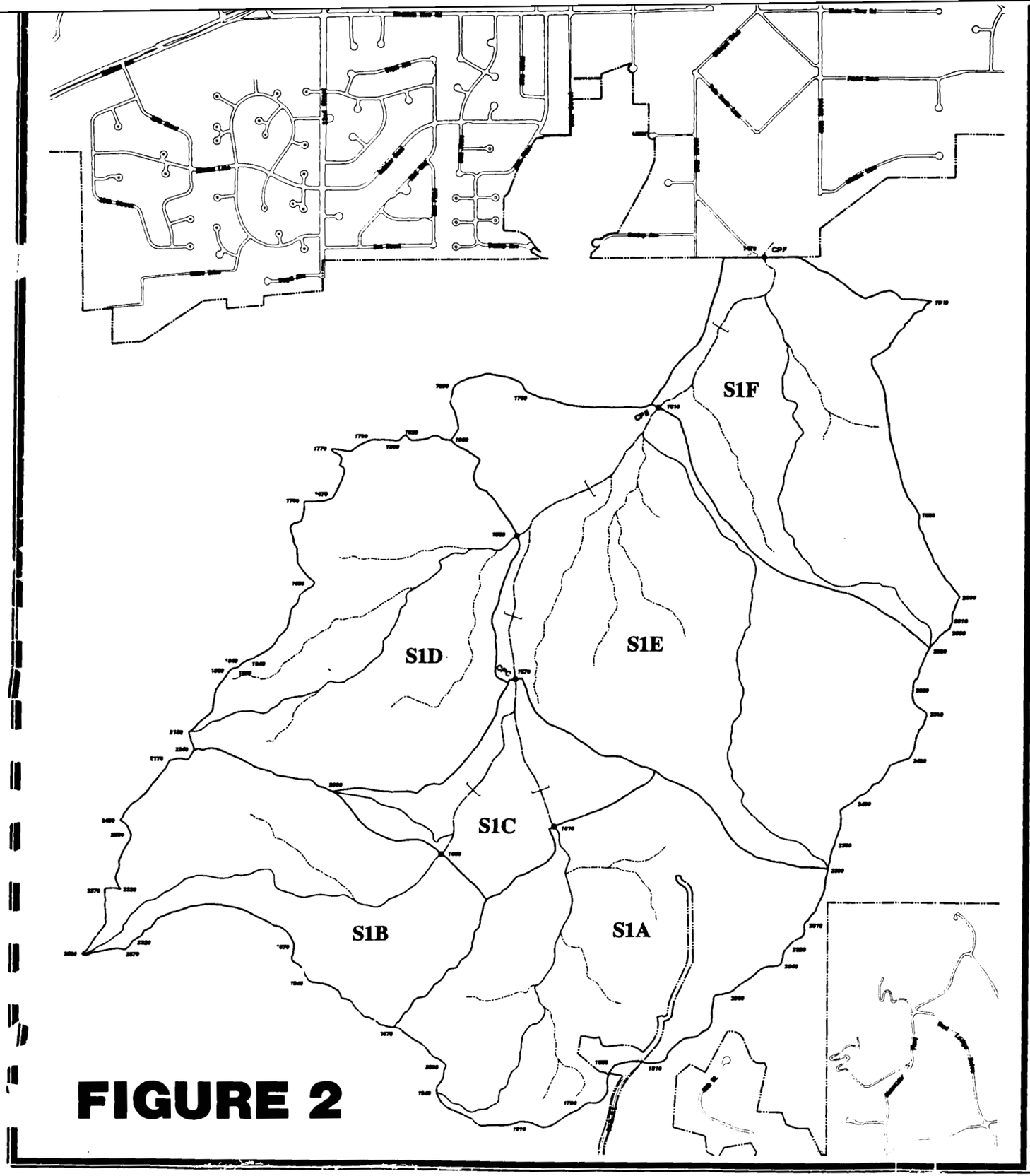


FIGURE 2

Tatum Wash Upper Watershed

Legend

- Potential Detention Basin Site
- Roads
- Watershed Basins Boundary
- Streamlines
- Longest Flowpath
- Routing Reaches
- Cross Sections
- Phoenix Mountains Preserve Boundary

Phase 2
Case 1

Prepared by: Mark Brewer, DSA I

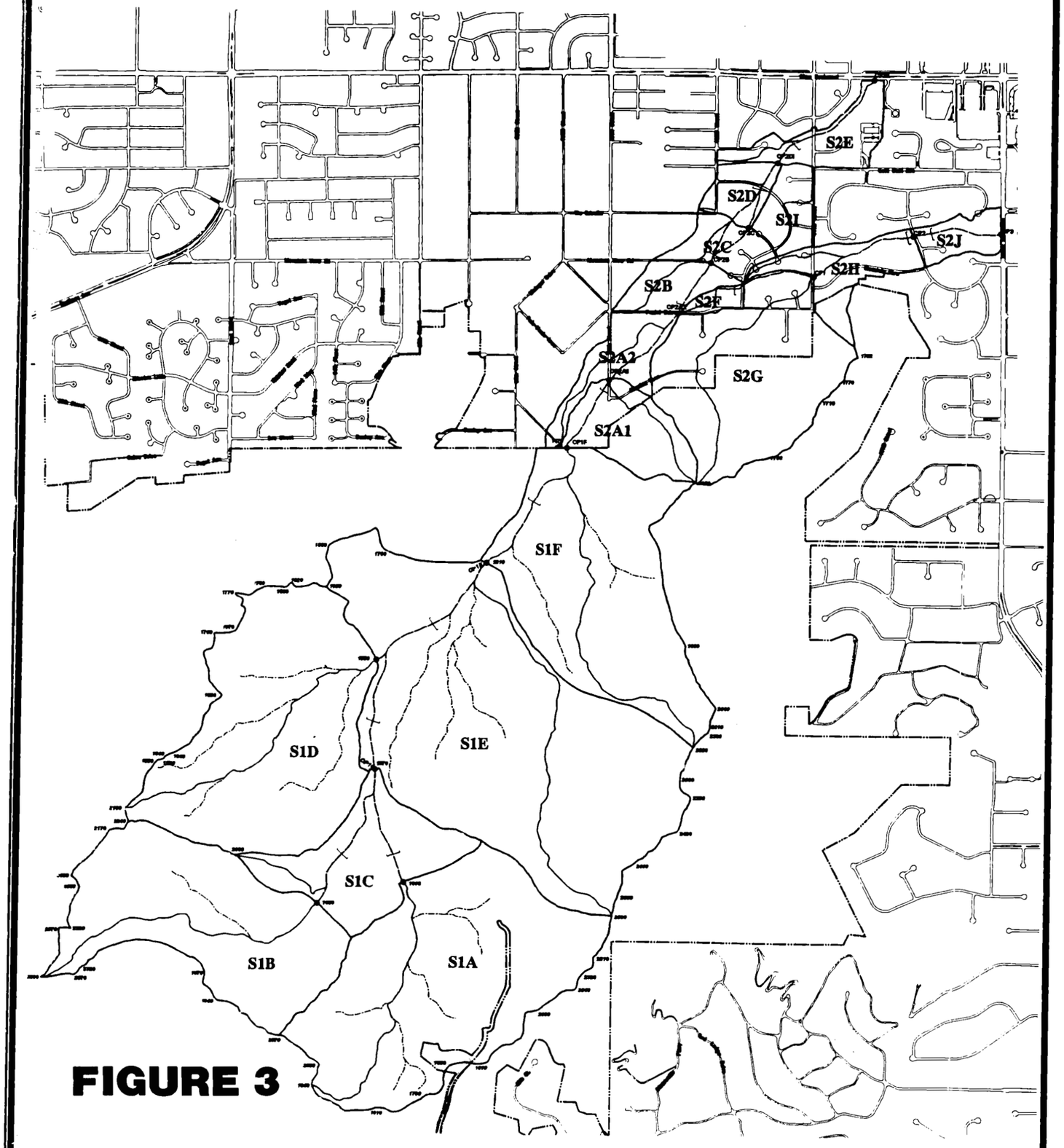


FIGURE 3

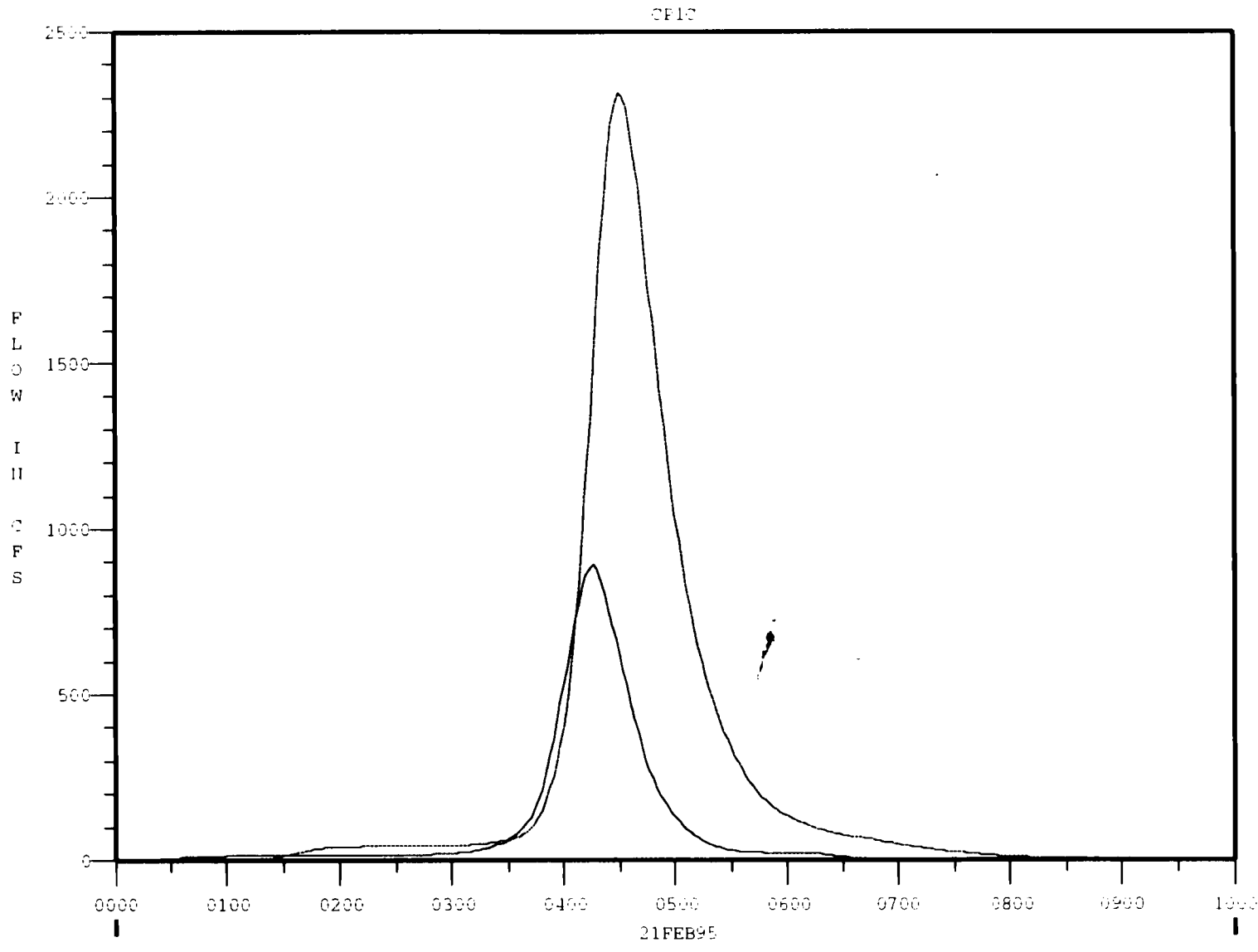
Tatum Wash Watershed

Legend

- Potential Detention Basin Site
- Roads
- Watershed Basins Boundary
- Streamlines
- Longest Flowpath
- Routing Reaches
- Cross Section
- Phoenix Mountains Preserve Boundary

Phase 2
Case 2

21FEB95 11:39:12



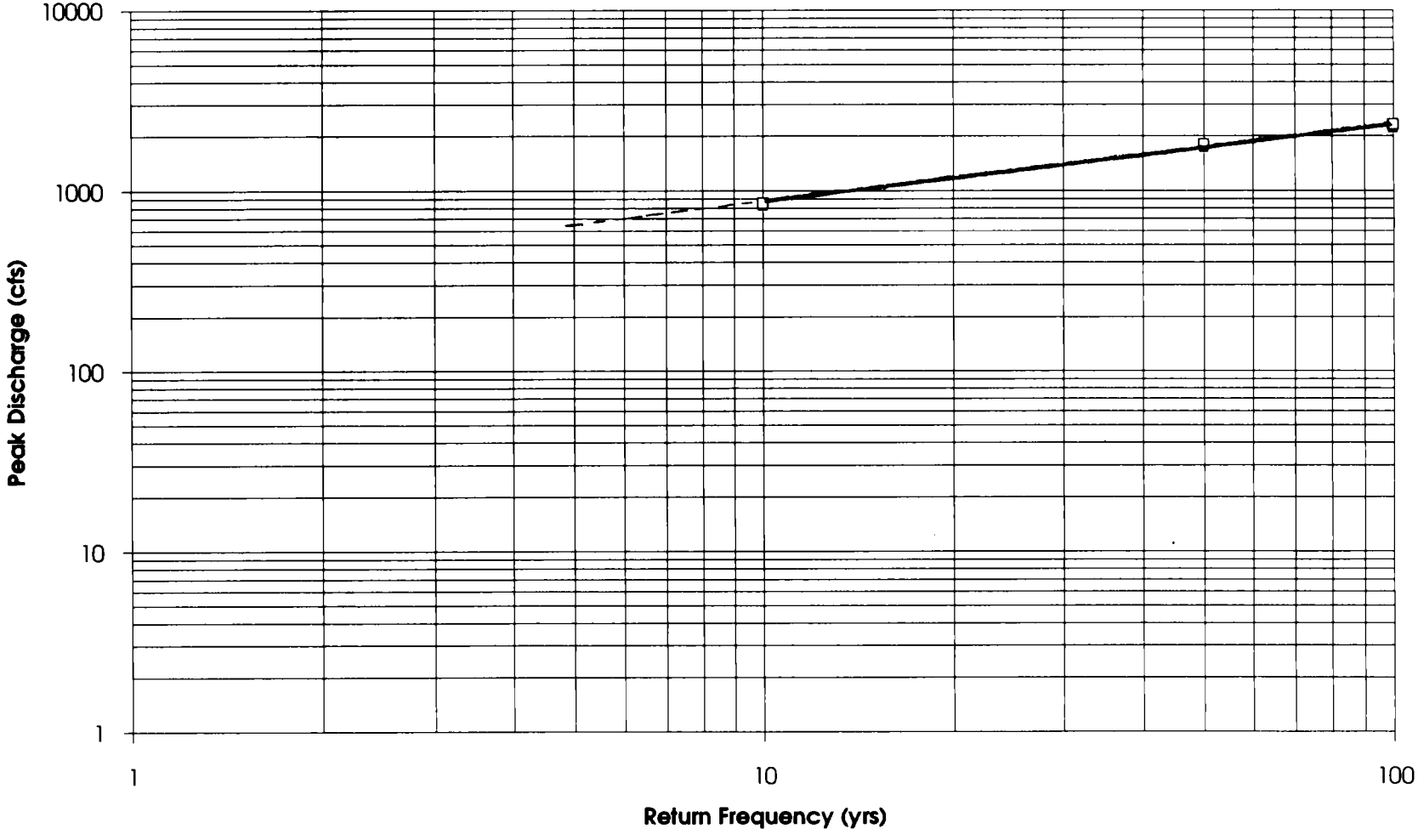
COMPUTED FLOW AT DB SITE 1

COMPUTED FLOW AT SHEA BLVD(DB SITE 5)

FIGURE 4

Tatum Wash Watershed

For CP-1F (Phoenix Mountain Preserve Boundary) and CP2E (Shea Blvd)



Tatum Wash Peak Discharges and Volumes of Return Periods

10, 50 and 100 years 6-hour storms

Conc. Point		10-Year	50-Year	100-Year	Remarks
CP1C	Q (cfs)	329	680	892	Potential
	V (ac-ft)	30	52	63	D.B. Site 1
CP1E	Q (cfs)	710	1486	1911	Potential
	V (ac-ft)	67	116	141	D.B.Site 2
CP1F	Q (cfs)	820	1719	2212	Potential
	V (ac-ft)	79	138	167	D.B. Site 3
CP2A1	Q (cfs)	818	1721	2219	Potential
	V (ac-ft)	82	143	173	D.B. Site 4
CP2A2	Q (cfs)	827	1744	2244	
	V (ac-ft)	83	145	176	
CP2B	Q (cfs)	830	1752	2261	
	V (ac-ft)	84	147	178	
CP2C	Q (cfs)	833	1762	2268	
	V (ac-ft)	85	149	180	
CP2DI	Q (cfs)	843	1786	2301	
	V (ac-ft)	87	153	185	
CP2E	Q (cfs)	848	1798	2315	At Shea
	V (ac-ft)	89	155	187	Boulevard
CP1	Q (cfs)	90	193	237	
	V (ac-ft)	7	14	17	
CP2	Q (cfs)	94	204	250	
	V (ac-ft)	9	17	21	

APPENDIX

Appendix:

HEC-1 Output Printout

Diskette Containing the Following Files

Tatca24.dat Phase 1, Dry Conditions (I), 24-hr storm.

Tatca24I.dat Phase 1, Normal Conditions (II), 24-hr storm.

Tatcase1.dat Phase 1, Normal Condition (II), 6-hr storm.

TatcaseI.dat Phase 1, Dry Condition (I), 6-hr storm.

Tatum.dat Case 1, Dry Condition (I), 6-hr storm.

TatumI.dat Case 1, Normal Condition (II), 6-hr storm.

Tatms1s2.dat Case 2, Normal condition, 6-hr storm (combined S1 and S2)

Phase 1

Normal Conditions (AMC II)

6-hr storm

```
1*****************************************
*****************************************
*                                       *                                       *
*                                       *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *   U.S. ARMY CORPS OF ENGINEERS
*                                       *                                       *
*            SEPTEMBER 1990             *                                       *   HYDROLOGIC ENGINEERING CENTER
*                                       *                                       *
*             VERSION 4.0               *                                       *        609 SECOND STREET
*                                       *                                       *
*                                       *                                       *      DAVIS, CALIFORNIA 95616
*                                       *                                       *
*  RUN DATE  02/23/1995  TIME  16:55:52 *                                       *          (916) 756-1104
*                                       *                                       *
*                                       *                                       *
*****************************************
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X         X     X        XX
X     X  X         X              X
XXXXXXX  XXXX      X        XXXXX X
X     X  X         X              X
X     X  X         X     X        X
X     X  XXXXXXX    XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            1           ID   6-hour storm using normal conditions
            2           ID   S2 is considered to be urban area. The storm size for the watershed is
            3           ID   picked to be 2.42.
            4           IT      5                    300
            5           IO      3

            6           KK     S1
            7           KM   SUB-BASIN SUB1
            8           KM   6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
            9           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
           10           BA   1.920
           11           IN      15
           12           KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
           13           PB   3.128
           14           KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.92
           15           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
           16           PC    .087    .100    .120    .161    .249    .445    .706    .843    .903    .939
           17           PC    .951    .964    .976    .988   1.000
           18           LG    .200    .250   4.300    .500  35.000
           19           UC    .604    .303
           20           UA      0       3       5       8      12      20      43      75      90      96
           21           UA    100

           22           KK     RS1
           23           KM     ROUTING FROM S1 TO S2
           24           RS      2    FLOW     -1
           25           RC    .035    .035    .035    5280    .034
           26           RX      0     0.5       1     125     136     251     252     253
           27           RY      5       5       5       0       0       5       5       5

           28           KK     S2
           29           KM   SUB-BASIN SUB2
           30           KM   6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
           31           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
           32           BA    .250
           33           LG    .100    .250   4.300    .500  15.000
           34           UC    .358    .261
           35           UA      0       5      16      30      65      77      84      90      94      97
           36           UA    100

           37           KK     CP2
           38           KM     SHEA BLVD CONCENTRATION POINY
           39           HC      2
           40           ZZ
```


```
1*****************************************
*****************************************
*                                       *                                       *
*                                       *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *   U.S. ARMY CORPS OF ENGINEERS
*                                       *                                       *
*            SEPTEMBER 1990             *                                       *   HYDROLOGIC ENGINEERING CENTER
*                                       *                                       *
*             VERSION 4.0               *                                       *        609 SECOND STREET
*                                       *                                       *
*                                       *                                       *      DAVIS, CALIFORNIA 95616
*                                       *                                       *
*  RUN DATE  02/23/1995  TIME  16:55:52 *                                       *          (916) 756-1104
*                                       *                                       *
*                                       *                                       *
*****************************************
*****************************************
```

```
**************************************

                    6-hour storm using normal conditions
                    S2 is considered to be urban area. The storm size for the watershed is
                    picked to be 2.42.

  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 HOURS

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


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

                 *************
                 *           *
  6 KK           *     S1    *
                 *           *
                 *************
                    SUB-BASIN SUB1
                    6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
                    RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                    THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.92

 11 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN          15  TIME INTERVAL IN MINUTES
                    JXDATE      1    0  STARTING DATE
                    JXTIME          0  STARTING TIME

                SUBBASIN RUNOFF DATA

 10 BA            SUBBASIN CHARACTERISTICS
                     TAREA        1.92  SUBBASIN AREA

                  PRECIPITATION DATA

 14 PB                STORM        3.13  BASIN TOTAL PRECIPITATION

 14 PI              INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                      .03       .03       .07       .07       .07       .09       .09       .09       .05       .05
                      .05       .02       .02       .02       .01       .01       .01       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00

 18 LG            GREEN AND AMPT LOSS RATE
                     STRTL         .20  STARTING LOSS
                       DTH         .25  MOISTURE DEFICIT
                      PSIF        4.30  WETTING FRONT SUCTION
                     XKSAT         .50  HYDRAULIC CONDUCTIVITY
                     RTIMP       35.00  PERCENT IMPERVIOUS AREA

 19 UC            CLARK UNITGRAPH
                        TC         .60  TIME OF CONCENTRATION
                         R         .30  STORAGE COEFFICIENT

 20 UA            ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                        .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                     100.0

                                                    ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .60 HR,       R=    .30 HR
                                          SNYDER  TP=    .50 HR,      CP=    .91

                                                UNIT HYDROGRAPH
                                          24 END-OF-PERIOD ORDINATES
                      68.       182.      306.      675.     1566.     2261.     2198.     1816.     1402.     1063.
                     806.       611.      463.      351.      266.      202.      153.      116.       88.       67.
                      51.        38.       29.       22.

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

                       HYDROGRAPH AT STATION       S1
```

```
    TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.34, TOTAL EXCESS =    1.78

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+    2108.      4.42                364.         92.          88.          88.
                       (INCHES)     1.765        1.775        1.775        1.775
                        (AC-FT)     181.         182.         182.         182.

                       CUMULATIVE AREA =    1.92 SQ MI


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


            **************
            *            *
 22 KK      *      RS1   *
            *            *
            **************
                        ROUTING FROM S1 TO S2

               HYDROGRAPH ROUTING DATA

 24 RS           STORAGE ROUTING
                      NSTPS          2  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

 25 RC           NORMAL DEPTH CHANNEL
                        ANL       .035  LEFT OVERBANK N-VALUE
                       ANCH       .035  MAIN CHANNEL N-VALUE
                        ANR       .035  RIGHT OVERBANK N-VALUE
                      RLNTH       5280.  REACH LENGTH
                        SEL       .0340  ENERGY SLOPE
                       ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                  CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 27 RY        ELEVATION      5.00      5.00      5.00       .00       .00      5.00      5.00      5.00
 26 RX        DISTANCE        .00       .50      1.00    125.00    136.00    251.00    252.00    253.00

                                                  ***

                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE         .00       .55      1.50      2.86      4.61      6.77      9.33     12.29     15.65     19.41
          OUTFLOW         .00     11.92     47.73    114.03    217.30    363.60    558.58    807.60   1115.75   1487.94
        ELEVATION         .00       .26       .53       .79      1.05      1.32      1.58      1.84      2.11      2.37

          STORAGE       23.57     28.13     33.10     38.47     44.23     50.40     56.97     63.94     71.32     79.09
          OUTFLOW     1928.88   2443.13   3035.11   3709.13   4469.36   5319.92   6264.79   7307.90   8453.08   9704.12
        ELEVATION         2.63      2.89      3.16      3.42      3.68      3.95      4.21      4.47      4.74      5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     6265. TO     9704.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION      RS1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+    2048.      4.50                364.         92.          88.          88.
                       (INCHES)     1.762        1.775        1.775        1.775
                        (AC-FT)     180.         182.         182.         182.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR        24-HR        72-HR     24.92-HR
+  (AC-FT)      (HR)
       12.      4.50                  3.           1.           1.           1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR        24-HR        72-HR     24.92-HR
+   (FEET)      (HR)
       2.69     4.50                1.00         .26          .25          .25

                       CUMULATIVE AREA =    1.92 SQ MI


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


            **************
            *            *
 28 KK      *      S2    *
            *            *
            **************
                        SUB-BASIN SUB2
                        6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
                        THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977

               SUBBASIN RUNOFF DATA

 32 BA           SUBBASIN CHARACTERISTICS
                      TAREA         .25  SUBBASIN AREA
```

```
            PRECIPITATION DATA

 14 PB              STORM        3.13  BASIN TOTAL PRECIPITATION

 14 PI           INCREMENTAL PRECIPITATION PATTERN
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                    .03      .03      .07      .07      .07      .09      .09      .09      .05      .05
                    .05      .02      .02      .02      .01      .01      .01      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00

 33 LG          GREEN AND AMPT LOSS RATE
                    STRTL         .10  STARTING LOSS
                      DTH         .25  MOISTURE DEFICIT
                     PSIF        4.30  WETTING FRONT SUCTION
                    XKSAT         .50  HYDRAULIC CONDUCTIVITY
                    RTIMP       15.00  PERCENT IMPERVIOUS AREA

 34 UC          CLARK UNITGRAPH
                       TC         .36  TIME OF CONCENTRATION
                        R         .26  STORAGE COEFFICIENT

 35 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                    .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                 100.0

                                                       ***

                                           UNIT HYDROGRAPH PARAMETERS
                                     CLARK  TC=   .36 HR,        R=   .26 HR
                                    SNYDER  TP=   .23 HR,       CP=   .53

                                                UNIT HYDROGRAPH
                                           19 END-OF-PERIOD ORDINATES
              55.      234.      354.      324.      261.      195.      141.      102.       74.       54.
              39.       28.       20.       15.       11.        8.        6.        4.        3.

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

                      HYDROGRAPH AT STATION        S2

   TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.73, TOTAL EXCESS =     1.40

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR       72-HR       24.92-HR
+   (CFS)       (HR)
                            (CFS)
+     269.      4.17                    37.          9.          9.           9.
                          (INCHES)     1.390       1.394       1.394        1.394
                           (AC-FT)       19.         19.         19.          19.

                          CUMULATIVE AREA =      .25 SQ MI


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

            *************
            *           *
 37 KK      *    CP2    *
            *           *
            *************
                            SHEA BLVD CONCENTRATION POINY

 39 HC          HYDROGRAPH COMBINATION
                    ICOMP              2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                       ***

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

                      HYDROGRAPH AT STATION       CP2

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR       72-HR       24.92-HR
+   (CFS)       (HR)
                            (CFS)
+    2196.      4.50                   401.        101.         97.          97.
                          (INCHES)     1.718       1.731       1.731        1.731
                           (AC-FT)      199.        200.        200.         200.

                          CUMULATIVE AREA =     2.17 SQ MI

1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	S1	2108.	4.42	364.	92.	88.	1.92		
+ +	ROUTED TO	RS1	2048.	4.50	364.	92.	88.	1.92	2.69	4.50
+	HYDROGRAPH AT	S2	269.	4.17	37.	9.	9.	.25		

+ 2 COMBINED AT	CP2	2196.	4.50	401.	101.	97.	2.17

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

Phase 1

Dry Conditions (AMC I)

6-hr storm

```
1***************************************
**************************************
*                                     *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*          SEPTEMBER 1990             *
*           VERSION 4.0               *
*                                     *
* RUN DATE  02/23/1995  TIME  16:56:22 *
*                                     *
***************************************
**************************************
```

```
*                                          *
*  U.S. ARMY CORPS OF ENGINEERS
*  HYDROLOGIC ENGINEERING CENTER
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*          (916) 756-1104
*
```

```
X       X  XXXXXXX   XXXXX         X
X       X  X        X     X       XX
X       X  X        X              X
XXXXXXX    XXXX     X      XXXXX   X
X       X  X        X              X
X       X  X        X     X        X
X       X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   6-hour storm using dry conditions
  2           ID   S2 is considered to be urban area. The storm size for the watershed is
  3           ID   picked to be 2.42.
  4           IT       5                  300
  5           IO       3

  6           KK      S1
  7           KM   SUB-BASIN SUB1
  8           KM   6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
  9           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
 10           BA   1.920
 11           IN      15
 12           KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 13           PB   3.128
 14           KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.92
 15           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 16           PC    .087    .100    .120    .161    .249    .445    .706    .843    .903    .939
 17           PC    .951    .964    .976    .988   1.000
 18           LG    .200    .350   4.300    .500  35.000
 19           UC    .625    .315
 20           UA       0       3       5       8      12      20      43      75      90      96
 21           UA     100

 22           KK      RS1
 23           KM      ROUTING FROM S1 TO S2
 24           RS       2    FLOW      -1
 25           RC    .035    .035    .035    5280    .034
 26           RX       0     0.5       1     125     136     251     252     253
 27           RY       5       5       5       0       0       5       5       5

 28           KK      S2
 29           KM   SUB-BASIN SUB2
 30           KM   6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
 31           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
 32           BA    .250
 33           LG    .100    .350   4.300    .500  15.000
 34           UC    .371    .271
 35           UA       0       5      16      30      65      77      84      90      94      97
 36           UA     100

 37           KK      CP2
 38           KM      SHEA BLVD CONCENTRATION POINY
 39           HC       2
 40           ZZ
```


```
1***************************************
**************************************
*                                     *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*          SEPTEMBER 1990             *
*           VERSION 4.0               *
*                                     *
* RUN DATE  02/23/1995  TIME  16:56:22 *
*                                     *
***************************************
```

```
*                                          *
*  U.S. ARMY CORPS OF ENGINEERS
*  HYDROLOGIC ENGINEERING CENTER
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*          (916) 756-1104
*
```

....

6-hour storm using dry conditions
S2 is considered to be urban area. The storm size for the watershed is picked to be 2.42.

```
 5 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          3  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL          0. HYDROGRAPH PLOT SCALE

   IT        HYDROGRAPH TIME DATA
                  NMIN           5  MINUTES IN COMPUTATION INTERVAL
                  IDATE     1    0  STARTING DATE
                  ITIME       0000  STARTING TIME
                  NQ           300  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE     2    0  ENDING DATE
                 NDTIME       0055  ENDING TIME
                  ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   24.92 HOURS

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

... ...
...

```
          **************
          *            *
  6 KK    *     S1     *
          *            *
          **************
```

SUB-BASIN SUB1
6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977
RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.92

```
 11 IN       TIME DATA FOR INPUT TIME SERIES
                  JXMIN         15  TIME INTERVAL IN MINUTES
                  JXDATE    1    0  STARTING DATE
                  JXTIME         0  STARTING TIME

           SUBBASIN RUNOFF DATA

 10 BA       SUBBASIN CHARACTERISTICS
                  TAREA       1.92  SUBBASIN AREA

             PRECIPITATION DATA

 14 PB            STORM       3.13  BASIN TOTAL PRECIPITATION

 14 PI         INCREMENTAL PRECIPITATION PATTERN
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                  .03       .03       .07       .07       .07       .09       .09       .09       .05       .05
                  .05       .02       .02       .02       .01       .01       .01       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00

 18 LG       GREEN AND AMPT LOSS RATE
                  STRTL        .20  STARTING LOSS
                  DTH          .35  MOISTURE DEFICIT
                  PSIF        4.30  WETTING FRONT SUCTION
                  XKSAT        .50  HYDRAULIC CONDUCTIVITY
                  RTIMP      35.00  PERCENT IMPERVIOUS AREA

 19 UC       CLARK UNITGRAPH
                  TC           .63  TIME OF CONCENTRATION
                  R            .31  STORAGE COEFFICIENT

 20 UA       ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                  .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
               100.0

                                                ***

                                         UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=   .63 HR,      R=   .31 HR
                                  SNYDER   TP=   .51 HR,     CP=   .90

                                             UNIT HYDROGRAPH
                                        25 END-OF-PERIOD ORDINATES
        64.      170.      275.      570.     1346.     2114.     2193.     1855.     1468.     1125.
       862.      661.      506.      388.      297.      228.      175.      134.      103.       79.
        60.       46.       35.       27.       21.

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

                  HYDROGRAPH AT STATION       S1
```

```
    TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.43, TOTAL EXCESS =    1.70

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                            (CFS)
+    1970.      4.42                 347.         87.         84.          84.
                          (INCHES)   1.679       1.690       1.690        1.690
                           (AC-FT)   172.        173.        173.         173.

                          CUMULATIVE AREA =    1.92 SQ MI


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

           **************
           *            *
  22 KK    *      RS1   *
           *            *
           **************
                           ROUTING FROM S1 TO S2

             HYDROGRAPH ROUTING DATA

  24 RS         STORAGE ROUTING
                     NSTPS          2  NUMBER OF SUBREACHES
                      ITYP       FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC      -1.00  INITIAL CONDITION
                         X        .00  WORKING R AND D COEFFICIENT

  25 RC         NORMAL DEPTH CHANNEL
                       ANL       .035  LEFT OVERBANK N-VALUE
                      ANCH       .035  MAIN CHANNEL N-VALUE
                       ANR       .035  RIGHT OVERBANK N-VALUE
                     RLNTH      5280.  REACH LENGTH
                       SEL      .0340  ENERGY SLOPE
                     ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                       CROSS-SECTION DATA
                           --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  27 RY        ELEVATION     5.00      5.00      5.00       .00       .00      5.00      5.00      5.00
  26 RX        DISTANCE       .00       .50      1.00    125.00    136.00    251.00    252.00    253.00

                                                 ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE        .00       .55      1.50      2.86      4.61      6.77      9.33     12.29     15.65     19.41
        OUTFLOW        .00     11.92     47.73    114.03    217.30    363.60    558.58    807.60   1115.75   1487.94
      ELEVATION        .00       .26       .53       .79      1.05      1.32      1.58      1.84      2.11      2.37

        STORAGE      23.57     28.13     33.10     38.47     44.23     50.40     56.97     63.94     71.32     79.09
        OUTFLOW    1928.88   2443.13   3035.11   3709.13   4469.36   5319.92   6264.79   7307.90   8453.08   9704.12
      ELEVATION       2.63      2.89      3.16      3.42      3.68      3.95      4.21      4.47      4.74      5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      6265. TO     9704.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION       RS1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                            (CFS)
+    1891.      4.50                 346.         87.         84.          84.
                          (INCHES)   1.676       1.690       1.690        1.690
                           (AC-FT)   172.        173.        173.         173.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR      24.92-HR
+  (AC-FT)      (HR)
       12.      4.50                   3.          1.          1.           1.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR      24.92-HR
+   (FEET)      (HR)
      2.61      4.50                  .99         .26         .25          .25

                          CUMULATIVE AREA =    1.92 SQ MI


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

           **************
           *            *
  28 KK    *       S2   *
           *            *
           **************
                         SUB-BASIN SUB2
                         6-HOUR RAINFALL, PATTERN NO. 1.92 WAS USED TO FIND TC & R FOR THIS BASIN
                         THIS BASIN USED RAINFALL REDUCTION FACTOR OF .977

             SUBBASIN RUNOFF DATA

  32 BA         SUBBASIN CHARACTERISTICS
                     TAREA        .25  SUBBASIN AREA
```

```
                PRECIPITATION DATA

 14 PB                STORM          3.13  BASIN TOTAL PRECIPITATION

 14 PI            INCREMENTAL PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                     .03       .03       .07       .07       .07       .09       .09       .09       .05       .05
                     .05       .02       .02       .02       .01       .01       .01       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00

 33 LG          GREEN AND AMPT LOSS RATE
                      STRTL          .10  STARTING LOSS
                        DTH          .35  MOISTURE DEFICIT
                       PSIF         4.30  WETTING FRONT SUCTION
                      XKSAT          .50  HYDRAULIC CONDUCTIVITY
                      RTIMP        15.00  PERCENT IMPERVIOUS AREA

 34 UC          CLARK UNITGRAPH
                         TC          .37  TIME OF CONCENTRATION
                          R          .27  STORAGE COEFFICIENT

 35 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                   100.0

                                                        ***

                                            UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=   .37 HR,       R=   .27 HR
                                  SNYDER   TP=   .23 HR,      CP=   .51

                                                 UNIT HYDROGRAPH
                                            20 END-OF-PERIOD ORDINATES
               50.       220.      339.      316.      262.      200.      146.      107.       79.       58.
               42.        31.       23.       17.       12.        9.        7.        5.        4.        3.

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

                      HYDROGRAPH AT STATION        S2

     TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.84, TOTAL EXCESS =    1.29

   PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR      24.92-HR
 +   (CFS)        (HR)
                             (CFS)
 +    246.        4.17                35.           9.          8.          8.
                           (INCHES)  1.284       1.288       1.288       1.288
                           (AC-FT)     17.         17.         17.         17.

                      CUMULATIVE AREA =      .25 SQ MI


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

            **************
            *            *
 37 KK      *     CP2    *
            *            *
            **************
                         SHEA BLVD CONCENTRATION POINY

 39 HC          HYDROGRAPH COMBINATION
                      ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                        ***

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

                      HYDROGRAPH AT STATION        CP2

   PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR      24.92-HR
 +   (CFS)        (HR)
                             (CFS)
 +   2031.        4.50               380.          96.         92.         92.
                           (INCHES)  1.630       1.644       1.644       1.644
                           (AC-FT)    189.        190.        190.        190.

                      CUMULATIVE AREA =     2.17 SQ MI

1
                                                    RUNOFF SUMMARY
                                             FLOW IN CUBIC FEET PER SECOND
                                           TIME IN HOURS,  AREA IN SQUARE MILES

                                            PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD       BASIN    MAXIMUM     TIME OF
             OPERATION        STATION       FLOW     PEAK                                              AREA     STAGE    MAX STAGE
 +                                                               6-HOUR      24-HOUR     72-HOUR

             HYDROGRAPH AT
 +                               S1        1970.     4.42         347.         87.         84.        1.92

             ROUTED TO
 +                               RS1       1891.     4.50         346.         87.         84.        1.92
 +                                                                                                            2.61        4.50

             HYDROGRAPH AT
 +                               S2         246.     4.17          35.          9.          8.         .25
```

+ 2 COMBINED AT	CP2	2031.	4.50	380.	96.	92.	2.17

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

Phase 1

Dry Conditions (AMC I)

24-hr storm

```
1*************************************
**************************************
*                                    *
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*                                    *
*          SEPTEMBER 1990            *
*                                    *
*           VERSION 4.0              *
*                                    *
*                                    *
*                                    *
* RUN DATE  02/23/1995  TIME  16:55:24*
*                                    *
*                                    *
*                                    *
 ************************************
**************************************
```

```
*                                    *
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*         (916) 756-1104             *
*                                    *
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X        XXXXX X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX  XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID   24-hour storm using dry conditions
   2          ID   Same assumptions as 6-hour storm
   3          IT       5                    300
   4          IO       3

   5          KK      S1
   6          KM   SUB-BASIN SUB1
   7          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
   8          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
   9          BA   1.920
  10          IN      30
  11          KM   RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  12          PB   3.762
  13          KM   THE FOLLOWING PC RECORD USED A 24-HR SCS TYPE II STORM
  14          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  15          PC    .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
  16          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  17          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  18          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
  19          LG    .200    .350   4.300    .500  15.000
  20          UC    .583    .292
  21          UA       0       3       5       8      12      20      43      75      90      96
  22          UA     100

  23          KK     RS1
  24          KM     ROUTING FROM S1 TO S2
  25          RS       2    FLOW      -1
  26          RC    .035    .035    .035    5280    .034
  27          RX       0     0.5       1     125     136     251     252     253
  28          RY       5       5       5       0       0       5       5       5

  29          KK      S2
  30          KM   SUB-BASIN SUB2
  31          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  32          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
  33          BA    .250
  34          LG    .100    .350   4.300    .500  15.000
  35          UC    .350    .254
  36          UA       0       5      16      30      65      77      84      90      94      97
  37          UA     100

  38          KK     CP2
  39          KM     SHEA BLVD CONCENTRATION POINT
  40          HC       2
  41          ZZ
```


```
1*************************************
**************************************
*                                    *
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*                                    *
*          SEPTEMBER 1990            *
*                                    *
*           VERSION 4.0              *
*                                    *
*                                    *
*                                    *
* RUN DATE  02/23/1995  TIME  16:55:24*
*                                    *
*                                    *
*                                    *
 ************************************
**************************************
```

```
*                                    *
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*         (916) 756-1104             *
*                                    *
```

```
*****************************************
***************************************

                         24-hour storm using dry conditions
                         Same assumptions as 6-hour storm

  4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2   0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL      .08 HOURS
                     TOTAL TIME BASE    24.92 HOURS

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

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

          **************
          *            *
  5 KK    *     S1     *
          *            *
          **************

                         SUB-BASIN SUB1
                         24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
                         THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
                         RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                         THE FOLLOWING PC RECORD USED A 24-HR SCS TYPE II STORM

 10 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN         30  TIME INTERVAL IN MINUTES
                     JXDATE      1   0  STARTING DATE
                     JXTIME          0  STARTING TIME

             SUBBASIN RUNOFF DATA

  9 BA          SUBBASIN CHARACTERISTICS
                      TAREA       1.92  SUBBASIN AREA

                PRECIPITATION DATA

 13 PB                STORM       3.76  BASIN TOTAL PRECIPITATION

 13 PI            INCREMENTAL PRECIPITATION PATTERN
```

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.06	.06
.06	.06	.06	.06	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

```
 19 LG          GREEN AND AMPT LOSS RATE
                      STRTL        .20  STARTING LOSS
                        DTH        .35  MOISTURE DEFICIT
                       PSIF       4.30  WETTING FRONT SUCTION
                      XKSAT        .50  HYDRAULIC CONDUCTIVITY
                      RTIMP      35.00  PERCENT IMPERVIOUS AREA

 20 UC          CLARK UNITGRAPH
                         TC        .58  TIME OF CONCENTRATION
                          R        .29  STORAGE COEFFICIENT
```

```
 21 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                     .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                  100.0

                                                  ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .58 HR,       R=    .29 HR
                                          SNYDER  TP=    .49 HR,       CP=   .94

                                                UNIT HYDROGRAPH
                                          23 END-OF-PERIOD ORDINATES
                    72.      194.      340.      792.     1762.     2379.     2208.     1778.     1334.     1001.
                   751.      563.      423.      317.      238.      179.      134.      100.       75.       57.
                    42.       32.       24.

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

                                HYDROGRAPH AT STATION       S1

     TOTAL RAINFALL =    3.76, TOTAL LOSS =    1.89, TOTAL EXCESS =    1.87

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR        72-HR       24.92-HR
+    (CFS)       (HR)
                                    (CFS)
+     1900.     12.33                305.         96.          92.          92.
                                (INCHES)       1.475        1.858        1.860        1.860
                                (AC-FT)          151.         190.         190.         190.

                                CUMULATIVE AREA =    1.92 SQ MI


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

                 *************
                 *           *
 23 KK           *     RS1   *
                 *           *
                 *************
                                ROUTING FROM S1 TO S2

                             HYDROGRAPH ROUTING DATA

 25 RS                    STORAGE ROUTING
                               NSTPS          2  NUMBER OF SUBREACHES
                                ITYP       FLOW  TYPE OF INITIAL CONDITION
                              RSVRIC      -1.00  INITIAL CONDITION
                                   X        .00 WORKING R AND D COEFFICIENT

 26 RC                    NORMAL DEPTH CHANNEL
                                 ANL       .035  LEFT OVERBANK N-VALUE
                                ANCH       .035  MAIN CHANNEL N-VALUE
                                 ANR       .035  RIGHT OVERBANK N-VALUE
                               RLNTH       5280.  REACH LENGTH
                                 SEL       .0340  ENERGY SLOPE
                               ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                CROSS-SECTION DATA
                                --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 28 RY          ELEVATION      5.00      5.00      5.00       .00       .00      5.00      5.00      5.00
 27 RX          DISTANCE        .00       .50      1.00    125.00    136.00    251.00    252.00    253.00

                                                  ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE        .00       .55      1.50      2.86      4.61      6.77      9.33     12.29     15.65     19.41
              OUTFLOW        .00     11.92     47.73    114.03    217.30    363.60    558.58    807.60   1115.75   1487.94
            ELEVATION        .00       .26       .53       .79      1.05      1.32      1.58      1.84      2.11      2.37

              STORAGE      23.57     28.13     33.10     38.47     44.23     50.40     56.97     63.94     71.32     79.09
              OUTFLOW    1928.88   2443.13   3035.11   3709.13   4469.36   5319.92   6264.79   7307.90   8453.08   9704.12
            ELEVATION        2.63      2.89      3.16      3.42      3.68      3.95      4.21      4.47      4.74      5.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     6265. TO     9704.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                HYDROGRAPH AT STATION      RS1

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR        72-HR       24.92-HR
+    (CFS)       (HR)
                                    (CFS)
+     1822.     12.42                305.         96.          92.          92.
                                (INCHES)       1.475        1.855        1.856        1.856
                                (AC-FT)          151.         190.         190.         190.

 PEAK STORAGE    TIME                           MAXIMUM AVERAGE STORAGE
                                              6-HR        24-HR        72-HR       24.92-HR
+  (AC-FT)       (HR)
       11.     12.42                  3.           1.           1.           1.

   PEAK STAGE    TIME                           MAXIMUM AVERAGE STAGE
                                              6-HR        24-HR        72-HR       24.92-HR
+    (FEET)      (HR)
       2.57     12.42                 .97          .52          .50          .50

                                CUMULATIVE AREA =    1.92 SQ MI
```

*** ***

29 KK S2

SUB-BASIN SUB2
24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990

SUBBASIN RUNOFF DATA

33 BA SUBBASIN CHARACTERISTICS
TAREA .25 SUBBASIN AREA

PRECIPITATION DATA

13 PB STORM 3.76 BASIN TOTAL PRECIPITATION

13 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.06	.06
.06	.06	.06	.06	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

34 LG GREEN AND AMPT LOSS RATE

STRTL	.10	STARTING LOSS
DTH	.35	MOISTURE DEFICIT
PSIF	4.30	WETTING FRONT SUCTION
XKSAT	.50	HYDRAULIC CONDUCTIVITY
RTIMP	15.00	PERCENT IMPERVIOUS AREA

35 UC CLARK UNITGRAPH

TC	.35	TIME OF CONCENTRATION
R	.25	STORAGE COEFFICIENT

36 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .35 HR, R= .25 HR
SNYDER TP= .23 HR, CP= .54

UNIT HYDROGRAPH
18 END-OF-PERIOD ORDINATES

58.	244.	364.	328.	261.	192.	138.	99.	71.	51.
37.	26.	19.	14.	10.	7.	5.	4.		

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

HYDROGRAPH AT STATION S2

TOTAL RAINFALL = 3.76, TOTAL LOSS = 2.45, TOTAL EXCESS = 1.31

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 248.	12.08		31.	9.	8.	8.
		(INCHES)	1.136	1.300	1.301	1.301
		(AC-FT)	15.	17.	17.	17.

CUMULATIVE AREA = .25 SQ MI

*** ***

38 KK CP2

****

SHEA BLVD CONCENTRATION POINT

40 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP2

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1926.	12.42		335.	105.	101.	101.
			(INCHES)	1.436	1.791	1.792	1.792
			(AC-FT)	166.	207.	207.	207.

CUMULATIVE AREA = 2.17 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	S1	1900.	12.33	305.	96.	92.	1.92		
+	ROUTED TO	RS1	1822.	12.42	305.	96.	92.	1.92		
+									2.57	12.42
+	HYDROGRAPH AT	S2	248.	12.08	31.	9.	8.	.25		
+	2 COMBINED AT	CP2	1926.	12.42	335.	105.	101.	2.17		

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

Phase 1

Normal Conditions (AMC II)

24-hr storm

```
1*************************************
**************************************
*                                    *                                    *
*                                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                                    *   U.S. ARMY CORPS OF ENGINEERS
*                                    *                                    *
*            SEPTEMBER 1990          *                                    *   HYDROLOGIC ENGINEERING CENTER
*                                    *                                    *
*             VERSION 4.0            *                                    *        609 SECOND STREET
*                                    *                                    *
*                                    *                                    *     DAVIS, CALIFORNIA 95616
*                                    *                                    *
*  RUN DATE  02/23/1995  TIME  16:54:54*                                   *          (916) 756-1104
*                                    *                                    *
*                                    *                                    *
*************************************
**************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID   24-hour storm using normal conditions
   2          ID   Same assumptions as 6-hour storm
   3          IT      5                    300
   4          IO      3

   5          KK     S1
   6          KM   SUB-BASIN SUB1
   7          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
   8          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
   9          BA   1.920
  10          IN     30
  11          KM   RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  12          PB   3.762
  13          KM   THE FOLLOWING PC RECORD USED A 24-HR SCS TYPE II STORM
  14          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  15          PC    .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
  16          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  17          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  18          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
  19          LG    .200    .250   4.300    .500  35.000
  20          UC    .567    .283
  21          UA       0       3       5       8      12      20      43      75      90      96
  22          UA     100

  23          KK     RS1
  24          KM     ROUTING FROM S1 TO S2
  25          RS       2    FLOW      -1
  26          RC    .035    .035    .035    5280    .034
  27          RX       0     0.5       1     125     136     251     252     253
  28          RY       5       5       5       0       0       5       5       5

  29          KK     S2
  30          KM   SUB-BASIN SUB2
  31          KM   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
  32          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
  33          BA    .250
  34          LG    .100    .250   4.300    .500  15.000
  35          UC    .342    .248
  36          UA       0       5      16      30      65      77      84      90      94      97
  37          UA     100

  38          KK     CP2
  39          KM     SHEA BLVD CONCENTRATION POINT
  40          HC       2
  41          ZZ
```


```
1*************************************
**************************************
*                                    *                                    *
*                                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                                    *   U.S. ARMY CORPS OF ENGINEERS
*                                    *                                    *
*            SEPTEMBER 1990          *                                    *   HYDROLOGIC ENGINEERING CENTER
*                                    *                                    *
*             VERSION 4.0            *                                    *        609 SECOND STREET
*                                    *                                    *
*                                    *                                    *     DAVIS, CALIFORNIA 95616
*                                    *                                    *
*  RUN DATE  02/23/1995  TIME  16:54:54*                                   *          (916) 756-1104
*                                    *                                    *
*                                    *                                    *
*************************************
```

```
 ****************************************
 **************************************



                      24-hour storm using normal conditions
                      Same assumptions as 6-hour storm

   4 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2   0  ENDING DATE
                      NDTIME       0055  ENDING TIME
                       ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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


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

              **************
              *            *
   5 KK       *      S1    *
              *            *
              **************
                      SUB-BASIN SUB1
                      24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
                      THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990
                      RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                      THE FOLLOWING PC RECORD USED A 24-HR SCS TYPE II STORM

  10 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN         30  TIME INTERVAL IN MINUTES
                      JXDATE      1   0  STARTING DATE
                      JXTIME          0  STARTING TIME

               SUBBASIN RUNOFF DATA

   9 BA          SUBBASIN CHARACTERISTICS
                       TAREA       1.92  SUBBASIN AREA

                 PRECIPITATION DATA

  13 PB                STORM       3.76  BASIN TOTAL PRECIPITATION

  13 PI            INCREMENTAL PRECIPITATION PATTERN
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .01      .01      .01      .01
                     .01      .01      .01      .01      .01      .01      .01      .01      .06      .06
                     .06      .06      .06      .06      .01      .01      .01      .01      .01      .01
                     .01      .01      .01      .01      .01      .01      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                     .00      .00      .00      .00      .00      .00      .00      .00

  19 LG          GREEN AND AMPT LOSS RATE
                       STRTL        .20  STARTING LOSS
                         DTH        .25  MOISTURE DEFICIT
                        PSIF       4.30  WETTING FRONT SUCTION
                       XKSAT        .50  HYDRAULIC CONDUCTIVITY
                       RTIMP      35.00  PERCENT IMPERVIOUS AREA

  20 UC          CLARK UNITGRAPH
                          TC        .57  TIME OF CONCENTRATION
                           R        .28  STORAGE COEFFICIENT
```

```
 21 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                     .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                  100.0

                                                  ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .57 HR,       R=    .28 HR
                                          SNYDER  TP=    .48 HR,       CP=   .95

                                                UNIT HYDROGRAPH
                                            23 END-OF-PERIOD ORDINATES
                    75.       205.      369.      892.     1903.     2458.     2204.     1736.     1290.      959.
                   713.       530.      394.      293.      218.      162.      120.       89.       66.       49.
                    37.        27.       20.

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

                                HYDROGRAPH AT STATION       S1

     TOTAL RAINFALL =    3.76, TOTAL LOSS =    1.84, TOTAL EXCESS =    1.92

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      24.92-HR
 +    (CFS)       (HR)
                          (CFS)
 +    2010.      12.33                   316.         99.          95.          95.
                          (INCHES)       1.532        1.915        1.917        1.917
                          (AC-FT)        157.         196.         196.         196.

                                CUMULATIVE AREA =    1.92 SQ MI


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

                 *************
                 *           *
 23 KK           *    RS1    *
                 *           *
                 *************
                                ROUTING FROM S1 TO S2

                    HYDROGRAPH ROUTING DATA

 25 RS                STORAGE ROUTING
                           NSTPS          2  NUMBER OF SUBREACHES
                           ITYP        FLOW  TYPE OF INITIAL CONDITION
                          RSVRIC      -1.00  INITIAL CONDITION
                               X        .00 WORKING R AND D COEFFICIENT

 26 RC                NORMAL DEPTH CHANNEL
                           ANL         .035  LEFT OVERBANK N-VALUE
                          ANCH         .035  MAIN CHANNEL N-VALUE
                           ANR         .035  RIGHT OVERBANK N-VALUE
                         RLNTH        5280.  REACH LENGTH
                           SEL        .0340  ENERGY SLOPE
                         ELMAX           .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                          CROSS-SECTION DATA
                                --- LEFT OVERBANK --- + ------ MAIN CHANNEL -------- + --- RIGHT OVERBANK ---
 28 RY          ELEVATION      5.00      5.00      5.00       .00       .00      5.00      5.00      5.00
 27 RX          DISTANCE        .00       .50      1.00    125.00    136.00    251.00    252.00    253.00

                                                  ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE        .00       .55      1.50      2.86      4.61      6.77      9.33     12.29     15.65     19.41
              OUTFLOW        .00     11.92     47.73    114.03    217.30    363.60    558.58    807.60   1115.75   1487.94
            ELEVATION        .00       .26       .53       .79      1.05      1.32      1.58      1.84      2.11      2.37

              STORAGE      23.57     28.13     33.10     38.47     44.23     50.40     56.97     63.94     71.32     79.09
              OUTFLOW    1928.88   2443.13   3035.11   3709.13   4469.36   5319.92   6264.79   7307.90   8453.08   9704.12
            ELEVATION        2.63      2.89      3.16      3.42      3.68      3.95      4.21      4.47      4.74      5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     6265. TO     9704.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                HYDROGRAPH AT STATION      RS1

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      24.92-HR
 +    (CFS)       (HR)
                          (CFS)
 +    1937.      12.42                   316.         99.          95.          95.
                          (INCHES)       1.531        1.912        1.913        1.913
                          (AC-FT)        157.         196.         196.         196.

 PEAK STORAGE    TIME                               MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR      24.92-HR
 +  (AC-FT)       (HR)
       12.       12.42                     3.           1.           1.           1.

   PEAK STAGE    TIME                                MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR      24.92-HR
 +    (FEET)      (HR)
       2.64      12.42                    .98          .52          .50          .50

                                CUMULATIVE AREA =    1.92 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
***

              **************
              *            *
  29 KK       *      S2    *
              *            *
              **************
                   SUB-BASIN SUB2
                   24-HOUR SCS TYPE II RAINFALL WAS USED TO FIND TC & R FOR THIS BASIN
                   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .990

             SUBBASIN RUNOFF DATA

  33 BA        SUBBASIN CHARACTERISTICS
                     TAREA          .25  SUBBASIN AREA

               PRECIPITATION DATA

  13 PB              STORM         3.76  BASIN TOTAL PRECIPITATION

  13 PI          INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .06       .06
                      .06       .06       .06       .06       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00

  34 LG        GREEN AND AMPT LOSS RATE
                     STRTL          .10  STARTING LOSS
                       DTH          .25  MOISTURE DEFICIT
                      PSIF         4.30  WETTING FRONT SUCTION
                     XKSAT          .50  HYDRAULIC CONDUCTIVITY
                     RTIMP        15.00  PERCENT IMPERVIOUS AREA

  35 UC        CLARK UNITGRAPH
                        TC          .34  TIME OF CONCENTRATION
                         R          .25  STORAGE COEFFICIENT

  36 UA        ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                        .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                     100.0

                                                    ***

                                             UNIT HYDROGRAPH PARAMETERS
                                        CLARK   TC=   .34 HR,       R=   .25 HR
                                       SNYDER   TP=   .23 HR,      CP=   .55

                                                    UNIT HYDROGRAPH
                                             18 END-OF-PERIOD ORDINATES
             62.       254.       373.       332.       261.       188.       134.        95.        68.        48.
             34.        25.        17.        12.         9.         6.         5.         3.

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

                         HYDROGRAPH AT STATION         S2

     TOTAL RAINFALL =     3.76, TOTAL LOSS =     2.39, TOTAL EXCESS =     1.38

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR          24-HR         72-HR       24.92-HR
 +   (CFS)       (HR)
                           (CFS)
 +     267.     12.08                  32.            9.            9.             9.
                         (INCHES)   1.205         1.369         1.370          1.370
                         (AC-FT)      16.           18.           18.            18.

                          CUMULATIVE AREA =      .25 SQ MI


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

              **************
              *            *
  38 KK       *     CP2    *
              *            *
```

....

SHEA BLVD CONCENTRATION POINT

40 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION CP2

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
2044.	12.42	(CFS)	349.	108.	104.	104.
		(INCHES)	1.494	1.849	1.851	1.851
		(AC-FT)	173.	214.	214.	214.

CUMULATIVE AREA = 2.17 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	S1	2010.	12.33	316.	99.	95.	1.92		
ROUTED TO	RS1	1937.	12.42	316.	99.	95.	1.92	2.64	12.42
HYDROGRAPH AT	S2	267.	12.08	32.	9.	9.	.25		
2 COMBINED AT	CP2	2044.	12.42	349.	108.	104.	2.17		

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

Case 1

Dry Conditions (AMC I)

6-hr storm

```
1*****************************************
*****************************************
*                                       *                                       *
*                                       *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *   U.S. ARMY CORPS OF ENGINEERS
*                                       *                                       *
*            SEPTEMBER 1990             *                                       *   HYDROLOGIC ENGINEERING CENTER
*                                       *                                       *
*             VERSION 4.0               *                                       *        609 SECOND STREET
*                                       *                                       *
*                                       *                                       *      DAVIS, CALIFORNIA 95616
*                                       *                                       *
*  RUN DATE  04/22/1994  TIME  14:40:04 *                                       *          (916) 756-1104
*                                       *                                       *
*                                       *                                       *
*****************************************
*****************************************
```

```
X      X  XXXXXXX   XXXXX           X
X      X  X        X     X         XX
X      X  X        X               X
XXXXXXX  XXXX     X         XXXXX  X
X      X  X        X               X
X      X  X        X     X         X
X      X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID   Sub-basin 1 has been further divivded into six sub-basins. 03-01-94
   2          ID   The cross section for the routing reaches are estimated from a 2' conotur
   3          ID   map of the area.
              *DIAGRAM
   4          IT       5                    300
   5          IO       3

   6          KK     S1B
   7          KM   SUB-BASIN S1B
   8          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
   9          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  10          BA    .230
  11          IN      15
  12          KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  13          PB   3.142
  14          KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.73
  15          PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .075
  16          PC    .087    .100    .119    .156    .242    .431    .731    .857    .908    .941
  17          PC    .953    .965    .977    .989   1.000
  18          LG    .200    .350   4.300    .500  35.000
  19          UC    .383    .264
  20          UA       0       3       5       8      12      20      43      75      90      96
  21          UA     100

  22          KK    RS1B
  23          KM    ROUTING THROUGH S1C
  24          RS       2    FLOW      -1
  25          RC    .035    .035    .035    2138    .028
  26          RX       0      36      66      90     126     150     168     228
  27          RY       7       7       7       0       0       4       6      22

  28          KK     S1A
  29          KM   SUB-BASIN S1A
  30          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
  31          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  32          BA    .330
  33          LG    .200    .350   4.300    .500  35.000
  34          UC    .346    .176
  35          UA       0       3       5       8      12      20      43      75      90      96
  36          UA     100

  37          KK    RS1A
  38          KM    ROUTING THROUGH S1C
  39          RS       2    FLOW      -1
  40          RC    .035    .035    .035    2025    .030
  41          RX       0     0.5       1     126     136     251     252     253
  42          RY       5       5       5       0       0       5       5       5

  43          KK     S1C
  44          KM   SUB-BASIN S1C
  45          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
  46          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  47          BA    .110
  48          LG    .200    .350   4.300    .500  35.000
  49          UC    .321    .258
  50          UA       0       3       5       8      12      20      43      75      90      96
  51          UA     100

  52          KK    CP1C
  53          KM    ADDITION OF 3 HYDROGRAPHS
  54          HC       3
```

```
55          KK   RCP1C
56          KM    ROUTING THROUGH S1E
57          RS       2     FLOW      -1
58          RC    .035     .035     .035     3600     .017
59          RX       0       42       72       84      120      138      180      216
60          RY       9      8.5        4        0        0        4        6        8

61          KK     S1D
62          KM   SUB-BASIN S1D
63          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
64          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
65          BA    .310
66          LG    .200     .350    4.300     .500   35.000
67          UC    .354     .200
68          UA       0        3        5        8       12       20       43       75       90       96
69          UA     100

70          KK    RS1D
71          KM    ROUTING THROUGH S1E
72          RS       2     FLOW      -1
73          RC    .035     .035     .035     2138     .019
74          RX       0       36       72       96      132      168      204      240
75          RY       8        6        4        0        0        8       10       11

76          KK     S1E
77          KM   SUB-BASIN S1E
78          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
79          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
80          BA    .510
81          LG    .200     .350    4.300     .500   35.000
82          UC    .429     .239
83          UA       0        3        5        8       12       20       43       75       90       96
84          UA     100

85          KK    CP1E
86          KM    CONCENTRATION OF 3 HYDROGRAPHS
87          HC       3

88          KK   RCP1E
89          KM    ROUTING THROUGH S1F
90          RS       2     FLOW      -1
91          RC    .035     .035     .035     2250     .014
92          RX       0       48       84      120      144      180      240      288
93          RY      12       10        6        2        0        8       10       11
94          KK     S1F
95          KM   SUB-BASIN S1F
96          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
97          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
98          BA    .280
99          LG    .200     .350    4.300     .500   35.000
100         UC    .404     .293
101         UA       0        3        5        8       12       20       43       75       90       96
102         UA     100

103         KK    CP1F
104         HC       2
105         ZZ
```

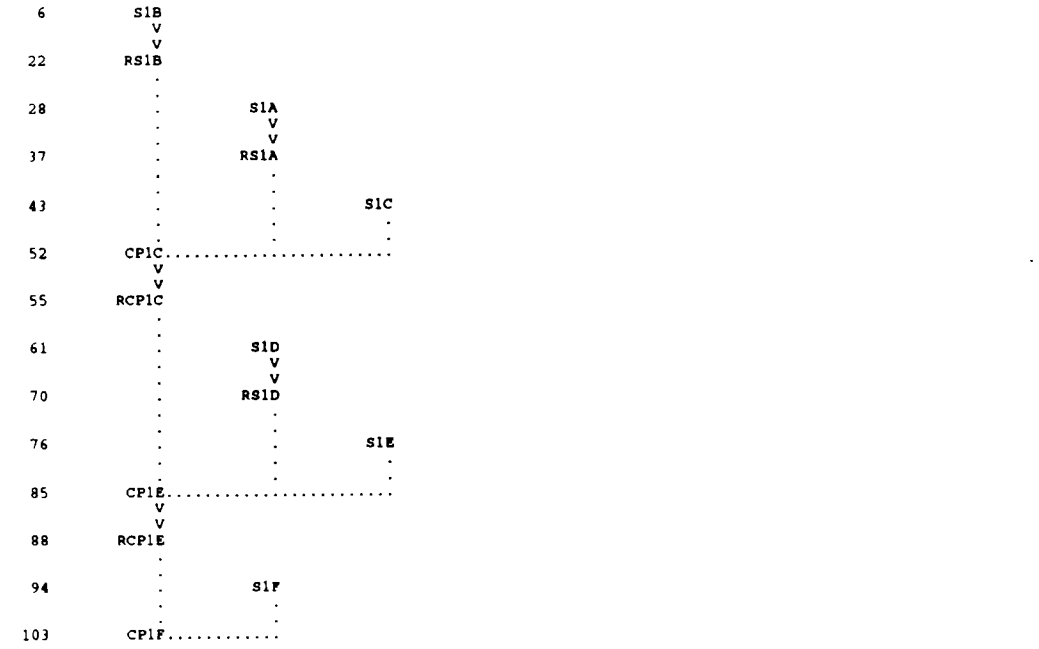
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
                    Sub-basin 1 has been further divivded into six sub-basins. 03-01-94
                    The cross section for the routing reaches are estimated from a 2' conotur
                    map of the area.

  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

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


          *************
          *           *
  6 KK    *       S1B *
          *           *
          *************
                    SUB-BASIN S1B
                    6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
                    RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                    THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.73

 11 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN          15  TIME INTERVAL IN MINUTES
                    JXDATE      1    0  STARTING DATE
                    JXTIME          0  STARTING TIME

            SUBBASIN RUNOFF DATA

 10 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .23  SUBBASIN AREA

            PRECIPITATION DATA

 14 PB              STORM        3.14  BASIN TOTAL PRECIPITATION

 14 PI          INCREMENTAL PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                   .03       .03       .06       .06       .06       .10       .10       .10       .04       .04
                   .04       .02       .02       .02       .01       .01       .01       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00

 18 LG          GREEN AND AMPT LOSS RATE
                     STRTL         .20  STARTING LOSS
                       DTH         .35  MOISTURE DEFICIT
                      PSIF        4.30  WETTING FRONT SUCTION
                     XKSAT         .50  HYDRAULIC CONDUCTIVITY
                     RTIMP       35.00  PERCENT IMPERVIOUS AREA

 19 UC          CLARK UNITGRAPH
                        TC         .38  TIME OF CONCENTRATION
                         R         .26  STORAGE COEFFICIENT

 20 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                       .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                    100.0


                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .38 HR,       R=    .26 HR
                                         SNYDER   TP=    .33 HR,      CP=    .74

                                                UNIT HYDROGRAPH
                                          20 END-OF-PERIOD ORDINATES
                    13.       46.      165.      313.      325.      250.      182.      133.       96.       70.
                    51.       37.       27.       20.       14.       10.        8.        5.        4.        3.

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

                          HYDROGRAPH AT STATION      S1B

     TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.40, TOTAL EXCESS =    1.75

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR      24.92-HR
+    (CFS)        (HR)
                  (CFS)
+     293.        4.25                  43.          11.          10.          10.
                (INCHES)              1.729        1.738        1.738        1.738
                (AC-FT)                 21.          21.          21.          21.

                          CUMULATIVE AREA =      .23 SQ MI
```

```
          **************
          *            *
22 KK     *     RS1B   *
          *            *
          **************
                    ROUTING THROUGH S1C

   HYDROGRAPH ROUTING DATA

24 RS       STORAGE ROUTING
                NSTPS          2  NUMBER OF SUBREACHES
                ITYP       FLOW   TYPE OF INITIAL CONDITION
              RSVRIC      -1.00   INITIAL CONDITION
                   X        .00 WORKING R AND D COEFFICIENT

25 RC       NORMAL DEPTH CHANNEL
                 ANL       .035  LEFT OVERBANK N-VALUE
                ANCH       .035  MAIN CHANNEL N-VALUE
                 ANR       .035  RIGHT OVERBANK N-VALUE
               RLNTH      2138.  REACH LENGTH
                 SEL      .0280  ENERGY SLOPE
               ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                  CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
27 RY       ELEVATION      7.00     7.00     7.00      .00      .00     4.00     6.00    22.00
26 RX       DISTANCE        .00    36.00    66.00    90.00   126.00   150.00   168.00   228.00

                                                  ***

                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     2.36     5.33     8.93    13.18    18.22    23.97    33.67    43.79    54.16
          OUTFLOW        .00   345.95  1171.35  2460.91  4359.06  6925.29 10154.22 14907.03 21059.23 28402.44
        ELEVATION        .00     1.16     2.32     3.47     4.63     5.79     6.95     8.11     9.26    10.42

          STORAGE      64.77    75.63    86.74    98.09   109.69   121.54   133.63   145.97   158.56   171.39
          OUTFLOW   36860.36 46388.17 56956.44 68544.80 81138.85 94728.38 109306.30 124867.80 141409.90 158931.20
        ELEVATION      11.58    12.74    13.89    15.05    16.21    17.37    18.53    19.68    20.84    22.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO   158931.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                      HYDROGRAPH AT STATION     RS1B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     24.92-HR
+    (CFS)     (HR)
                          (CFS)
+     284.     4.33                43.          11.          10.          10.
                        (INCHES)   1.729        1.738        1.738        1.738
                        (AC-FT)      21.          21.          21.          21.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                    6-HR        24-HR        72-HR     24.92-HR
+  (AC-FT)     (HR)
        1.     4.33                 0.           0.           0.           0.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR        24-HR        72-HR     24.92-HR
+    (FEET)    (HR)
         .95   4.33                 .14          .04          .03          .03

                      CUMULATIVE AREA =      .23 SQ MI


          **************
          *            *
28 KK     *     S1A    *
          *            *
          **************
                    SUB-BASIN S1A
                    6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

   SUBBASIN RUNOFF DATA

32 BA       SUBBASIN CHARACTERISTICS
              TAREA         .33  SUBBASIN AREA

            PRECIPITATION DATA

14 PB            STORM       3.14  BASIN TOTAL PRECIPITATION

14 PI          INCREMENTAL PRECIPITATION PATTERN
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                 .03      .03      .06      .06      .06      .10      .10      .10      .04      .04
                 .04      .02      .02      .02      .01      .01      .01      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00

33 LG       GREEN AND AMPT LOSS RATE
              STRTL         .20  STARTING LOSS
                DTH         .35  MOISTURE DEFICIT
               PSIF        4.30  WETTING FRONT SUCTION
              XKSAT         .50  HYDRAULIC CONDUCTIVITY
              RTIMP       35.00  PERCENT IMPERVIOUS AREA
```

```
34 UC          CLARK UNITGRAPH
                        TC         .35  TIME OF CONCENTRATION
                        R          .18  STORAGE COEFFICIENT

35 UA            ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                   100.0

                                                      ***

                                                 UNIT HYDROGRAPH PARAMETERS
                                            CLARK   TC=    .35 HR,       R=    .18 HR
                                            SNYDER  TP=    .30 HR,      CP=    .94

                                                 UNIT HYDROGRAPH
                                            14 END-OF-PERIOD ORDINATES
                      30.       109.      421.      651.      507.      320.      198.      122.       75.       46.
                      29.        18.       11.        7.

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

                                HYDROGRAPH AT STATION      S1A

           TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.40, TOTAL EXCESS =    1.75

        PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                                6-HR       24-HR       72-HR      24.92-HR
      +   (CFS)       (HR)
                                  (CFS)
      +    485.       4.17                     61.         15.         15.         15.
                                (INCHES)      1.732       1.738       1.738       1.738
                                (AC-FT)         30.         31.         31.         31.

                                CUMULATIVE AREA =      .33 SQ MI


                    **************
                    *            *
          37 KK     *     RS1A   *
                    *            *
                    **************
                                ROUTING THROUGH S1C

                    HYDROGRAPH ROUTING DATA

          39 RS       STORAGE ROUTING
                            NSTPS          2  NUMBER OF SUBREACHES
                            ITYP        FLOW  TYPE OF INITIAL CONDITION
                           RSVRIC       -1.00  INITIAL CONDITION
                                X         .00 WORKING R AND D COEFFICIENT

          40 RC       NORMAL DEPTH CHANNEL
                             ANL        .035  LEFT OVERBANK N-VALUE
                            ANCH        .035  MAIN CHANNEL N-VALUE
                             ANR        .035  RIGHT OVERBANK N-VALUE
                            RLNTH      2025.  REACH LENGTH
                              SEL      .0300  ENERGY SLOPE
                            ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                                --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
          42 RY       ELEVATION      5.00      5.00      5.00       .00       .00      5.00      5.00      5.00
          41 RX       DISTANCE        .00       .50      1.00    126.00    136.00    251.00    252.00    253.00

                                                      ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                     STORAGE         .00       .20       .55      1.06      1.73      2.54      3.52      4.64      5.92      7.36
                     OUTFLOW         .00     10.45     42.58    102.85    197.47    332.19    512.38    743.12   1029.24   1375.37
                   ELEVATION         .00       .26       .53       .79      1.05      1.32      1.58      1.84      2.11      2.37

                     STORAGE        8.95     10.69     12.59     14.65     16.86     19.22     21.74     24.41     27.24     30.22
                     OUTFLOW     1785.98   2265.39   2817.77   3447.19   4157.62   4952.92   5836.87   6813.18   7885.47   9057.32
                   ELEVATION        2.63      2.89      3.16      3.42      3.68      3.95      4.21      4.47      4.74      5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      197. TO     9057.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                HYDROGRAPH AT STATION     RS1A

        PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                                6-HR       24-HR       72-HR      24.92-HR
      +   (CFS)       (HR)
                                  (CFS)
      +    474.       4.25                     61.         15.         15.         15.
                                (INCHES)      1.730       1.738       1.738       1.738
                                (AC-FT)         30.         31.         31.         31.

        PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                                6-HR       24-HR       72-HR      24.92-HR
      +   (AC-FT)     (HR)
                2.      4.25                      0.          0.          0.          0.

        PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                                6-HR       24-HR       72-HR      24.92-HR
      +   (FEET)      (HR)
              1.52      4.25                    .43         .11         .11         .11

                                CUMULATIVE AREA =      .33 SQ MI
```

```
**************
*            *
43 KK    *   S1C   *
*            *
**************
                SUB-BASIN S1C
                6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

          SUBBASIN RUNOFF DATA

47 BA       SUBBASIN CHARACTERISTICS
              TAREA          .11  SUBBASIN AREA

            PRECIPITATION DATA

14 PB            STORM        3.14  BASIN TOTAL PRECIPITATION

14 PI         INCREMENTAL PRECIPITATION PATTERN
              .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
              .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
              .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
              .00    .00    .00    .01    .01    .01    .01    .01    .01    .03
              .03    .03    .06    .06    .06    .10    .10    .10    .04    .04
              .04    .02    .02    .02    .01    .01    .01    .00    .00    .00
              .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
              .00    .00

48 LG       GREEN AND AMPT LOSS RATE
              STRTL          .20  STARTING LOSS
                DTH          .35  MOISTURE DEFICIT
               PSIF         4.30  WETTING FRONT SUCTION
              XKSAT          .50  HYDRAULIC CONDUCTIVITY
              RTIMP        35.00  PERCENT IMPERVIOUS AREA

49 UC       CLARK UNITGRAPH
                TC           .32  TIME OF CONCENTRATION
                 R           .26  STORAGE COEFFICIENT

50 UA       ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                .0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
             100.0

                                                  ***

                                          UNIT HYDROGRAPH PARAMETERS
                                    CLARK   TC=    .32 HR,       R=    .26 HR
                                   SNYDER   TP=    .30 HR,      CP=    .77

                                          UNIT HYDROGRAPH
                                    19 END-OF-PERIOD ORDINATES
                8.      35.     120.     176.     143.     103.      74.      54.      39.      28.
               20.      15.      11.       8.       5.       4.       3.       2.       1.

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

                   HYDROGRAPH AT STATION      S1C

    TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.40, TOTAL EXCESS =    1.75

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR      24.92-HR
+   (CFS)       (HR)
                          (CFS)
+    143.      4.17                20.           5.           5.           5.
                       (INCHES)   1.729        1.737        1.737        1.737
                        (AC-FT)      10.          10.          10.          10.

                   CUMULATIVE AREA =     .11 SQ MI

**************
*            *
52 KK    *   CP1C  *
*            *
**************
                ADDITION OF 3 HYDROGRAPHS

54 HC       HYDROGRAPH COMBINATION
              ICOMP            3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                   HYDROGRAPH AT STATION     CP1C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR      24.92-HR
+   (CFS)       (HR)
                          (CFS)
+    884.      4.25                125.          31.          30.          30.
                       (INCHES)   1.729        1.738        1.738        1.738
                        (AC-FT)      62.          62.          62.          62.

                   CUMULATIVE AREA =     .67 SQ MI


**************
*            *
55 KK    *   RCP1C  *
*            *
**************
                ROUTING THROUGH S1E

          HYDROGRAPH ROUTING DATA

57 RS       STORAGE ROUTING
              NSTPS            2  NUMBER OF SUBREACHES
```

```
                    ITYP        FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC       -1.00  INITIAL CONDITION
                       X         .00 WORKING R AND D COEFFICIENT

 58 RC          NORMAL DEPTH CHANNEL
                     ANL        .035  LEFT OVERBANK N-VALUE
                    ANCH        .035  MAIN CHANNEL N-VALUE
                     ANR        .035  RIGHT OVERBANK N-VALUE
                   RLNTH       3600.  REACH LENGTH
                     SEL       .0170  ENERGY SLOPE
                   ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 60 RY          ELEVATION      9.00      8.50      4.00       .00       .00      4.00      6.00      8.00
 59 RX          DISTANCE        .00     42.00     72.00     84.00    120.00    138.00    180.00    216.00

                                                      ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE        .00      1.48      3.10      4.85      6.75      8.78     10.96     13.27     15.72     18.37
              OUTFLOW        .00     58.41    188.69    377.96    622.76    922.11   1276.11   1685.47   2151.21   2724.73
            ELEVATION        .00       .47       .95      1.42      1.89      2.37      2.84      3.32      3.79      4.26

              STORAGE      21.50     25.14     29.29     33.95     39.08     44.67     50.72     57.22     63.98     71.65
              OUTFLOW    3415.48   4202.95   5100.50   6121.38   7275.86   8568.21  10006.23  11609.31  13438.61  15242.29
            ELEVATION        4.74      5.21      5.68      6.16      6.63      7.11      7.58      8.05      8.53      9.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      623. TO    15242.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                HYDROGRAPH AT STATION    RCP1C

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     24.92-HR
+    (CFS)       (HR)
                                (CFS)
+     856.      4.33                       124.         31.          30.         30.
                                (INCHES)  1.726       1.738        1.738       1.738
                                (AC-FT)     62.         62.          62.         62.

 PEAK STORAGE   TIME                                MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR     24.92-HR
+  (AC-FT)       (HR)
        4.      4.33                         1.          0.           0.          0.

  PEAK STAGE    TIME                                MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR     24.92-HR
+    (FEET)      (HR)
      2.26      4.33                       .51         .13          .12         .12

                          CUMULATIVE AREA =      .67 SQ MI

                ********************
                *                  *
 61 KK          *       S1D        *
                *                  *
                ********************
                          SUB-BASIN S1D
                          6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                          THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

                     SUBBASIN RUNOFF DATA

 65 BA                 SUBBASIN CHARACTERISTICS
                            TAREA         .31  SUBBASIN AREA

                     PRECIPITATION DATA

 14 PB                      STORM        3.14  BASIN TOTAL PRECIPITATION

 14 PI                   INCREMENTAL PRECIPITATION PATTERN
                           .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                           .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                           .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                           .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                           .03       .03       .06       .06       .06       .10       .10       .10       .04       .04
                           .04       .02       .02       .02       .01       .01       .01       .00       .00       .00
                           .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                           .00       .00

 66 LG                 GREEN AND AMPT LOSS RATE
                            STRTL         .20  STARTING LOSS
                              DTH         .35  MOISTURE DEFICIT
                             PSIF        4.30  WETTING FRONT SUCTION
                            XKSAT         .50  HYDRAULIC CONDUCTIVITY
                            RTIMP       35.00  PERCENT IMPERVIOUS AREA

 67 UC                 CLARK UNITGRAPH
                               TC         .35  TIME OF CONCENTRATION
                                R         .20  STORAGE COEFFICIENT

 68 UA                 ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                           .0        3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                        100.0

                                                      ***

                                          UNIT HYDROGRAPH PARAMETERS
                                    CLARK   TC=    .35 HR,       R=    .20 HR
                                   SNYDER   TP=    .31 HR,      CP=    .88
```

UNIT HYDROGRAPH

16 END-OF-PERIOD ORDINATES

25.	90.	348.	559.	466.	315.	206.	135.	89.	58.
38.	25.	16.	11.	7.	5.				

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

HYDROGRAPH AT STATION S1D

TOTAL RAINFALL = 3.14, TOTAL LOSS = 1.40, TOTAL EXCESS = 1.75

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)	58.	14.	14.	14.
435.	4.17	(INCHES)	1.732	1.739	1.739	1.739
		(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .31 SQ MI

```
**************
*            *
*     RS1D   *
*            *
**************
```

ROUTING THROUGH S1E

HYDROGRAPH ROUTING DATA

72 RS STORAGE ROUTING

NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

73 RC NORMAL DEPTH CHANNEL

ANL	.035	LEFT OVERBANK N-VALUE
ANCH	.035	MAIN CHANNEL N-VALUE
ANR	.035	RIGHT OVERBANK N-VALUE
RLNTH	2138.	REACH LENGTH
SEL	.0190	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL -------		+ --- RIGHT OVERBANK ---		
75 RY	ELEVATION	8.00	6.00	4.00	.00	.00	8.00	10.00	11.00
74 RX	DISTANCE	.00	36.00	72.00	96.00	132.00	168.00	204.00	240.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.11	2.39	3.85	5.47	7.27	9.25	11.39	13.83	16.63
OUTFLOW	.00	87.48	287.26	585.30	981.04	1477.11	2077.41	2793.79	3704.40	4759.75
ELEVATION	.00	.58	1.16	1.74	2.32	2.89	3.47	4.05	4.63	5.21
STORAGE	19.81	23.36	27.27	31.56	36.21	41.19	46.46	52.03	57.97	64.49
OUTFLOW	5978.62	7377.05	8969.73	10770.46	12852.95	15450.52	18309.76	21440.18	24830.59	28537.45
ELEVATION	5.79	6.37	6.95	7.53	8.11	8.68	9.26	9.84	10.42	11.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 87. TO 28537.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RS1D

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)	58.	14.	14.	14.
430.	4.25	(INCHES)	1.731	1.739	1.739	1.739
		(AC-FT)	29.	29.	29.	29.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
2.	4.25	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				
1.43	4.25	.27	.07	.06	.06

CUMULATIVE AREA = .31 SQ MI

```
**************
*            *
*     S1E    *
*            *
**************
```

SUB-BASIN S1E
6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

SUBBASIN RUNOFF DATA

80 BA SUBBASIN CHARACTERISTICS

TAREA	.51	SUBBASIN AREA

PRECIPITATION DATA

```
14 PB              STORM        3.14  BASIN TOTAL PRECIPITATION

14 PI          INCREMENTAL PRECIPITATION PATTERN
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                  .03      .03      .06      .06      .06      .10      .10      .10      .04      .04
                  .04      .02      .02      .02      .01      .01      .01      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00

81 LG          GREEN AND AMPT LOSS RATE
                 STRTL        .20  STARTING LOSS
                   DTH        .35  MOISTURE DEFICIT
                  PSIF       4.30  WETTING FRONT SUCTION
                 XKSAT        .50  HYDRAULIC CONDUCTIVITY
                 RTIMP      35.00  PERCENT IMPERVIOUS AREA

82 UC          CLARK UNITGRAPH
                    TC        .43  TIME OF CONCENTRATION
                     R        .24  STORAGE COEFFICIENT

83 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                    .0      3.0      5.0      8.0     12.0     20.0     43.0     75.0     90.0     96.0
                 100.0

                                                  ***

                                          UNIT HYDROGRAPH PARAMETERS
                                    CLARK   TC=   .43 HR,      R=   .24 HR
                                   SNYDER   TP=   .37 HR,     CP=   .91

                                          UNIT HYDROGRAPH
                                  19 END-OF-PERIOD ORDINATES
                  29.      88.     262.     624.     789.     634.     452.     318.     224.     157.
                 111.      78.      55.      38.      27.      19.      13.       9.       7.

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

                      HYDROGRAPH AT STATION      S1E

   TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.40, TOTAL EXCESS =    1.75

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                 (CFS)
+    669.      4.25                  95.         24.         23.          23.
                (INCHES)          1.730       1.738       1.738        1.738
                (AC-FT)             47.         47.         47.          47.

                      CUMULATIVE AREA =     .51 SQ MI

            **************
            *            *
85 KK       *      CP1E  *
            *            *
            **************
                      CONCENTRATION OF 3 HYDROGRAPHS

87 HC          HYDROGRAPH COMBINATION
                  ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                      HYDROGRAPH AT STATION      CP1E

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                 (CFS)
+   1894.      4.33                 277.         70.         67.          67.
                (INCHES)          1.727       1.738       1.738        1.738
                (AC-FT)             137.        138.        138.         138.

                      CUMULATIVE AREA =    1.49 SQ MI

            **************
            *            *
88 KK       *     RCP1E  *
            *            *
            **************
                      ROUTING THROUGH S1F

   HYDROGRAPH ROUTING DATA

90 RS          STORAGE ROUTING
                 NSTPS           2  NUMBER OF SUBREACHES
                  ITYP        FLOW  TYPE OF INITIAL CONDITION
                RSVRIC       -1.00  INITIAL CONDITION
                     X         .00 WORKING R AND D COEFFICIENT

91 RC          NORMAL DEPTH CHANNEL
                   ANL        .035  LEFT OVERBANK N-VALUE
                  ANCH        .035  MAIN CHANNEL N-VALUE
                   ANR        .035  RIGHT OVERBANK N-VALUE
                 RLNTH      2250.  REACH LENGTH
                   SEL       .0140  ENERGY SLOPE
                 ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
93 RY       ELEVATION     12.00     10.00      6.00      2.00       .00       8.00     10.00     11.00
92 RX       DISTANCE        .00     48.00     84.00    120.00    144.00    180.00    240.00    288.00
```

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.17	.68	1.53	2.70	4.15	5.87	7.87	10.16	12.72
OUTFLOW	.00	7.64	40.51	143.03	311.81	560.81	899.18	1336.76	1883.00	2546.97
ELEVATION	.00	.63	1.26	1.89	2.53	3.16	3.79	4.42	5.05	5.68
STORAGE	15.56	18.67	22.07	25.77	30.16	35.35	41.35	48.61	57.17	66.32
OUTFLOW	3400.40	4451.38	5646.69	7038.90	8710.76	10627.37	12804.66	15245.51	18227.79	21727.64
ELEVATION	6.32	6.95	7.58	8.21	8.84	9.47	10.11	10.74	11.37	12.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 312. TO 21728.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RCP1E

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)				
+ 1895.	4.33		277.	70.	67.	67.
		(INCHES)	1.726	1.738	1.738	1.738
		(AC-FT)	137.	138.	138.	138.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
5.	4.33	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
5.06	4.33	1.84	.49	.47	.47

CUMULATIVE AREA = 1.49 SQ MI

```
**************
*            *
*     S1F    *
*            *
**************
```

94 KK

SUB-BASIN S1F
6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

SUBBASIN RUNOFF DATA

98 BA SUBBASIN CHARACTERISTICS
TAREA .28 SUBBASIN AREA

PRECIPITATION DATA

14 PB STORM 3.14 BASIN TOTAL PRECIPITATION

14 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.06	.06	.06	.10	.10	.10	.04	.04
.04	.02	.02	.02	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

99 LG GREEN AND AMPT LOSS RATE
STRTL .20 STARTING LOSS
DTH .35 MOISTURE DEFICIT
PSIF 4.30 WETTING FRONT SUCTION
XKSAT .50 HYDRAULIC CONDUCTIVITY
RTIMP 35.00 PERCENT IMPERVIOUS AREA

100 UC CLARK UNITGRAPH
TC .40 TIME OF CONCENTRATION
R .29 STORAGE COEFFICIENT

101 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	3.0	5.0	8.0	12.0	20.0	43.0	75.0	90.0	96.0
100.0									

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .40 HR, R= .29 HR
SNYDER TP= .36 HR, CP= .77

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

14.	46.	153.	327.	383.	310.	233.	175.	131.	99.
74.	56.	42.	31.	24.	18.	13.	10.	8.	6.
4.	3.								

HYDROGRAPH AT STATION S1F

TOTAL RAINFALL = 3.14, TOTAL LOSS = 1.40, TOTAL EXCESS = 1.75

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)				
+ 343.	4.25		52.	13.	13.	13.
		(INCHES)	1.728	1.738	1.738	1.738
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .28 SQ MI

```
              **************
              *            *
 103 KK       *    CP1F    *
              *            *
              **************

 104 HC            HYDROGRAPH COMBINATION
                       ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                       ***

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

                              HYDROGRAPH AT STATION      CP1F

  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                            6-HR          24-HR         72-HR        24.92-HR
+    (CFS)         (HR)
                              (CFS)
+     2220.        4.33                        329.            83.            80.            80.
                             (INCHES)         1.726          1.738          1.738          1.738
                              (AC-FT)          163.           164.           164.           164.

                            CUMULATIVE AREA =     1.77 SQ MI
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
+	HYDROGRAPH AT	S1B	293.	4.25	43.	11.	10.	.23		
+	ROUTED TO	RS1B	284.	4.33	43.	11.	10.	.23		
+									.95	4.33
+	HYDROGRAPH AT	S1A	485.	4.17	61.	15.	15.	.33		
+	ROUTED TO	RS1A	474.	4.25	61.	15.	15.	.33		
+									1.52	4.25
+	HYDROGRAPH AT	S1C	143.	4.17	20.	5.	5.	.11		
+	3 COMBINED AT	CP1C	884.	4.25	125.	31.	30.	.67		
+	ROUTED TO	RCP1C	856.	4.33	124.	31.	30.	.67		
+									2.26	4.33
+	HYDROGRAPH AT	S1D	435.	4.17	58.	14.	14.	.31		
+	ROUTED TO	RS1D	430.	4.25	58.	14.	14.	.31		
+									1.43	4.25
+	HYDROGRAPH AT	S1E	669.	4.25	95.	24.	23.	.51		
+	3 COMBINED AT	CP1E	1894.	4.33	277.	70.	67.	1.49		
+	ROUTED TO	RCP1E	1895.	4.33	277.	70.	67.	1.49		
+									5.06	4.33
+	HYDROGRAPH AT	S1F	343.	4.25	52.	13.	13.	.28		
+	2 COMBINED AT	CP1F	2220.	4.33	329.	83.	80.	1.77		

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

Case 1

Normal Conditions (AMC II)

6-hr storm

```
1*****************************************
*****************************************
*                                       *
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                                       *
*            SEPTEMBER 1990             *
*                                       *
*             VERSION 4.0               *
*                                       *
*                                       *
*                                       *
*  RUN DATE  04/22/1994  TIME  14:42:01 *
*                                       *
*                                       *
*                                       *
*****************************************
*****************************************
```

```
*                                       *
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID   Sub-basin 1 has been further divivded into six sub-basins. 03-01-94
   2          ID   The cross section for the routing reaches are estimated from a 2' conotur
   3          ID   map of the area.
              *DIAGRAM
   4          IT       5                    300
   5          IO       3

   6          KK     S1B
   7          KM   SUB-BASIN S1B
   8          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
   9          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  10          BA    .230
  11          IN      15
  12          KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  13          PB   3.142
  14          KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.73
  15          PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .075
  16          PC    .087    .100    .119    .156    .242    .431    .731    .857    .908    .941
  17          PC    .953    .965    .977    .989   1.000
  18          LG    .200    .250   4.300    .500  35.000
  19          UC    .383    .264
  20          UA       0       3       5       8      12      20      43      75      90      96
  21          UA     100

  22          KK    RS1B
  23          KM    ROUTING THROUGH S1C
  24          RS       2    FLOW      -1
  25          RC    .035    .035    .035    2138    .028
  26          RX       0      36      66      90     126     150     168     228
  27          RY       7       7       7       0       0       4       6      22

  28          KK     S1A
  29          KM   SUB-BASIN S1A
  30          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
  31          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  32          BA    .330
  33          LG    .200    .250   4.300    .500  35.000
  34          UC    .346    .176
  35          UA       0       3       5       8      12      20      43      75      90      96
  36          UA     100

  37          KK    RS1A
  38          KM    ROUTING THROUGH S1C
  39          RS       2    FLOW      -1
  40          RC    .035    .035    .035    2025    .030
  41          RX       0     0.5       1     126     136     251     252     253
  42          RY       5       5       5       0       0       5       5       5

  43          KK     S1C
  44          KM   SUB-BASIN S1C
  45          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
  46          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
  47          BA    .110
  48          LG    .200    .250   4.300    .500  35.000
  49          UC    .321    .258
  50          UA       0       3       5       8      12      20      43      75      90      96
  51          UA     100

  52          KK    CP1C
  53          KM    ADDITION OF 3 HYDROGRAPHS
  54          HC       3
```

```
55          KK   RCP1C
56          KM    ROUTING THROUGH S1E
57          RS       2     FLOW       -1
58          RC    .035     .035     .035     3600     .017
59          RX       0       42       72       84      120      138      180      216
60          RY       9      8.5        4        0        0        4        6        8

61          KK     S1D
62          KM   SUB-BASIN S1D
63          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
64          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
65          BA    .310
66          LG    .200     .250    4.300     .500   35.000
67          UC    .354     .200
68          UA       0        3        5        8       12       20       43       75       90       96
69          UA     100

70          KK    RS1D
71          KM    ROUTING THROUGH S1E
72          RS       2     FLOW       -1
73          RC    .035     .035     .035     2138     .019
74          RX       0       36       72       96      132      168      204      240
75          RY       8        6        4        0        0        8       10       11

76          KK     S1E
77          KM   SUB-BASIN S1E
78          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
79          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
80          BA    .510
81          LG    .200     .250    4.300     .500   35.000
82          UC    .429     .239
83          UA       0        3        5        8       12       20       43       75       90       96
84          UA     100

85          KK    CP1E
86          KM    CONCENTRATION OF 3 HYDROGRAPHS
87          HC       3

88          KK   RCP1E
89          KM    ROUTING THROUGH S1F
90          RS       2     FLOW       -1
91          RC    .035     .035     .035     2250     .014
92          RX       0       48       84      120      144      180      240      288
93          RY      12       10        6        2        0        8       10       11
94          KK     S1F
95          KM   SUB-BASIN S1F
96          KM   6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
97          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
98          BA    .280
99          LG    .200     .250    4.300     .500   35.000
100         UC    .404     .293
101         UA       0        3        5        8       12       20       43       75       90       96
102         UA     100

103         KK    CP1F
104         HC       2
105         ZZ
```

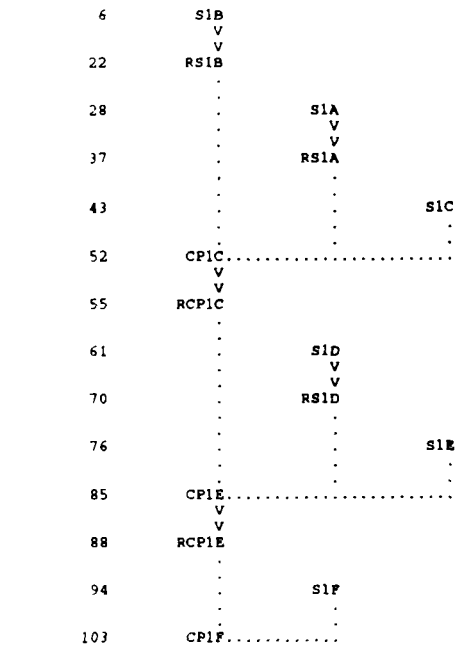
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
                    Sub-basin 1 has been further divivded into six sub-basins. 03-01-94
                    The cross section for the routing reaches are estimated from a 2' conotur
                    map of the area.

 5 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN           5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1    0  STARTING DATE
                    ITIME         0000  STARTING TIME
                       NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2    0  ENDING DATE
                   NDTIME         0055  ENDING TIME
                    ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

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



          *************
          *           *
 6 KK     *      S1B  *
          *           *
          *************
                    SUB-BASIN S1B
                    6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982
                    RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                    THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.73

11 IN          TIME DATA FOR INPUT TIME SERIES
                    JXMIN          15  TIME INTERVAL IN MINUTES
                   JXDATE      1    0  STARTING DATE
                   JXTIME           0  STARTING TIME

             SUBBASIN RUNOFF DATA

10 BA          SUBBASIN CHARACTERISTICS
                    TAREA        .23  SUBBASIN AREA

               PRECIPITATION DATA

14 PB               STORM       3.14  BASIN TOTAL PRECIPITATION

14 PI            INCREMENTAL PRECIPITATION PATTERN
                    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                    .00    .00    .00    .01    .01    .01    .01    .01    .01    .03
                    .03    .03    .06    .06    .06    .10    .10    .10    .04    .04
                    .04    .02    .02    .02    .01    .01    .01    .00    .00    .00
                    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                    .00    .00

18 LG          GREEN AND AMPT LOSS RATE
                    STRTL        .20  STARTING LOSS
                      DTH        .25  MOISTURE DEFICIT
                     PSIF       4.30  WETTING FRONT SUCTION
                    XKSAT        .50  HYDRAULIC CONDUCTIVITY
                    RTIMP      35.00  PERCENT IMPERVIOUS AREA

19 UC          CLARK UNITGRAPH
                       TC        .38  TIME OF CONCENTRATION
                        R        .26  STORAGE COEFFICIENT

20 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                    .0     3.0    5.0    8.0   12.0   20.0   43.0   75.0   90.0   96.0
                  100.0


                                        UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=   .38 HR,      R=   .26 HR
                                  SNYDER   TP=   .33 HR,     CP=   .74

                                        UNIT HYDROGRAPH
                                  20 END-OF-PERIOD ORDINATES
                13.    46.   165.   313.   325.   250.   182.   133.    96.    70.
                51.    37.    27.    20.    14.    10.     8.     5.     4.     3.

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

                        HYDROGRAPH AT STATION      S1B

     TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.31, TOTAL EXCESS =    1.83

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+    307.       4.25          45.         11.         11.         11.
                         (INCHES)     1.815       1.824       1.824       1.824
                          (AC-FT)       22.         22.         22.         22.

                        CUMULATIVE AREA =     .23 SQ MI
```

```
          **************
          *            *
22 KK     *     RS1B   *
          *            *
          **************
                    ROUTING THROUGH S1C

     HYDROGRAPH ROUTING DATA

24 RS       STORAGE ROUTING
                 NSTPS          2  NUMBER OF SUBREACHES
                  ITYP       FLOW  TYPE OF INITIAL CONDITION
                RSVRIC      -1.00  INITIAL CONDITION
                     X        .00 WORKING R AND D COEFFICIENT

25 RC       NORMAL DEPTH CHANNEL
                   ANL       .035  LEFT OVERBANK N-VALUE
                  ANCH       .035  MAIN CHANNEL N-VALUE
                   ANR       .035  RIGHT OVERBANK N-VALUE
                 RLNTH       2138.  REACH LENGTH
                   SEL       .0280  ENERGY SLOPE
                 ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                  CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
27 RY       ELEVATION      7.00      7.00      7.00       .00       .00      4.00      6.00     22.00
26 RX       DISTANCE        .00     36.00     66.00     90.00    126.00    150.00    168.00    228.00

                                                  ***

                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00      2.36      5.33      8.93     13.18     18.22     23.97     33.67     43.79     54.16
          OUTFLOW        .00    345.95   1171.35   2460.91   4359.06   6925.29  10154.22  14907.03  21059.23  28402.44
        ELEVATION        .00      1.16      2.32      3.47      4.63      5.79      6.95      8.11      9.26     10.42

          STORAGE      64.77     75.63     86.74     98.09    109.69    121.54    133.63    145.97    158.56    171.39
          OUTFLOW   36860.36  46388.17  56956.44  68544.80  81138.85  94728.38 109306.30 124867.80 141409.90 158931.20
        ELEVATION      11.58     12.74     13.89     15.05     16.21     17.37     18.53     19.68     20.84     22.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO   158931.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                       HYDROGRAPH AT STATION     RS1B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     24.92-HR
+    (CFS)     (HR)
                              (CFS)
+     298.     4.33                45.          11.          11.          11.
                           (INCHES)      1.815        1.824        1.824        1.824
                            (AC-FT)         22.          22.          22.          22.

 PEAK STORAGE  TIME                       MAXIMUM AVERAGE STORAGE
                                    6-HR        24-HR        72-HR     24.92-HR
+   (AC-FT)     (HR)
         1.     4.33                 0.           0.           0.           0.

 PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                    6-HR        24-HR        72-HR     24.92-HR
+    (FEET)     (HR)
         1.00   4.33                .15          .04          .04          .04

                         CUMULATIVE AREA =      .23 SQ MI


          **************
          *            *
28 KK     *     S1A    *
          *            *
          **************
                    SUB-BASIN S1A
                    6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

     SUBBASIN RUNOFF DATA

32 BA       SUBBASIN CHARACTERISTICS
                 TAREA         .33  SUBBASIN AREA

            PRECIPITATION DATA

14 PB            STORM        3.14  BASIN TOTAL PRECIPITATION

14 PI          INCREMENTAL PRECIPITATION PATTERN
                  .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .01       .01       .01       .01       .01       .03
                  .03       .03       .06       .06       .06       .10       .10       .10       .04       .04
                  .04       .02       .02       .02       .01       .01       .01       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00

33 LG       GREEN AND AMPT LOSS RATE
                 STRTL         .20  STARTING LOSS
                   DTH         .25  MOISTURE DEFICIT
                  PSIF        4.30  WETTING FRONT SUCTION
                 XKSAT         .50  HYDRAULIC CONDUCTIVITY
                 RTIMP       35.00  PERCENT IMPERVIOUS AREA
```

```
34 UC          CLARK UNITGRAPH
                    TC          .35  TIME OF CONCENTRATION
                     R          .18  STORAGE COEFFICIENT

35 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                   .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                100.0
                                                    ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .35 HR,       R=    .18 HR
                                         SNYDER   TP=    .30 HR,      CP=    .94

                                                UNIT HYDROGRAPH
                                            14 END-OF-PERIOD ORDINATES
                     30.       109.       421.       651.       507.       320.       198.       122.       75.        46.
                     29.        18.        11.         7.

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

                              HYDROGRAPH AT STATION      S1A

     TOTAL RAINFALL =     3.14, TOTAL LOSS =     1.31, TOTAL EXCESS =     1.83

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      24.92-HR
+    (CFS)       (HR)
                                (CFS)
+     508.       4.17                      65.          16.          16.          16.
                                (INCHES)  1.818        1.824        1.824        1.824
                                (AC-FT)     32.          32.          32.          32.

                              CUMULATIVE AREA =      .33 SQ MI


                ************
                *          *
37 KK           *    RS1A  *
                *          *
                ************
                              ROUTING THROUGH S1C

                HYDROGRAPH ROUTING DATA

39 RS             STORAGE ROUTING
                       NSTPS          2  NUMBER OF SUBREACHES
                        ITYP       FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC      -1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

40 RC             NORMAL DEPTH CHANNEL
                         ANL       .035  LEFT OVERBANK N-VALUE
                        ANCH       .035  MAIN CHANNEL N-VALUE
                         ANR       .035  RIGHT OVERBANK N-VALUE
                        RLNTH     2025.  REACH LENGTH
                         SEL      .0300  ENERGY SLOPE
                        ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                                --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
42 RY          ELEVATION      5.00       5.00       5.00        .00        .00       5.00       5.00       5.00
41 RX          DISTANCE        .00        .50       1.00     126.00     136.00     251.00     252.00     253.00

                                                    ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE          .00        .20        .55       1.06       1.73       2.54       3.52       4.64       5.92       7.36
              OUTFLOW          .00      10.45      42.58     102.85     197.47     332.19     512.38     743.12    1029.24    1375.37
            ELEVATION          .00        .26        .53        .79       1.05       1.32       1.58       1.84       2.11       2.37

              STORAGE         8.95      10.69      12.59      14.65      16.86      19.22      21.74      24.41      27.24      30.22
              OUTFLOW      1785.98    2265.39    2817.77    3447.19    4157.62    4952.92    5836.87    6813.18    7885.47    9057.32
            ELEVATION         2.63       2.89       3.16       3.42       3.68       3.95       4.21       4.47       4.74       5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      197. TO     9057.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                              HYDROGRAPH AT STATION      RS1A

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      24.92-HR
+    (CFS)       (HR)
                                (CFS)
+     496.       4.25                      64.          16.          16.          16.
                                (INCHES)  1.816        1.824        1.824        1.824
                                (AC-FT)     32.          32.          32.          32.

  PEAK STORAGE  TIME                                MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR      24.92-HR
+  (AC-FT)       (HR)
        2.       4.25                      0.           0.           0.           0.

  PEAK STAGE    TIME                                MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR      24.92-HR
+    (FEET)      (HR)
        1.55     4.25                     .44          .11          .11          .11

                              CUMULATIVE AREA =      .33 SQ MI
```

```
          **************
          *            *
43 KK     *     S1C    *
          *            *
          **************
                    SUB-BASIN S1C
                    6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                    THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

               SUBBASIN RUNOFF DATA

47 BA            SUBBASIN CHARACTERISTICS
                      TAREA         .11  SUBBASIN AREA

                 PRECIPITATION DATA

14 PB                 STORM        3.14  BASIN TOTAL PRECIPITATION

14 PI              INCREMENTAL PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .01       .01       .01       .01       .01       .01       .03
                     .03       .03       .06       .06       .06       .10       .10       .10       .04       .04
                     .04       .02       .02       .02       .01       .01       .01       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00

48 LG            GREEN AND AMPT LOSS RATE
                      STRTL         .20  STARTING LOSS
                        DTH         .25  MOISTURE DEFICIT
                       PSIF        4.30  WETTING FRONT SUCTION
                      XKSAT         .50  HYDRAULIC CONDUCTIVITY
                      RTIMP       35.00  PERCENT IMPERVIOUS AREA

49 UC            CLARK UNITGRAPH
                        TC          .32  TIME OF CONCENTRATION
                         R          .26  STORAGE COEFFICIENT

50 UA            ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                        .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                     100.0

                                                      ***

                                                 UNIT HYDROGRAPH PARAMETERS
                                           CLARK   TC=    .32 HR,       R=    .26 HR
                                          SNYDER   TP=    .30 HR,      CP=    .77

                                                 UNIT HYDROGRAPH
                                              19 END-OF-PERIOD ORDINATES
                      8.       35.      120.      176.      143.      103.       74.       54.       39.       28.
                     20.       15.       11.        8.        5.        4.        3.        2.        1.

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

                              HYDROGRAPH AT STATION      S1C

          TOTAL RAINFALL =     3.14, TOTAL LOSS =     1.31, TOTAL EXCESS =     1.83

        PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR       72-HR      24.92-HR
      +   (CFS)       (HR)
                        (CFS)
      +     150.      4.17                   21.          5.          5.          5.
                      (INCHES)              1.815       1.824       1.824       1.824
                       (AC-FT)               11.         11.         11.         11.

                              CUMULATIVE AREA =      .11 SQ MI


          **************
          *            *
52 KK     *     CP1C   *
          *            *
          **************
                    ADDITION OF 3 HYDROGRAPHS

54 HC            HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                      ***

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

                              HYDROGRAPH AT STATION     CP1C

        PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR       72-HR      24.92-HR
      +   (CFS)       (HR)
                        (CFS)
      +     928.      4.25                  131.         33.         32.         32.
                      (INCHES)              1.815       1.824       1.824       1.824
                       (AC-FT)               65.         65.         65.         65.

                              CUMULATIVE AREA =      .67 SQ MI


          **************
          *            *
55 KK     *    RCP1C   *
          *            *
          **************
                    ROUTING THROUGH S1E

               HYDROGRAPH ROUTING DATA
```

```
 57 RS          STORAGE ROUTING
                     NSTPS          2  NUMBER OF SUBREACHES
                      ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 58 RC          NORMAL DEPTH CHANNEL
                       ANL       .035  LEFT OVERBANK N-VALUE
                      ANCH       .035  MAIN CHANNEL N-VALUE
                       ANR       .035  RIGHT OVERBANK N-VALUE
                     RLNTH       3600.  REACH LENGTH
                       SEL       .0170  ENERGY SLOPE
                      ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                    CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 60 RY        ELEVATION      9.00     8.50     4.00      .00      .00     4.00     6.00     8.00
 59 RX        DISTANCE        .00    42.00    72.00    84.00   120.00   138.00   180.00   216.00

                                              ***

                                    COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE         .00     1.48     3.10     4.85     6.75     8.78    10.96    13.27    15.72    18.37
          OUTFLOW         .00    58.41   188.69   377.96   622.76   922.11  1276.11  1685.47  2151.21  2724.73
        ELEVATION         .00      .47      .95     1.42     1.89     2.37     2.84     3.32     3.79     4.26

          STORAGE       21.50    25.14    29.29    33.95    39.08    44.67    50.72    57.22    63.98    71.65
          OUTFLOW     3415.48  4202.95  5100.50  6121.38  7275.86  8568.21 10006.23 11609.31 13438.61 15242.29
        ELEVATION         4.74     5.21     5.68     6.16     6.63     7.11     7.58     8.05     8.53     9.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      623. TO    15242.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                          HYDROGRAPH AT STATION    RCP1C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      24.92-HR
+    (CFS)       (HR)
                          (CFS)
+      900.      4.33                131.          33.          32.          32.
                       (INCHES)      1.813        1.824        1.824        1.824
                        (AC-FT)        65.          65.          65.          65.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR        24-HR        72-HR      24.92-HR
+   (AC-FT)      (HR)
         4.      4.33                  1.           0.           0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR        24-HR        72-HR      24.92-HR
+    (FEET)      (HR)
       2.33      4.33                 .52          .13          .13          .13

                          CUMULATIVE AREA =      .67 SQ MI

                ********************
                *                  *
 61 KK          *       S1D        *
                *                  *
                ********************
                          SUB-BASIN S1D
                          6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
                          THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

                SUBBASIN RUNOFF DATA

 65 BA            SUBBASIN CHARACTERISTICS
                       TAREA          .31  SUBBASIN AREA

                  PRECIPITATION DATA

 14 PB                 STORM         3.14  BASIN TOTAL PRECIPITATION

 14 PI              INCREMENTAL PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                      .03      .03      .06      .06      .06      .10      .10      .10      .04      .04
                      .04      .02      .02      .02      .01      .01      .01      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00

 66 LG            GREEN AND AMPT LOSS RATE
                       STRTL          .20  STARTING LOSS
                         DTH          .25  MOISTURE DEFICIT
                        PSIF         4.30  WETTING FRONT SUCTION
                       XKSAT          .50  HYDRAULIC CONDUCTIVITY
                       RTIMP        35.00  PERCENT IMPERVIOUS AREA

 67 UC            CLARK UNITGRAPH
                          TC          .35  TIME OF CONCENTRATION
                           R          .20  STORAGE COEFFICIENT

 68 UA            ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                        .0      3.0      5.0      8.0      12.0     20.0     43.0     75.0     90.0     96.0
                     100.0

                                              ***

                                    UNIT HYDROGRAPH PARAMETERS
                                  CLARK   TC=    .35 HR,       R=    .20 HR
                                 SNYDER   TP=    .31 HR,      CP=    .88
```

UNIT HYDROGRAPH
16 END-OF-PERIOD ORDINATES

25.	90.	348.	559.	466.	315.	206.	135.	89.	58.
38.	25.	16.	11.	7.	5.				

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

HYDROGRAPH AT STATION S1D

TOTAL RAINFALL = 3.14, TOTAL LOSS = 1.31, TOTAL EXCESS = 1.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 456.	4.17		61.	15.	15.	15.
		(INCHES)	1.819	1.825	1.825	1.825
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .31 SQ MI

```
**************
*            *
*    RS1D    *
*            *
**************
```

ROUTING THROUGH S1E

HYDROGRAPH ROUTING DATA

72 RS STORAGE ROUTING

NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

73 RC NORMAL DEPTH CHANNEL

ANL	.035	LEFT OVERBANK N-VALUE
ANCH	.035	MAIN CHANNEL N-VALUE
ANR	.035	RIGHT OVERBANK N-VALUE
RLNTH	2138.	REACH LENGTH
SEL	.0190	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---	+	------ MAIN CHANNEL -------	+	--- RIGHT OVERBANK ---		
75 RY	ELEVATION	8.00	6.00	4.00	.00	.00	8.00	10.00	11.00
74 RX	DISTANCE	.00	36.00	72.00	96.00	132.00	168.00	204.00	240.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.11	2.39	3.85	5.47	7.27	9.25	11.39	13.83	16.63
OUTFLOW	.00	87.48	287.26	585.30	981.04	1477.11	2077.41	2793.79	3704.40	4759.75
ELEVATION	.00	.58	1.16	1.74	2.32	2.89	3.47	4.05	4.63	5.21
STORAGE	19.81	23.36	27.27	31.56	36.21	41.19	46.46	52.03	57.97	64.49
OUTFLOW	5978.62	7377.05	8969.73	10770.46	12852.95	15450.52	18309.76	21440.18	24830.59	28537.45
ELEVATION	5.79	6.37	6.95	7.53	8.11	8.68	9.26	9.84	10.42	11.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 87. TO 28537.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RS1D

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 450.	4.25		61.	15.	15.	15.
		(INCHES)	1.818	1.825	1.825	1.825
		(AC-FT)	30.	30.	30.	30.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
2.	4.25	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1.47	4.25	.28	.07	.07	.07

CUMULATIVE AREA = .31 SQ MI

```
**************
*            *
*    S1E     *
*            *
**************
```

SUB-BASIN S1E
6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

SUBBASIN RUNOFF DATA

80 BA SUBBASIN CHARACTERISTICS

TAREA	.51	SUBBASIN AREA

PRECIPITATION DATA

14 PB STORM 3.14 BASIN TOTAL PRECIPITATION

```
14 PI            INCREMENTAL PRECIPITATION PATTERN
                   .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                   .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                   .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                   .00     .00     .00     .01     .01     .01     .01     .01     .01     .03
                   .03     .03     .06     .06     .06     .10     .10     .10     .04     .04
                   .04     .02     .02     .02     .01     .01     .01     .00     .00     .00
                   .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                   .00     .00

81 LG            GREEN AND AMPT LOSS RATE
                    STRTL      .20  STARTING LOSS
                      DTH      .25  MOISTURE DEFICIT
                     PSIF     4.30  WETTING FRONT SUCTION
                    XKSAT      .50  HYDRAULIC CONDUCTIVITY
                    RTIMP    35.00  PERCENT IMPERVIOUS AREA

82 UC            CLARK UNITGRAPH
                       TC      .43  TIME OF CONCENTRATION
                        R      .24  STORAGE COEFFICIENT

83 UA            ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
                   100.0

                                                    ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .43 HR,       R=    .24 HR
                                         SNYDER   TP=    .37 HR,      CP=    .91

                                                UNIT HYDROGRAPH
                                          19 END-OF-PERIOD ORDINATES
                    29.     88.    262.    624.    789.    634.    452.    318.    224.    157.
                   111.     78.     55.     38.     27.     19.     13.      9.      7.

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

                          HYDROGRAPH AT STATION      S1E

      TOTAL RAINFALL =    3.14, TOTAL LOSS =    1.31, TOTAL EXCESS =    1.83

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR      24.92-HR
+     (CFS)       (HR)
                          (CFS)
+      702.       4.25                100.         25.         24.          24.
                          (INCHES)   1.817       1.825       1.825        1.825
                          (AC-FT)     49.         50.         50.          50.

                          CUMULATIVE AREA =     .51 SQ MI


                ***************
                *             *
85 KK           *      CP1E   *
                *             *
                ***************
                          CONCENTRATION OF 3 HYDROGRAPHS

87 HC            HYDROGRAPH COMBINATION
                      ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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

                          HYDROGRAPH AT STATION     CP1E

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR      24.92-HR
+     (CFS)       (HR)
                          (CFS)
+     1988.       4.33                291.         73.         70.          70.
                          (INCHES)   1.813       1.825       1.825        1.825
                          (AC-FT)     144.        145.        145.         145.

                          CUMULATIVE AREA =    1.49 SQ MI


                ***************
                *             *
88 KK           *     RCP1E   *
                *             *
                ***************
                          ROUTING THROUGH S1F

                HYDROGRAPH ROUTING DATA

90 RS            STORAGE ROUTING
                      NSTPS          2  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

91 RC            NORMAL DEPTH CHANNEL
                        ANL       .035  LEFT OVERBANK N-VALUE
                       ANCH       .035  MAIN CHANNEL N-VALUE
                        ANR       .035  RIGHT OVERBANK N-VALUE
                      RLNTH     2250.   REACH LENGTH
                        SEL     .0140   ENERGY SLOPE
                       ELMAX        .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                CROSS-SECTION DATA
                                --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
93 RY          ELEVATION     12.00   10.00    6.00    2.00     .00    8.00   10.00   11.00
92 RX          DISTANCE        .00   48.00   84.00  120.00  144.00  180.00  240.00  288.00
```

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.17	.68	1.53	2.70	4.15	5.87	7.87	10.16	12.72
OUTFLOW	.00	7.64	48.51	143.03	311.81	560.81	899.18	1336.76	1883.00	2546.97
ELEVATION	.00	.63	1.26	1.89	2.53	3.16	3.79	4.42	5.05	5.68
STORAGE	15.56	18.67	22.07	25.77	30.16	35.35	41.35	48.61	57.17	66.32
OUTFLOW	3400.40	4451.38	5646.69	7038.90	8710.76	10627.37	12804.66	15245.51	18227.79	21727.64
ELEVATION	6.32	6.95	7.58	8.21	8.84	9.47	10.11	10.74	11.37	12.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 312. TO 21728.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RCP1E

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)				
1997.	4.33		290.	73.	70.	70.
		(INCHES)	1.812	1.825	1.825	1.825
		(AC-FT)	144.	145.	145.	145.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
5.	4.33	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				
5.16	4.33	1.86	.50	.48	.48

CUMULATIVE AREA = 1.49 SQ MI

94 KK S1F

SUB-BASIN S1F
6-HOUR RAINFALL, PATTERN NO. 1.73 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .982

SUBBASIN RUNOFF DATA

98 BA SUBBASIN CHARACTERISTICS
TAREA .28 SUBBASIN AREA

PRECIPITATION DATA

14 PB STORM 3.14 BASIN TOTAL PRECIPITATION

14 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.06	.06	.06	.10	.10	.10	.04	.04
.04	.02	.02	.02	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

99 LG GREEN AND AMPT LOSS RATE

STRTL	.20	STARTING LOSS
DTH	.25	MOISTURE DEFICIT
PSIF	4.30	WETTING FRONT SUCTION
XKSAT	.50	HYDRAULIC CONDUCTIVITY
RTIMP	35.00	PERCENT IMPERVIOUS AREA

100 UC CLARK UNITGRAPH

TC	.40	TIME OF CONCENTRATION
R	.29	STORAGE COEFFICIENT

101 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	3.0	5.0	8.0	12.0	20.0	43.0	75.0	90.0	96.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .40 HR, R= .29 HR
SNYDER TP= .36 HR, CP= .77

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

14.	46.	153.	327.	383.	310.	233.	175.	131.	99.
74.	56.	42.	31.	24.	18.	13.	10.	8.	6.
4.	3.								

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

HYDROGRAPH AT STATION S1F

TOTAL RAINFALL = 3.14, TOTAL LOSS = 1.31, TOTAL EXCESS = 1.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)				
360.	4.25		55.	14.	13.	13.

	(INCHES)	1.815	1.824	1.824	1.824
	(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .28 SQ MI

```
103 KK      **************
            *            *
            *     CP1F   *
            *            *
            **************
```

104 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION CP1F

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
2339.	4.33		345.	87.	84.	84.
		(INCHES)	1.812	1.825	1.825	1.825
		(AC-FT)	171.	172.	172.	172.

CUMULATIVE AREA = 1.77 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	S1B	307.	4.25	45.	11.	11.	.23		
ROUTED TO	RS1B	298.	4.33	45.	11.	11.	.23	1.00	4.33
HYDROGRAPH AT	S1A	508.	4.17	65.	16.	16.	.33		
ROUTED TO	RS1A	496.	4.25	64.	16.	16.	.33	1.55	4.25
HYDROGRAPH AT	S1C	150.	4.17	21.	5.	5.	.11		
3 COMBINED AT	CP1C	928.	4.25	131.	33.	32.	.67		
ROUTED TO	RCP1C	900.	4.33	131.	33.	32.	.67	2.33	4.33
HYDROGRAPH AT	S1D	456.	4.17	61.	15.	15.	.31		
ROUTED TO	RS1D	450.	4.25	61.	15.	15.	.31	1.47	4.25
HYDROGRAPH AT	S1E	702.	4.25	100.	25.	24.	.51		
3 COMBINED AT	CP1E	1988.	4.33	291.	73.	70.	1.49		
ROUTED TO	RCP1E	1997.	4.33	290.	73.	70.	1.49	5.16	4.33
HYDROGRAPH AT	S1F	360.	4.25	55.	14.	13.	.28		
2 COMBINED AT	CP1F	2339.	4.33	345.	87.	84.	1.77		

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

Case 2

Normal Conditions (AMC II)

6-hr storm

```
*****************************************
*****************************************
*                                       *
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                                       *
*          SEPTEMBER 1990               *
*                                       *
*           VERSION 4.0                 *
*                                       *
*                                       *
*  RUN DATE  03/02/1995  TIME  16:35:15 *
*                                       *
*                                       *
*****************************************
*****************************************
```

```
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID   TATUM WASH PROJECT SUB-AREAS 1 AND 2  COMBINED  - 2/9/95
   2          ID   100YR-6HR STORM = 3.20". ASSUMED NORMAL CONDITION W/ DTHETA=0.250
   3          ID   STORM SIZE = 2.28 SQ. MI (TOTAL AREA)
   4          ID   HYDROGRAPH PLOT FOR 5 DETENTION BASIN SITES (*.DSS)
              *DIAGRAM
   5          IT       2 21FEB95    0000      300
   6          IO       3

   7          KK     S1B
   8          KM   SUB-BASIN S1B
   9          KM   6-HOUR RAINFALL, PATTERN NO. 1.88 WAS USED TO FIND TC & R FOR THIS BASIN
  10          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF .978
  11          BA    .230
  12          IN     15
  13          KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  14          PB   3.131
  15          KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.88
  16          PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
  17          PC    .087    .100    .120    .160    .248    .442    .711    .846    .904    .939
  18          PC    .951    .964    .976    .988   1.000
  19          LG    .200    .250   4.300    .500  35.000
  20          UC    .363    .185
  21          UA       0       3       5       8      12      20      43      75      90      96
  22          UA     100

  23          KK    RS1B
  24          KM    ROUTING THROUGH S1C
  25          RS       3    FLOW      -1
  26          RC    .035    .035    .035    2138    .028
  27          RX       0      36      66      90     126     150     168     228
  28          RY       7       7       7       0       0       4       6      22

  29          KK     S1A
  30          KM   SUB-BASIN S1A
  31          BA    .330
  32          LG    .200    .250   4.300    .500  35.000
  33          UC    .363    .185
  34          UA       0       3       5       8      12      20      43      75      90      96
  35          UA     100

  36          KK    RS1A
  37          KM    ROUTING THROUGH S1C
  38          RS       3    FLOW      -1
  39          RC    .035    .035    .035    2025    .030
  40          RX       0     0.5       1     126     136     251     252     253
  41          RY       5       5       5       0       0       5       5       5

  42          KK     S1C
  43          KM   SUB-BASIN S1C
  44          BA    .110
  45          LG    .200    .250   4.300    .500  35.000
  46          UC    .329    .265
  47          UA       0       3       5       8      12      20      43      75      90      96
  48          UA     100
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  49          KK    CP1C
  50          KM    ADDITION OF 3 HYDROGRAPHS
```

```
KM    POTENTIAL DETENTION BASIN SITE 1
HC       3
ZW       A=CP1C     C=FLOW       F=CALC

KK    RCP1C
KM    ROUTING THROUGH S1E
RS       5     FLOW       -1
RC    .035    .035    .035    3600    .017
RX       0      42      72      84     120     138     180     216
RY       9     8.5       4       0       0       4       6       8

KK     S1D
KM    SUB-BASIN S1D
BA    .310
LG    .200    .250   4.300    .500  35.000
UC    .363    .205
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK    RS1D
KM    ROUTING THROUGH S1E
RS       3     FLOW       -1
RC    .035    .035    .035    2138    .019
RX       0      36      72      96     132     168     204     240
RY       8       6       4       0       0       8      10      11

KK     S1E
KM    SUB-BASIN S1E
BA    .510
LG    .200    .250   4.300    .500  35.000
UC    .433    .242
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK    CP1E
KM    CONCENTRATION OF 3 HYDROGRAPHS
KM    POTENTIAL DETENTION BASIN SITE 2
HC       3
ZW       A=CP1E       C=FLOW       F=CALC

KK    RCP1E
KM    ROUTING THROUGH S1F
RS       3     FLOW       -1
RC    .035    .035    .035    2250    .014
RX       0      48      84     120     144     180     240     288
RY      12      10       6       2       0       8      10      11
```



```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK     S1F
KM    SUB-BASIN S1F
BA    .280
LG    .200    .250   4.300    .500  35.000
UC    .413    .300
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK    CP1F
KM    POTENTIAL DETENTION BASIN SITE 3
HC       2
ZW       A=CP1F     C=FLOW     F=CALC
*  END OF PREVIOUS HEC-1 MODEL FOR AREA1 - AA

KK    RCF1
RS       2     FLOW       -1
RC    .035     .03    .035  1100.0  0.0009
RX       0      30      60      90     120     150     180     210
RY       5       3       1       0       0       1       3       5

KK    S2A1
KM    SUB-BASIN S2A1
BA    0.056
LG    0.150   0.250   4.300   0.400  35.000
UC    0.217   0.155
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK    CP2A1
KM    COMBINE AT 40TH STREET
KM    POTENTIAL DETENTION BASIN SITE 4
HC       2
ZW       A=CP2A1    C=FLOW     F=CALC

KK    RCP21
RS       2     FLOW       -1
RC    .035     .03    .035    1360   .0162
RX       0      30      40      50      70      80     110     130
RY       8       6       2       0       0       2       4       6

KK    S2A2
BA    0.039
LG     0.10    0.20    4.30    0.40    15.0
UC    0.471   0.595
UA       0       5      16      30      65      77      84      90      94      97
UA     100

KK    CP2A2
KM    COMBINE AT FANFOL DRIVE  (NO DIVERSION AS PER FIELD INSPECTION)
HC       2
```



```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK    RCP22
RS       1     FLOW       -1
```

```
135          RC    .035     .03     .035   820.0  0.0106
136          RX       0      30       70      80     100     110   110.5     120
137          RY       8       7        6       0       0       4       6       8

138          KK     S2B
139          KM    SUB-BASIN S2B
140          BA    0.027
141          LG    0.100   0.250   4.300   0.400  15.000
142          UC    0.246   0.221
143          UA        0       5      16      30      65      77      84      90      94      97
144          UA      100

145          KK     CP2B
146          HC        2

147          KK    RCP2B
148          RS        1    FLOW      -1
149          RC     .035    0.03   0.035   680.0  0.0088
150          RX        0      10      20      70     120     130     140     200
151          RY      2.5       2       2       0       0       1       2       3

152          KK     S2C
153          KM    SUB-BASIN S2C
154          BA    0.028
155          LG    0.100   0.250   4.300   0.400  15.000
156          UC    0.250   0.214
157          UA        0       5      16      30      65      77      84      90      94      97
158          UA      100

159          KK     CP2C
160          KM    CROSSING THRU VIA ESTRELLA ALIGNMENT
161          HC        2

162          KK    RCP2C
163          RS        2    FLOW      -1
164          RC     .035     .03    .035  1040.0  0.0144
165          RX        0      50      70     100     120     130     140     180
166          RY        4       5       3       0       0       1       2     2.5

167          KK     S2D
168          KM    SUB-BASIN S2D
169          BA    0.024
170          LG    0.100   0.250   4.300   0.400  15.000
171          UC    0.288   0.292
172          UA        0       5      16      30      65      77      84      90      94      97
173          UA      100
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

174          KK     S2I
175          KM    SUB-BASIN S2I
176          BA    0.028
177          LG    0.100   0.250   4.300   0.400   20.00
178          UC    0.233   0.227
179          UA        0       5      16      30      65      77      84      90      94      97
180          UA      100

181          KK    CP2DI
182          HC        3

183          KK    RCPDI
184          RS        3    FLOW      -1
185          RC     .035     .03    .035  2059.0  0.0107
186          RX        0      30      40      90     100   100.5     101     110
187          RY        5       3       1       0       0       1       3       3

188          KK     S2E
189          KM    SUB-BASIN S2E
190          BA    0.033
191          LG     0.10   0.250   4.300   0.400  20.000
192          UC    0.367   0.443
193          UA        0       5      16      30      65      77      84      90      94      97
194          UA      100

195          KK     CP2E
196          KM    AT SHEA BLVD, POTENTIAL DETENTION BASIN SITE 5
197          HC        2
198          ZW        A=C4       C=FLOW      F=CALC

199          KK     S2F
200          KM    SUB-BASIN S2F
201          BA    0.008
202          LG    0.100   0.250   4.300   0.400  15.000
203          UC    0.225   0.318
204          UA        0       5      16      30      65      77      84      90      94      97
205          UA      100

206          KK     RCPF
207          RS        2    FLOW      -1
208          RC     .035     .03    .035  1144.0  0.0105
209          RX        0      10      15      35      50      65      80      90
210          RY        1       1       0       1       2     2.5     2.5     2.5

211          KK     S2G
212          KM    SUB-BASIN S2G
213          BA    0.189
214          LG    0.150   0.250   4.300   0.400  20.000
215          UC    0.396   0.277
216          UA        0       3       5       8      12      20      43      75      90      96
217          UA      100
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

218          KK     CP1
```

```
219          KM   AT 44TH STREET INTERSECTION
220          HC      2

221          KK   RCP2G
222          RS      5     FLOW      -1
223          RC   .035      .03    .035  3088.0  0.0123
224          RX      0       40      60      80     125     130     140     155
225          RY    1.1        1       1       0       1       1     1.1       2

226          KK     S2H
227          KM   SUB-BASIN S2H
228          BA   0.049
229          LG   0.100   0.280   3.200   0.491  15.000
230          UC   0.163   0.196
231          UA       0       5      16      30      65      77      84      90      94      97
232          UA     100

233          KK     CP2
234          HC       2

235          KK    RCP2
236          RS       2     FLOW      -1
237          RC   0.035      .03   0.035  1160.0  0.0138
238          RX       0       45      55      75      80      85      93     100
239          RY     5.5      4.5     2.5     0.5       0     0.5     2.5     4.5

240          KK     S2J
241          BA   0.023
242          LG    0.10    0.25    4.30    0.40   20.00
243          UC   0.275   0.226
244          UA       0       5      16      30      65      77      84      90      94      97
245          UA     100

246          KK     CP3
247          KM   AT TATUM BLVD
248          HC       2
249          ZZ
```

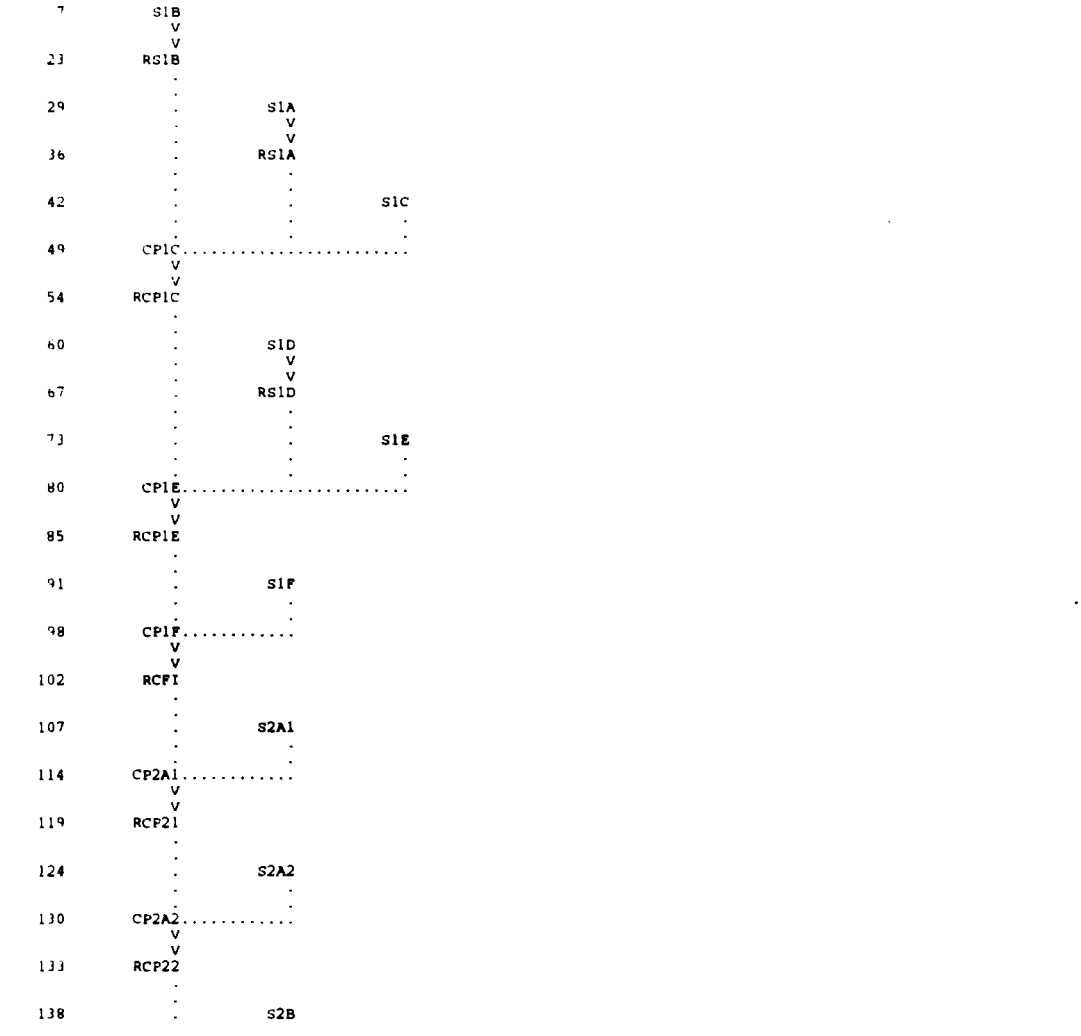
1

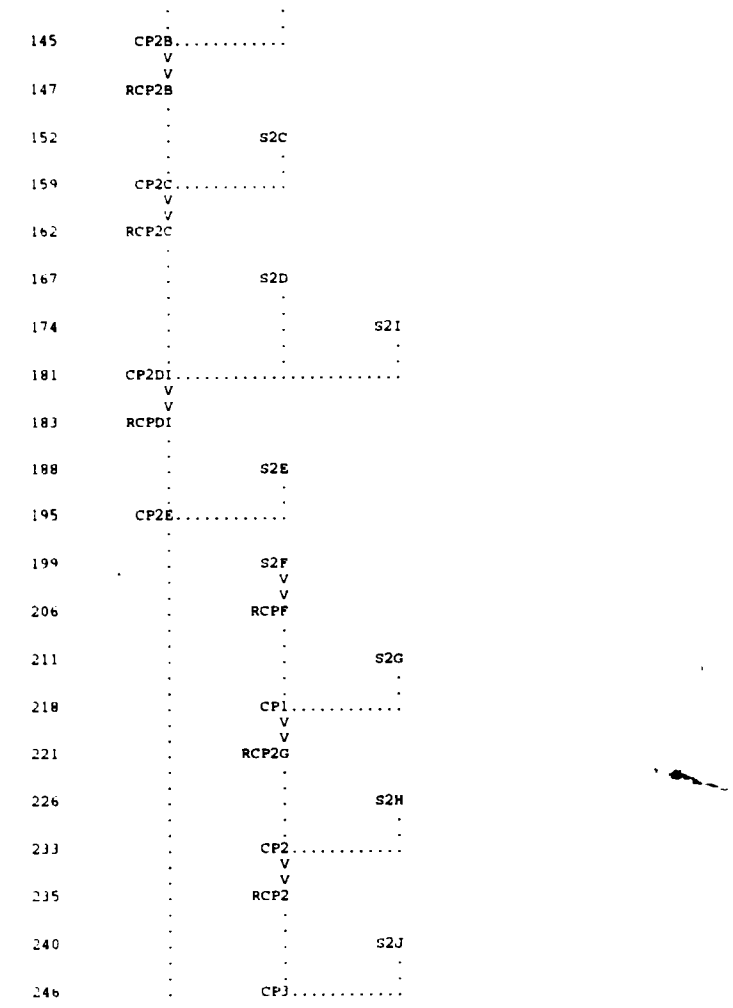
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (.---) RETURN OF DIVERTED OR PUMPED FLOW





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*                                    *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)  *
*                                    *
*           SEPTEMBER 1990           *
*                                    *
*            VERSION 4.0             *
*                                    *
*                                    *
* RUN DATE 03/02/1995 TIME 16:35:15  *
*                                    *
*                                    *
**************************************
```

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

TATUM WASH PROJECT SUB-AREAS 1 AND 2 COMBINED - 2/9/95
100YR-6HR STORM = 3.20". ASSUMED NORMAL CONDITION W/ DTHETA=0.250
STORM SIZE = 2.28 SQ. MI (TOTAL AREA)
HYDROGRAPH PLOT FOR 5 DETENTION BASIN SITES (*.DSS)

6 IO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	21FEB95	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	21FEB95	ENDING DATE
NDTIME	0958	ENDING TIME
ICENT	19	CENTURY MARK

TOTAL TIME BASE 9.97 HOURS

ENGLISH UNITS

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

*** ***

7 KK S1B

SUB-BASIN S1B
6-HOUR RAINFALL, PATTERN NO. 1.88 WAS USED TO FIND TC & R FOR THIS BASIN
THIS BASIN USED RAINFALL REDUCTION FACTOR OF .978
RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.73

12 IN TIME DATA FOR INPUT TIME SERIES

JXMIN	15	TIME INTERVAL IN MINUTES
JXDATE	21FEB95	STARTING DATE
JXTIME	0	STARTING TIME

SUBBASIN RUNOFF DATA

11 BA SUBBASIN CHARACTERISTICS

TAREA	.23	SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

19 LG GREEN AND AMPT LOSS RATE

STRTL	.20	STARTING LOSS
DTH	.25	MOISTURE DEFICIT
PSIF	4.30	WETTING FRONT SUCTION
XKSAT	.50	HYDRAULIC CONDUCTIVITY
RTIMP	35.00	PERCENT IMPERVIOUS AREA

20 UC CLARK UNITGRAPH

TC	.36	TIME OF CONCENTRATION
R	.19	STORAGE COEFFICIENT

21 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	3.0	5.0	8.0	12.0	20.0	43.0	75.0	90.0	96.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS

CLARK	TC= .36 HR,	R=	.19 HR
SNYDER	TP= .30 HR,	CP=	.92

UNIT HYDROGRAPH
37 END-OF-PERIOD ORDINATES

10.	26.	38.	54.	80.	144.	267.	401.	464.	448.
405.	350.	292.	244.	203.	170.	142.	118.	99.	82.
69.	57.	48.	40.	33.	28.	23.	19.	16.	14.
11.	9.	8.	7.	5.	5.	4.			

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

HYDROGRAPH AT STATION S1B

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.34, TOTAL EXCESS = 1.79

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	9.97-HR
(CFS)	(HR)	(CFS)			
319.	4.20	44.	27.	27.	27.
		(INCHES) 1.777	1.784	1.784	1.784
		(AC-FT) 22.	22.	22.	22.

CUMULATIVE AREA = .23 SQ MI

... ...
...

[illegible] KK **RS1B**

ROUTING THROUGH S1C

HYDROGRAPH ROUTING DATA

25 RS STORAGE ROUTING

NSTPS	3	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

26 RC NORMAL DEPTH CHANNEL

ANL	.035	LEFT OVERBANK N-VALUE
ANCH	.035	MAIN CHANNEL N-VALUE
ANR	.035	RIGHT OVERBANK N-VALUE
RLNTH	2138.	REACH LENGTH
SEL	.0280	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL	-------	+ --- RIGHT OVERBANK ---			
28 RY	ELEVATION	7.00	7.00	7.00	.00	.00	4.00	6.00	22.00
27 RX	DISTANCE	.00	36.00	66.00	90.00	126.00	150.00	168.00	228.00

...

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.36	5.33	8.93	13.18	18.22	23.97	33.67	43.79	54.16
OUTFLOW	.00	345.95	1171.35	2460.91	4359.06	6925.29	10154.22	14907.03	21059.23	28402.44
ELEVATION	.00	1.16	2.32	3.47	4.63	5.79	6.95	8.11	9.26	10.42
STORAGE	64.77	75.63	86.74	98.09	109.69	121.54	133.63	145.97	158.56	171.39
OUTFLOW	36860.36	46388.17	56956.44	68544.80	81138.85	94728.38	109306.30	124867.80	141409.90	158931.20
ELEVATION	11.58	12.74	13.89	15.05	16.21	17.37	18.53	19.68	20.84	22.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 346. TO 158931.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

... ...

HYDROGRAPH AT STATION RS1B

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 311.	4.27		44.	27.	27.	27.
		(INCHES)	1.777	1.784	1.784	1.784
		(AC-FT)	22.	22.	22.	22.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
1.	4.27	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
1.04	4.27	.15	.09	.09	.09

CUMULATIVE AREA = .23 SQ MI

... ...
...

29 KK **S1A**

SUB-BASIN S1A

SUBBASIN RUNOFF DATA

31 BA SUBBASIN CHARACTERISTICS
TAREA .33 SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03

```
                .03     .03     .03     .04     .04     .04     .04     .04     .04     .04
                .02     .02     .02     .02     .02     .02     .02     .01     .01     .01
                .01     .01     .01     .01     .01     .00     .00     .00     .00     .00
                .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                .00     .00     .00     .00     .00     .00     .00     .00     .00     .00

32 LG       GREEN AND AMPT LOSS RATE
                STRTL       .20  STARTING LOSS
                  DTH       .25  MOISTURE DEFICIT
                 PSIF      4.30  WETTING FRONT SUCTION
                XKSAT       .50  HYDRAULIC CONDUCTIVITY
                RTIMP     85.00  PERCENT IMPERVIOUS AREA

33 UC       CLARK UNITGRAPH
                  TC       .36  TIME OF CONCENTRATION
                   R       .19  STORAGE COEFFICIENT

34 UA       ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                 .0     3.0     5.0     9.0    12.0    20.0    43.0    75.0    90.0    96.0
              100.0

                                        ...

                                UNIT HYDROGRAPH PARAMETERS
                          CLARK   TC=    .36 HR,       R=    .19 HR
                          SNYDER  TP=    .30 HR.       CP=   .92

                                UNIT HYDROGRAPH
                            37 END-OF-PERIOD ORDINATES
                  15.     37.     55.     77.    115.    207.    383.    576.    665.    642.
                 581.    502.    419.    350.    292.    244.    203.    170.    142.    118.
                  99.     82.     69.     57.     48.     40.     33.     28.     23.     19.
                  16.     14.     11.      9.      8.      7.      5.

     ...        ...             ...             ...             ...

                          HYDROGRAPH AT STATION      S1A

     TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.34, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR       9.97-HR
    (CFS)       (HR)
                              (CFS)
     458.       4.20             63.          38.          38.          38.
                          (INCHES)      1.777        1.784        1.784        1.784
                          (AC-FT)         31.          31.          31.          31.

                          CUMULATIVE AREA =     .33 SQ MI

... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
...

                .............
                .           .
39 KK           .    RS1A   .
                .           .
                .............
                          ROUTING THROUGH S1C

                HYDROGRAPH ROUTING DATA

38 RS           STORAGE ROUTING
                     NSTPS         3  NUMBER OF SUBREACHES
                     ITYP      FLOW   TYPE OF INITIAL CONDITION
                    RSVRIC     -1.00  INITIAL CONDITION
                         X       .00 WORKING R AND D COEFFICIENT

39 RC           NORMAL DEPTH CHANNEL
                      ANL      .035  LEFT OVERBANK N-VALUE
                     ANCH      .035  MAIN CHANNEL N-VALUE
                      ANR      .035  RIGHT OVERBANK N-VALUE
                    RLNTH     2025.  REACH LENGTH
                      SEL     .0300  ENERGY SLOPE
                     ELMAX        .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
41 RY       ELEVATION      5.00    5.00    5.00     .00     .00    5.00    5.00    5.00
40 RX       DISTANCE        .00     .50    1.00  126.00  136.00  251.00  252.00  253.00

                                        ...

                                COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     .20     .55    1.06    1.73    2.54    3.52    4.64    5.92    7.36
          OUTFLOW        .00   10.45   42.58  102.85  197.47  332.19  512.38  743.12 1029.24 1375.37
        ELEVATION        .00     .26     .53     .79    1.05    1.32    1.58    1.84    2.11    2.37

          STORAGE       8.95   10.69   12.59   14.65   16.86   19.22   21.74   24.41   27.24   30.22
          OUTFLOW    1785.98 2265.39 2817.77 3447.19 4157.62 4952.92 5836.87 6813.18 7885.47 9057.32
        ELEVATION       2.63    2.89    3.16    3.42    3.68    3.95    4.21    4.47    4.74    5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     1375. TO     9057.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

     ...            ...             ...             ...             ...

                          HYDROGRAPH AT STATION      RS1A
```

```
  PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                             6-HR          24-HR          72-HR         9.97-HR
+   (CFS)        (HR)
                               (CFS)
+     450.       4.27                          63.            38.            38.            38.
                               (INCHES)     1.776          1.784          1.784          1.784
                               (AC-FT)        31.            31.            31.            31.

 PEAK STORAGE    TIME                                   MAXIMUM AVERAGE STORAGE
                                             6-HR          24-HR          72-HR         9.97-HR
+   (AC-FT)      (HR)
       [illegible]   4.27                                0.             0.             0.             0.

  PEAK STAGE     TIME                                   MAXIMUM AVERAGE STAGE
                                             6-HR          24-HR          72-HR         9.97-HR
+   (FEET)       (HR)
       1.49      4.27                           .44            .27            .27            .27

                             CUMULATIVE AREA =       .33 SQ MI


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

              *************
              *           *
   43 KK      *     S1C   *
              *           *
              *************
                          SUB-BASIN S1C

                SUBBASIN RUNOFF DATA

   44 BA          SUBBASIN CHARACTERISTICS
                        TAREA          .11   SUBBASIN AREA

                  PRECIPITATION DATA

   15 PB                STORM        3.13   BASIN TOTAL PRECIPITATION

   15 PI            INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
                      .03       .03       .03       .04       .04       .04       .04       .04       .04       .04
                      .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                      .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

   45 LG          GREEN AND AMPT LOSS RATE
                        STRTL          .20   STARTING LOSS
                          DTH          .25   MOISTURE DEFICIT
                         PSIF         4.30   WETTING FRONT SUCTION
                        XKSAT          .50   HYDRAULIC CONDUCTIVITY
                        RTIMP        35.00   PERCENT IMPERVIOUS AREA

   46 UC          CLARK UNITGRAPH
                           TC          .33   TIME OF CONCENTRATION
                            R          .26   STORAGE COEFFICIENT

   47 UA          ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                        .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                     100.0

                                                            ***

                                                   UNIT HYDROGRAPH PARAMETERS
                                              CLARK   TC=   .33 HR,        R=   .26 HR
                                             SNYDER   TP=   .28 HR,       CP=   .70

                                                        UNIT HYDROGRAPH
                                                   49 END-OF-PERIOD ORDINATES
                    4.       10.       15.       23.       37.       74.      134.      175.      180.      170.
                  155.      136.      120.      106.       93.       82.       73.       64.       56.       50.
                   44.       39.       34.       30.       27.       23.       21.       18.       16.       14.
                   12.       11.       10.        9.        8.        7.        6.        5.        5.        4.
                    4.        3.        3.        2.        2.        2.        2.        1.        1.

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

                               HYDROGRAPH AT STATION       S1C

     TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.34, TOTAL EXCESS =     1.79

  PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                             6-HR          24-HR          72-HR         9.97-HR
+   (CFS)        (HR)
                               (CFS)
+     138.       4.20                          21.            13.            13.            13.
                               (INCHES)     1.775          1.783          1.783          1.783
                               (AC-FT)        10.            10.            10.            10.

                             CUMULATIVE AREA =       .11 SQ MI
```

... ...

```
              **************
              *            *
   49 KK      *    CP1C    *
              *            *
              **************
```

ADDITION OF 3 HYDROGRAPHS
POTENTIAL DETENTION BASIN SITE 1

52 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

...

... ...

HYDROGRAPH AT STATION CP1C

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 892.	4.27		128.	77.	77.	77.
		(INCHES)	1.775	1.784	1.784	1.784
		(AC-FT)	63.	64.	64.	64.

CUMULATIVE AREA = .67 SQ MI

```
  -----DSS---ZOPEN:  Version: 6-EA;  Existing File Opened
                     Unit:  71,  File: TATMS1S2.DSS
-----DSS---ZWRITE Unit  71; Vers.    3:  /CP1C/CP1C/FLOW/20FEB1995/2MIN/CALC/
-----DSS---ZWRITE Unit  71; Vers.    3:  /CP1C/CP1C/FLOW/21FEB1995/2MIN/CALC/
```

... ...

```
              **************
              *            *
   54 KK      *   RCP1C    *
              *            *
              **************
```

ROUTING THROUGH S1E

HYDROGRAPH ROUTING DATA

55 RS STORAGE ROUTING

NSTPS	5	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

57 RC NORMAL DEPTH CHANNEL

ANL	.035	LEFT OVERBANK N-VALUE
ANCH	.035	MAIN CHANNEL N-VALUE
ANR	.035	RIGHT OVERBANK N-VALUE
RLNTH	3600.	REACH LENGTH
SEL	.0170	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK --- +		------ MAIN CHANNEL		------- + ---	RIGHT OVERBANK ---		
59 RY	ELEVATION	9.00	8.50	4.00	.00	.00	4.00	6.00	8.00
58 RX	DISTANCE	.00	42.00	72.00	84.00	120.00	138.00	180.00	216.00

...

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.48	3.10	4.85	6.75	8.78	10.96	13.27	15.72	18.37
OUTFLOW	.00	58.41	188.69	377.96	622.76	922.11	1276.11	1685.47	2151.21	2724.73
ELEVATION	.00	.47	.95	1.42	1.89	2.37	2.84	3.32	3.79	4.26
STORAGE	21.50	25.14	29.29	33.95	39.08	44.67	50.72	57.22	63.98	71.65
OUTFLOW	3415.48	4202.95	5100.50	6121.38	7275.86	8568.21	10006.23	11609.31	13438.61	15242.23
ELEVATION	4.74	5.21	5.68	6.16	6.63	7.11	7.58	8.05	8.53	[illegible]

*** WARNING *** **MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 623. TO 15242.**
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

... ...

HYDROGRAPH AT STATION RCP1C

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 881.	4.33		128.	77.	77.	77.
		(INCHES)	1.774	1.784	1.784	1.784
		(AC-FT)	63.	64.	64.	64.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)					
2.	4.33		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	9.97-HR

```
+    FEET)      HR)
      2.30      4.33                   .51          .31          .31          .31

                  CUMULATIVE AREA =        .57 SQ MI

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

           *************
           *           *
  60 KK    *    S1D    *
           *           *
           *************
                       SUB-BASIN S1D

           SUBBASIN RUNOFF DATA

  62 BA      SUBBASIN CHARACTERISTICS
                  TAREA          .31  SUBBASIN AREA

             PRECIPITATION DATA

  15 PB           STORM         3.13  BASIN TOTAL PRECIPITATION

  15 PI        INCREMENTAL PRECIPITATION PATTERN
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                    .01      .01      .01      .01      .01      .03      .03      .03      .03      .03
                    .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                    .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                    .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

  63 LG      GREEN AND AMPT LOSS RATE
                  STRTL          .20  STARTING LOSS
                    DTH          .25  MOISTURE DEFICIT
                   PSIF         4.30  WETTING FRONT SUCTION
                  XKSAT          .50  HYDRAULIC CONDUCTIVITY
                  RTIMP        35.00  PERCENT IMPERVIOUS AREA

  64 UC      CLARK UNITGRAPH
                     TC          .36  TIME OF CONCENTRATION
                      R          .20  STORAGE COEFFICIENT

  65 UA      ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                     .0      3.0      5.0      8.0     12.0     20.0     43.0     75.0     90.0     96.0
                 100.0

                                                ***

                                       UNIT HYDROGRAPH PARAMETERS
                                 CLARK  TC=  .36 HR,      R=  .20 HR
                                SNYDER  TP=  .30 HR,     CP=  .87

                                            UNIT HYDROGRAPH
                                       40 END-OF-PERIOD ORDINATES
           12.       32.      47.      67.     100.     180.     333.     502.     584.     571.
          523.      459.     390.     331.     281.     239.     203.     173.     147.     125.
          106.       90.      76.      65.      55.      47.      40.      34.      29.      24.
           21.       18.      15.      13.      11.       9.       8.       7.       6.       5.

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

                  HYDROGRAPH AT STATION      S1D

   TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.34, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                       MAXIMUM AVERAGE FLOW
                                 6-HR       24-HR       72-HR       9.97-HR
+   (CFS)       (HR)
                       (CFS)
+   418.        4.20                59.         36.         36.         36.
                     (INCHES)     1.776       1.783       1.783       1.783
                      (AC-FT)       29.         29.         29.         29.

                  CUMULATIVE AREA =        .31 SQ MI

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

           *************
           *           *
  67 KK    *   RS1D    *
           *           *
           *************
                        ROUTING THROUGH S1E

           HYDROGRAPH ROUTING DATA
```

```
69 RS        STORAGE ROUTING
                  NSTPS          3  NUMBER OF SUBREACHES
                   ITYP       FLOW  TYPE OF INITIAL CONDITION
                 RSVRIC      -1.00  INITIAL CONDITION
                      X        .00  WORKING R AND D COEFFICIENT

70 RC        NORMAL DEPTH CHANNEL
                    ANL       .035  LEFT OVERBANK N-VALUE
                   ANCH       .035  MAIN CHANNEL N-VALUE
                    ANR       .035  RIGHT OVERBANK N-VALUE
                  RLNTH      2138.  REACH LENGTH
                    SEL      .0190  ENERGY SLOPE
                  ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                       --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
72 RY        ELEVATION     9.00      6.00      4.00       .00       .00      8.00     10.00     11.00
71 RX        DISTANCE       .00     36.00     72.00     96.00    132.00    168.00    204.00    240.00

                                                ***

                              COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00      1.11      2.39      3.85      5.47      7.27      9.25     11.39     13.93  [illegible]
          OUTFLOW        .00     87.48    287.26    585.30    981.04   1477.11   2077.41   2793.79   3704.43  [illegible]
          ELEVATION      .00       .58      1.16      1.74      2.32      2.89      3.47      4.05      4.63      5.21

          STORAGE      19.81     23.36     27.27     31.56     36.21     41.19     46.46     52.03     57.97     64.47
          OUTFLOW    5978.62   7377.05   8969.73  10770.46  12852.35  15450.52  18309.76  21440.18  24830.59  28537.45
          ELEVATION     5.79      6.37      6.95      7.53      8.11      8.68      9.26      9.84     10.42  [illegible]

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      585. TO    28537.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                         HYDROGRAPH AT STATION      RS1D

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                       6-HR         24-HR        72-HR       9.97-HR
+   (CFS)       (HR)
                            (CFS)
+    413.       4.27                     59.          36.          36.          36.
                          (INCHES)    1.776        1.783        1.783        1.783
                           (AC-FT)      29.          29.          29.          29.

  PEAK STORAGE  TIME                         MAXIMUM AVERAGE STORAGE
                                       6-HR         24-HR        72-HR       9.97-HR
+   (AC-FT)     (HR)
        1.      4.27                      0.           0.           0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                       6-HR         24-HR        72-HR       9.97-HR
+   (FEET)      (HR)
      1.43  *   4.27                     .27          .17          .17          .17

                        CUMULATIVE AREA =     .31 SQ MI


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

             **************
             *            *
73 KK        *     S1E    *
             *            *
             **************
                   SUB-BASIN S1E

             SUBBASIN RUNOFF DATA

75 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .51  SUBBASIN AREA

              PRECIPITATION DATA

15 PB               STORM        3.13  BASIN TOTAL PRECIPITATION

15 PI         INCREMENTAL PRECIPITATION PATTERN
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                  .01      .01      .01      .01      .01      .03      .03      .03      .03      .03
                  .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                  .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                  .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                  .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

76 LG         GREEN AND AMPT LOSS RATE
                    STRTL         .20  STARTING LOSS
                      DTH         .25  MOISTURE DEFICIT
                     PSIF        4.30  WETTING FRONT SUCTION
                    XKSAT         .50  HYDRAULIC CONDUCTIVITY
```

```
                    RTIMP       55.00  PERCENT IMPERVIOUS AREA

 77 UC          CLARK UNITGRAPH
                      TC         .43  TIME OF CONCENTRATION
                       R         .24  STORAGE COEFFICIENT

 78 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                    .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                 100.0

                                                  ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .43 HR,       R=    .24 HR
                                          SNYDER  TP=    .36 HR,      CP=    .86

                                                UNIT HYDROGRAPH
                                          47 END-OF-PERIOD ORDINATES
                  15.       39.       57.       76.      101.      143.      236.      404.      630.      787.
                 813.      782.      727.      652.      568.      495.      431.      376.      327.      285.
                 248.      216.      188.      164.      143.      125.      109.       95.       82.       72.
                  63.       54.       47.       41.       36.       31.       27.       24.       21.       18.
                  16.       14.       12.       10.        9.        8.        7.

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

                          HYDROGRAPH AT STATION       S1E

     TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.34, TOTAL EXCESS =     1.79

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       9.97-HR
+    (CFS)        (HR)
                    (CFS)
+      647.       4.27                    97.          59.          59.          59.
                (INCHES)                1.775        1.783        1.783        1.783
                 (AC-FT)                  48.          49.          49.          49.

                          CUMULATIVE AREA =      .51 SQ MI


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

                ************
                *          *
 80 KK          *    CP1E  *
                *          *
                ************
                          CONCENTRATION OF 3 HYDROGRAPHS
                          POTENTIAL DETENTION BASIN SITE 2

 83 HC          HYDROGRAPH COMBINATION
                      ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                          HYDROGRAPH AT STATION     CP1E

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       9.97-HR
+    (CFS)        (HR)
                    (CFS)
+     1911.       4.30                   284.         172.         172.         172.
                (INCHES)                1.773        1.783        1.783        1.783
                 (AC-FT)                 141.         142.         142.         142.

                          CUMULATIVE AREA =     1.49 SQ MI

 -----DSS---ZWRITE Unit  71; Vers.    3:  /CP1E/CP1E/FLOW/20FEB1995/2MIN/CALC/
 -----DSS---ZWRITE Unit  71; Vers.    3:  /CP1E/CP1E/FLOW/21FEB1995/2MIN/CALC/


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

                ************
                *          *
 85 KK          *   RCP1E  *
                *          *
                ************
                          ROUTING THROUGH S1F

                HYDROGRAPH ROUTING DATA

 87 RS          STORAGE ROUTING
                      NSTPS          3  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

 88 RC          NORMAL DEPTH CHANNEL
                        ANL       .035  LEFT OVERBANK N-VALUE
                       ANCH       .035  MAIN CHANNEL N-VALUE
                        ANR       .035  RIGHT OVERBANK N-VALUE
                      RLNTH      2250.  REACH LENGTH
                        SEL      .0140  ENERGY SLOPE
                      ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                CROSS-SECTION DATA
                    --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
```

90 RY	ELEVATION	12.00	10.00	6.00	2.00	.00	8.00	10.00	11.00
89 RX	DISTANCE	.00	48.00	84.00	120.00	144.00	180.00	240.00	288.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.17	.68	1.53	2.70	4.15	5.87	7.87	10.16	12.72
OUTFLOW	.00	7.64	48.51	143.03	311.81	560.81	899.18	1336.76	1883.00	2546.97
ELEVATION	.00	.63	1.26	1.89	2.53	3.16	3.79	4.42	5.05	5.68
STORAGE	15.56	18.67	22.07	25.77	30.16	35.35	41.35	48.61	57.17	66.32
OUTFLOW	3400.40	4451.38	5646.69	7038.90	8710.76	10627.37	12804.66	15245.51	18227.79	21727.64
ELEVATION	6.32	6.95	7.58	8.21	8.84	9.47	10.11	10.74	11.37	12.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 1883. TO 21728.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RCP1E

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1895.	4.33		284.	172.	172.	172.
		(INCHES)	1.772	1.783	1.783	1.783
		(AC-FT)	141.	142.	142.	142.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
3.	4.33	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
5.06	4.33	1.86	1.18	1.18	1.18

CUMULATIVE AREA = 1.49 SQ MI

*** ***

91 KK S1F

SUB-BASIN S1F

SUBBASIN RUNOFF DATA

93 BA SUBBASIN CHARACTERISTICS
TAREA .28 SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

94 LG GREEN AND AMPT LOSS RATE

STRTL	.20	STARTING LOSS
DTH	.25	MOISTURE DEFICIT
PSIF	4.30	WETTING FRONT SUCTION
XKSAT	.50	HYDRAULIC CONDUCTIVITY
RTIMP	35.00	PERCENT IMPERVIOUS AREA

95 UC CLARK UNITGRAPH

TC	.41	TIME OF CONCENTRATION
R	.30	STORAGE COEFFICIENT

96 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	3.0	5.0	8.0	12.0	20.0	43.0	75.0	90.0	96.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS

CLARK	TC=	.41 HR,	R=	.30 HR
SNYDER	TP=	.35 HR,	CP=	.74

```
                                                          UNIT HYDROGRAPH
                                                     56 END-OF-PERIOD ORDINATES
              7.        18.        27.        38.        51.        74.       131.       228.       329.       388.
            394.       376.       350.       317.       283.       254.       227.       203.       182.       163.
            145.       130.       116.       104.        93.        83.        75.        67.        60.        53.
             48.        43.        38.        34.        31.        27.        25.        22.        20.        18.
             16.        14.        13.        11.        10.         9.         8.         7.         6.         6.
              5.         5.         4.         4.         3.         3.

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

                               HYDROGRAPH AT STATION       S1F

        TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.34, TOTAL EXCESS =     1.79

      PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR        72-HR        9.97-HR
   +   (CFS)         (HR)
                                 (CFS)
   +    331.         4.27                  53.          32.          32.           32.
                               (INCHES)   1.773        1.783        1.783         1.783
                                (AC-FT)    26.          27.          27.           27.

                               CUMULATIVE AREA =      .28 SQ MI


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


             **************
             *            *
     98 KK   *     CP1F   *
             *            *
             **************
                                 POTENTIAL DETENTION BASIN SITE 3

    100 HC           HYDROGRAPH COMBINATION
                           ICOMP             2   NUMBER OF HYDROGRAPHS TO COMBINE
                                                                        ***

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

                               HYDROGRAPH AT STATION       CP1F

      PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR        72-HR        9.97-HR
   +   (CFS)         (HR)
                                 (CFS)
   +   2212.         4.33                 337.         204.         204.          204.
                               (INCHES)   1.772        1.783        1.783         1.783
                                (AC-FT)   167.         168.         168.          168.

                               CUMULATIVE AREA =     1.77 SQ MI

 -----DSS---ZWRITE Unit  71; Vers.    3:  /CP1F/CP1F/FLOW/20FEB1995/2MIN/CALC/
 -----DSS---ZWRITE Unit  71; Vers.    3:  /CP1F/CP1F/FLOW/21FEB1995/2MIN/CALC/


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


             **************
             *            *
    102 KK   *     RCF1   *
             *            *
             **************

                          HYDROGRAPH ROUTING DATA

    103 RS           STORAGE ROUTING
                          NSTPS             2   NUMBER OF SUBREACHES
                           ITYP          FLOW   TYPE OF INITIAL CONDITION
                         RSVRIC         -1.00   INITIAL CONDITION
                              X           .00   WORKING R AND D COEFFICIENT

    104 RC           NORMAL DEPTH CHANNEL
                            ANL          .035   LEFT OVERBANK N-VALUE
                           ANCH          .030   MAIN CHANNEL N-VALUE
                            ANR          .035   RIGHT OVERBANK N-VALUE
                          RLNTH         1100.   REACH LENGTH
                            SEL         .0009   ENERGY SLOPE
                          ELMAX            .0   MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                    CROSS-SECTION DATA
                               --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
    106 RY       ELEVATION       5.00       3.00       1.00        .00        .00       1.00       3.00       5.00
    105 RX       DISTANCE         .00      30.00      60.00      90.00     120.00     150.00     180.00     210.00
                                                                        ***

                                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE        .00        .25        .61       1.07       1.64       2.27       2.96       3.70       4.49       5.33
              OUTFLOW        .00       5.38      19.21      42.27      77.42     130.73     196.13     273.71     363.59     465.97
            ELEVATION        .00        .26        .53        .79       1.05       1.32       1.58       1.84       2.11       2.37

              STORAGE       6.23       7.18       8.18       9.24      10.34      11.50      12.72      13.98      15.30      16.67
              OUTFLOW     581.06     709.10     850.37    1005.13    1173.66    1356.25    1553.19    1764.76    1991.27    2233.00
            ELEVATION       2.63       2.89       3.16       3.42       3.68       3.95       4.21       4.47       4.74       5.00

    ***             ***             ***             ***             ***
```

```
                              HYDROGRAPH AT STATION      RCFI

  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                           6-HR        24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                              (CFS)
+    2171.       4.40                      337.         204.         204.         204.
                            (INCHES)      1.770        1.783        1.783        1.783
                            (AC-FT)        167.         168.         168.         168.

 PEAK STORAGE    TIME                              MAXIMUM AVERAGE STORAGE
                                           6-HR        24-HR        72-HR        9.97-HR
+   (AC-FT)      (HR)
        8.       4.40                        2.           1.           1.           1.

  PEAK STAGE     TIME                               MAXIMUM AVERAGE STAGE
                                           6-HR        24-HR        72-HR        9.97-HR
+   (FEET)       (HR)
      4.93       4.40                      1.57         1.00         1.00         1.00

                             CUMULATIVE AREA =     1.77 SQ MI


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

          ***************
          *             *
107 KK    *     S2A1    *
          *             *
          ***************
                        SUB-BASIN S2A1

          SUBBASIN RUNOFF DATA

109 BA      SUBBASIN CHARACTERISTICS
                  TAREA          .06  SUBBASIN AREA

            PRECIPITATION DATA

 15 PB            STORM         3.13  BASIN TOTAL PRECIPITATION

 15 PI        INCREMENTAL PRECIPITATION PATTERN
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                   .01      .01      .01      .01      .01      .03      .03      .03      .03      .03
                   .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                   .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                   .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

110 LG      GREEN AND AMPT LOSS RATE
                  STRTL          .15  STARTING LOSS
                    DTH          .25  MOISTURE DEFICIT
                   PSIF         4.30  WETTING FRONT SUCTION
                  XKSAT          .40  HYDRAULIC CONDUCTIVITY
                  RTIMP        35.00  PERCENT IMPERVIOUS AREA

111 UC      CLARK UNITGRAPH
                     TC          .22  TIME OF CONCENTRATION
                      R          .16  STORAGE COEFFICIENT

112 UA      ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                   .0      3.0      5.0      8.0     12.0     20.0     43.0     75.0     90.0     96.0
                100.0

                                                          ***

                                                 UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=   .22 HR,      R=   .16 HR
                                         SNYDER   TP=   .19 HR,     CP=   .79

                                                      UNIT HYDROGRAPH
                                                 29 END-OF-PERIOD ORDINATES
            4.       12.       23.       60.      120.      149.      136.      113.       91.       73.
           59.       47.       38.       31.       25.       20.       16.       13.       10.        8.
            7.        5.        4.        4.        3.        2.        2.        1.        1.

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

                              HYDROGRAPH AT STATION      S2A1

    TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.24, TOTAL EXCESS =     1.89

  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                           6-HR        24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                              (CFS)
+      88.       4.10                       11.           7.           7.           7.
                            (INCHES)      1.881        1.886        1.886        1.886
                            (AC-FT)          6.           6.           6.           6.

                             CUMULATIVE AREA =      .06 SQ MI
```

*** ***

```
              *************
              *           *
 114 KK       *   CP2A1   *
              *           *
              *************
```

COMBINE AT 40TH STREET
POTENTIAL DETENTION BASIN SITE 4

117 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP2A1

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2219.	4.40		348.	211.	211.	211.
		(INCHES)	1.773	1.787	1.787	1.787
		(AC-FT)	173.	174.	174.	174.

CUMULATIVE AREA = 1.83 SQ MI

-----DSS---ZWRITE Unit 71; Vers. 2: /CP2A1/CP2A1/FLOW/20FEB1995/2MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 2: /CP2A1/CP2A1/FLOW/21FEB1995/2MIN/CALC/

*** ***

```
              *************
              *           *
 119 KK       *   RCP21   *
              *           *
              *************
```

HYDROGRAPH ROUTING DATA

120 RS STORAGE ROUTING

NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

121 RC NORMAL DEPTH CHANNEL

ANL	.035	LEFT OVERBANK N-VALUE
ANCH	.030	MAIN CHANNEL N-VALUE
ANR	.035	RIGHT OVERBANK N-VALUE
RLNTH	1360.	REACH LENGTH
SEL	.0162	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

--- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---

123 RY	ELEVATION	8.00	6.00	2.00	.00	.00	2.00	4.00	6.00
122 RX	DISTANCE	.00	30.00	40.00	50.00	70.00	80.00	110.00	130.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.29	.64	1.04	1.49	2.01	2.61	3.30	4.09	4.98
OUTFLOW	.00	31.04	102.88	211.66	358.13	552.92	820.44	1142.15	1523.06	1967.53
ELEVATION	.00	.42	.84	1.26	1.68	2.11	2.53	2.95	3.37	3.79
STORAGE	5.97	7.02	8.14	9.34	10.60	11.94	13.36	14.86	16.44	18.11
OUTFLOW	2483.16	3071.20	3729.20	4458.90	5262.12	6155.50	7153.75	8247.25	9434.80	10717.57
ELEVATION	4.21	4.63	5.05	5.47	5.89	6.32	6.74	7.16	7.58	8.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 358. TO 10718.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RCP21

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2213.	4.43		348.	211.	211.	211.
		(INCHES)	1.772	1.787	1.787	1.787
		(AC-FT)	173.	174.	174.	174.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
3.	4.43	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
3.99	4.43	1.19	.74	.74	.74

CUMULATIVE AREA = 1.83 SQ MI

... ...
...

```
              **************
              *            *
124 KK        *    S2A2    *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

125 BA SUBBASIN CHARACTERISTICS
TAREA .04 SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

126 LG GREEN AND AMPT LOSS RATE
STRTL .10 STARTING LOSS
DTH .20 MOISTURE DEFICIT
PSIF 4.30 WETTING FRONT SUCTION
XKSAT .40 HYDRAULIC CONDUCTIVITY
RTIMP 15.00 PERCENT IMPERVIOUS AREA

127 UC CLARK UNITGRAPH
TC .47 TIME OF CONCENTRATION
R .60 STORAGE COEFFICIENT

128 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .47 HR, R= .60 HR
SNYDER TP= .33 HR, CP= .37

UNIT HYDROGRAPH
101 END-OF-PERIOD ORDINATES

1.	3.	5.	9.	15.	22.	27.	28.	29.	29.
29.	28.	28.	27.	26.	25.	23.	22.	21.	20.
19.	18.	17.	16.	15.	14.	13.	13.	12.	11.
11.	10.	9.	9.	8.	8.	8.	7.	7.	6.
6.	6.	5.	5.	5.	5.	4.	4.	4.	4.
3.	3.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.									

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

HYDROGRAPH AT STATION S2A2

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.60

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 32.	4.30		7.	4.	4.	4.
		(INCHES)	1.580	1.592	1.592	1.592
		(AC-FT)	3.	3.	3.	3.

CUMULATIVE AREA = .04 SQ MI

... ...
...

```
              **************
              *            *
130 KK        *   CP2A2    *
              *            *
              **************
```

COMBINE AT FANFOL DRIVE (NO DIVERSION AS PER FIELD INSPECTION)

```
132 HC          HYDROGRAPH COMBINATION
                      ICOMP              2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                      ***

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

                        HYDROGRAPH AT STATION     CP2A2

  PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR          24-HR          72-HR         9.97-HR
+   (CFS)        (HR)
                              (CFS)
+    2244.       4.43                   355.           215.           215.           215.
                            (INCHES)   1.768          1.782          1.782          1.782
                            (AC-FT)     176.           177.           177.           177.

                          CUMULATIVE AREA =     1.87 SQ MI


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

             **************
             *            *
133 KK       *    RCP22   *
             *            *
             **************

             HYDROGRAPH ROUTING DATA

134 RS          STORAGE ROUTING
                      NSTPS              1  NUMBER OF SUBREACHES
                       ITYP           FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC          -1.00  INITIAL CONDITION
                          X            .00  WORKING R AND D COEFFICIENT

135 RC          NORMAL DEPTH CHANNEL
                        ANL           .035  LEFT OVERBANK N-VALUE
                       ANCH           .030  MAIN CHANNEL N-VALUE
                        ANR           .035  RIGHT OVERBANK N-VALUE
                      RLNTH           820.  REACH LENGTH
                        SEL          .0106  ENERGY SLOPE
                      ELMAX             .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                           CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
137 RY       ELEVATION       8.00      7.00      6.00       .00        .00       4.00       6.00       8.00
136 RX       DISTANCE         .00     30.00     70.00     80.00     100.00     110.00     110.50     120.00

                                                                      ***

                                               COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00        .17        .34        .54        .75        .97       1.20       1.45       1.71       1.99
          OUTFLOW        .00      24.42      78.45     156.30     256.24     377.60     520.22     684.19     869.76    1077.29
        ELEVATION        .00        .42        .84       1.26       1.68       2.11       2.53       2.95       3.37       3.79

          STORAGE       2.28       2.58       2.88       3.19       3.51       3.87       4.38       5.03       5.81       6.70
          OUTFLOW    1318.85    1594.44    1892.02    2211.23    2551.82    2942.43    3385.98    3892.22    4472.18    5131.08
        ELEVATION       4.21       4.63       5.05       5.47       5.89       6.32       6.74       7.16       7.58       8.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      870. TO      5131.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION     RCP22

  PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR          24-HR          72-HR         9.97-HR
+   (CFS)        (HR)
                              (CFS)
+    2244.       4.43                   355.           215.           215.           215.
                            (INCHES)   1.768          1.782          1.782          1.782
                            (AC-FT)     176.           177.           177.           177.

 PEAK STORAGE    TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR          24-HR          72-HR         9.97-HR
+  (AC-FT)       (HR)
        3.       4.43                     1.             0.             0.             0.

  PEAK STAGE     TIME                           MAXIMUM AVERAGE STAGE
                                        6-HR          24-HR          72-HR         9.97-HR
+   (FEET)       (HR)
     5.51        4.43                   1.52            .94            .94            .94

                          CUMULATIVE AREA =     1.87 SQ MI


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

             **************
             *            *
138 KK       *      S2B   *
             *            *
             **************
                                SUB-BASIN S2B
```

SUBBASIN RUNOFF DATA

140 BA *SUBBASIN CHARACTERISTICS*
TAREA .03 SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

141 LG GREEN AND AMPT LOSS RATE

STRTL	.10	STARTING LOSS
DTH	.25	MOISTURE DEFICIT
PSIF	4.30	WETTING FRONT SUCTION
XKSAT	.40	HYDRAULIC CONDUCTIVITY
RTIMP	15.00	PERCENT IMPERVIOUS AREA

142 UC CLARK UNITGRAPH

TC	.25	TIME OF CONCENTRATION
R	.22	STORAGE COEFFICIENT

143 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .25 HR, R= .22 HR
SNYDER TP= .15 HR, CP= .43

UNIT HYDROGRAPH
39 END-OF-PERIOD ORDINATES

3.	12.	31.	47.	49.	47.	44.	40.	35.	30.
26.	22.	19.	16.	14.	12.	10.	9.	8.	7.
6.	5.	4.	4.	3.	3.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	0.	0.	

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

HYDROGRAPH AT STATION S2B

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.60, TOTAL EXCESS = 1.53

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 36.	4.07		4.	3.	3.	3.
		(INCHES)	1.520	1.523	1.523	1.523
		(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .03 SQ MI

*** ***

145 KK * CP2B *

146 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP2B

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2261.	4.43		359.	218.	218.	218.
		(INCHES)	1.764	1.779	1.779	1.779
		(AC-FT)	178.	179.	179.	179.

CUMULATIVE AREA = 1.89 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
***

              **************
              *            *
 147 KK       *    RCP2B   *
              *            *
              **************

                 HYDROGRAPH ROUTING DATA

 148 RS            STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC      -1.00  INITIAL CONDITION
                            X        .00 WORKING R AND D COEFFICIENT

 149 RC            NORMAL DEPTH CHANNEL
                          ANL       .035  LEFT OVERBANK N-VALUE
                         ANCH       .030  MAIN CHANNEL N-VALUE
                          ANR       .035  RIGHT OVERBANK N-VALUE
                        RLNTH       680.  REACH LENGTH
                          SEL      .0088  ENERGY SLOPE
                        ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                 CROSS-SECTION DATA
                             --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 151 RY         ELEVATION      2.50       2.00       2.00        .00        .00       1.00       2.00       3.00
 150 RX         DISTANCE        .00      10.00      20.00      70.00     120.00     130.00     140.00     200.00

                                                             ***

                                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE         .00        .13        .27        .43        .60        .79        .98       1.20       1.42       1.66
            OUTFLOW         .00      10.96      35.55      71.52     118.31     175.87     244.29     326.02     420.27     526.19
          ELEVATION         .00        .16        .32        .47        .63        .79        .95       1.11       1.26       1.42

            STORAGE        1.91       2.18       2.46       2.76       3.11       3.49       3.89       4.33       4.79       5.27
            OUTFLOW      644.09     774.27     917.03    1079.33    1273.83    1488.17    1722.78    1979.44    2257.21    2556.52
          ELEVATION        1.58       1.74       1.89       2.05       2.21       2.37       2.53       2.68       2.84       3.00

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

                         HYDROGRAPH AT STATION     RCP2B

 PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                         6-HR          24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                                 (CFS)
+    2252.      4.47                      359.          218.         218.          218.
                              (INCHES)   1.764         1.779        1.779         1.779
                               (AC-FT)    178.          179.         179.          179.

 PEAK STORAGE   TIME                                 MAXIMUM AVERAGE STORAGE
                                         6-HR          24-HR        72-HR        9.97-HR
+  (AC-FT)      (HR)
        5.      4.47                        1.            1.           1.            1.

 PEAK STAGE     TIME                                   MAXIMUM AVERAGE STAGE
                                         6-HR          24-HR        72-HR        9.97-HR
+   (FEET)      (HR)
      2.84      4.47                       .86           .54          .54           .54

                        CUMULATIVE AREA =      1.89 SQ MI


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

              **************
              *            *
 152 KK       *     S2C    *
              *            *
              **************
                           SUB-BASIN S2C

                SUBBASIN RUNOFF DATA

 154 BA           SUBBASIN CHARACTERISTICS
                       TAREA          .03  SUBBASIN AREA

                  PRECIPITATION DATA

  15 PB                STORM         3.13  BASIN TOTAL PRECIPITATION

  15 PI              INCREMENTAL PRECIPITATION PATTERN
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                       .01        .01        .01        .01        .01        .03        .03        .03        .03        .03
                       .03        .03        .03        .04        .04        .04        .04        .04        .04        .04
                       .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                       .01        .01        .01        .01        .01        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
```

```
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 155 LG          GREEN AND AMPT LOSS RATE
                       STRTL       .10  STARTING LOSS
                         DTH       .25  MOISTURE DEFICIT
                        PSIF      4.30  WETTING FRONT SUCTION
                       XKSAT       .40  HYDRAULIC CONDUCTIVITY
                       RTIMP     15.00  PERCENT IMPERVIOUS AREA

 156 UC          CLARK UNITGRAPH
                          TC       .25  TIME OF CONCENTRATION
                           R       .21  STORAGE COEFFICIENT

 157 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                   100.0

                                                    ***

                                                UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=    .25 HR,       R=    .21 HR
                                          SNYDER  TP=    .15 HR,      CP=    .43

                                                UNIT HYDROGRAPH
                                          38 END-OF-PERIOD ORDINATES
                     3.       13.       33.       49.       51.       50.       46.       42.       37.       31.
                    27.       23.       20.       17.       14.       12.       11.        9.        8.        7.
                     6.        5.        4.        4.        3.        3.        2.        2.        2.        1.
                     1.        1.        1.        1.        1.        1.        0.        0.

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

                          HYDROGRAPH AT STATION      S2C

        TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.60, TOTAL EXCESS =    1.53

      PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       9.97-HR
    +    (CFS)        (HR)
                       (CFS)
    +      37.       4.07                5.           3.           3.           3.
                     (INCHES)          1.520        1.523        1.523        1.523
                     (AC-FT)             2.           2.           2.           2.

                     CUMULATIVE AREA =     .03 SQ MI


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

                  *************
                  *           *
 159 KK           *     CP2C  *
                  *           *
                  *************
                        CROSSING THRU VIA ESTRELLA ALIGNMENT

 161 HC           HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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

                          HYDROGRAPH AT STATION     CP2C

      PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       9.97-HR
    +    (CFS)        (HR)
                       (CFS)
    +    2268.       4.47                364.         221.         221.         221.
                     (INCHES)          1.760        1.775        1.775        1.775
                     (AC-FT)             180.         182.         182.         182.

                     CUMULATIVE AREA =    1.92 SQ MI


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

                  *************
                  *           *
 162 KK           *    RCP2C  *
                  *           *
                  *************

                    HYDROGRAPH ROUTING DATA

 163 RS             STORAGE ROUTING
                         NSTPS           2  NUMBER OF SUBREACHES
                          ITYP        FLOW  TYPE OF INITIAL CONDITION
                         RSVRIC      -1.00  INITIAL CONDITION
                              X        .00 WORKING R AND D COEFFICIENT

 164 RC             NORMAL DEPTH CHANNEL
                          ANL        .035  LEFT OVERBANK N-VALUE
                         ANCH        .030  MAIN CHANNEL N-VALUE
                          ANR        .035  RIGHT OVERBANK N-VALUE
                        RLNTH      1040.   REACH LENGTH
                          SEL       .0144  ENERGY SLOPE
                        ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

		--- LEFT OVERBANK ---	+	------ MAIN CHANNEL	-------	+ ---	RIGHT OVERBANK ---		
166 RY	ELEVATION	4.00	5.00	3.00	.00	.00	1.00	2.00	2.50
165 RX	DISTANCE	.00	50.00	70.00	100.00	120.00	130.00	140.00	180.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.14	.32	.53	.77	1.04	1.35	1.69	2.07	2.58
OUTFLOW	.00	13.54	45.48	94.81	163.67	257.23	371.58	507.86	662.76	849.91
ELEVATION	.00	.26	.53	.79	1.05	1.32	1.58	1.84	2.11	2.37
STORAGE	3.23	3.90	4.60	5.31	6.03	6.77	7.56	8.44	9.42	10.51
OUTFLOW	1089.27	1380.47	1735.94	2147.90	2600.54	3093.24	3621.10	4199.68	4833.19	5525.98
ELEVATION	2.63	2.89	3.16	3.42	3.68	3.95	4.21	4.47	4.74	5.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 257. TO 5526.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

HYDROGRAPH AT STATION RCP2C

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2268.	4.47		364.	221.	221.	221.
		(INCHES)	1.760	1.775	1.775	1.775
		(AC-FT)	180.	182.	182.	182.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
3.	4.47	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
3.49	4.47	1.14	.72	.72	.72

CUMULATIVE AREA = 1.92 SQ MI

*** ***

167 KK S2D

SUB-BASIN S2D

SUBBASIN RUNOFF DATA

169 BA SUBBASIN CHARACTERISTICS
TAREA .02 SUBBASIN AREA

PRECIPITATION DATA

15 PB STORM 3.13 BASIN TOTAL PRECIPITATION

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

170 LG GREEN AND AMPT LOSS RATE
STRTL .10 STARTING LOSS
DTH .25 MOISTURE DEFICIT
PSIF 4.30 WETTING FRONT SUCTION
XKSAT .40 HYDRAULIC CONDUCTIVITY
RTIMP 15.00 PERCENT IMPERVIOUS AREA

171 UC CLARK UNITGRAPH
TC .29 TIME OF CONCENTRATION
R .29 STORAGE COEFFICIENT

172 UA ACCUMULATED-AREA VS. TIME, 11 ORDINATES

.0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
100.0									

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .29 HR, R= .29 HR

```
                                        SNYDER   TP=   .18 HR,      CP=   .40

                                                UNIT HYDROGRAPH
                                        50 END-OF-PERIOD ORDINATES
          2.      7.     16.     27.     33.     34.     33.     32.     30.     27.
         24.     22.     19.     17.     15.     14.     12.     11.     10.      9.
          8.      7.      6.      5.      5.      4.      4.      3.      3.      3.
          2.      2.      2.      2.      2.      1.      1.      1.      1.      1.
          1.      1.      1.      1.      0.      0.      0.      0.      0.      0.

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

                        HYDROGRAPH AT STATION      S2D

    TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.60, TOTAL EXCESS =    1.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR       9.97-HR
+   (CFS)       (HR)
                              (CFS)
+     28.       4.10                4.           2.           2.           2.
                            (INCHES)      1.518        1.522        1.522        1.522
                              (AC-FT)        2.           2.           2.

                        CUMULATIVE AREA =     .02 SQ MI


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

          **************
          *            *
174 KK    *     S2I    *
          *            *
          **************
                        SUB-BASIN S2I

          SUBBASIN RUNOFF DATA

176 BA      SUBBASIN CHARACTERISTICS
                 TAREA          .03  SUBBASIN AREA

            PRECIPITATION DATA

 15 PB            STORM        3.13  BASIN TOTAL PRECIPITATION

 15 PI      INCREMENTAL PRECIPITATION PATTERN
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
              .01     .01     .01     .01     .01     .03     .03     .03     .03     .03
              .03     .03     .03     .04     .04     .04     .04     .04     .04     .04
              .02     .02     .02     .02     .02     .02     .02     .01     .01     .01
              .01     .01     .01     .01     .01     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
              .00     .00     .00     .00     .00     .00     .00     .00     .00     .00

177 LG      GREEN AND AMPT LOSS RATE
              STRTL          .10  STARTING LOSS
                DTH          .25  MOISTURE DEFICIT
               PSIF         4.30  WETTING FRONT SUCTION
              XKSAT          .40  HYDRAULIC CONDUCTIVITY
              RTIMP        20.00  PERCENT IMPERVIOUS AREA

178 UC      CLARK UNITGRAPH
                 TC          .23  TIME OF CONCENTRATION
                  R          .23  STORAGE COEFFICIENT

179 UA      ACCUMULATED-AREA VS. TIME,  11 ORDINATES
              .0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
            100.0

                                                ***

                                        UNIT HYDROGRAPH PARAMETERS
                                CLARK   TC=   .23 HR,      R=   .23 HR
                                SNYDER  TP=   .15 HR,      CP=   .41

                                                UNIT HYDROGRAPH
                                        39 END-OF-PERIOD ORDINATES
          4.      14.     33.     49.     50.     49.     45.     41.     35.     30.
         26.      23.     20.     17.     15.     13.     11.      9.      8.      7.
          6.       5.      4.      4.      3.      3.      2.      2.      2.      2.
          1.       1.      1.      1.      1.      1.      1.      0.      0.

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

                        HYDROGRAPH AT STATION      S2I

    TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.51, TOTAL EXCESS =    1.62

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR       9.97-HR
+   (CFS)       (HR)
                              (CFS)
+     38.       4.07                5.           3.           3.           3.
```

```
                         (INCHES)     1.612         1.616         1.616          1.616
                          (AC-FT)        2.            2.            2.             2.

                          CUMULATIVE AREA =       .03 SQ MI


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


              **************
              *            *
 181 KK       *    CP2DI   *
              *            *
              **************

 182 HC            HYDROGRAPH COMBINATION
                         ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                       ***

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

                            HYDROGRAPH AT STATION     CP2DI

 PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                          (CFS)
+    2301.      4.47                  372.         226.         226.          226.
                         (INCHES)    1.755        1.770        1.770         1.770
                          (AC-FT)     185.         186.         186.          186.

                          CUMULATIVE AREA =      1.97 SQ MI


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


              **************
              *            *
 183 KK       *    RCPDI   *
              *            *
              **************

                HYDROGRAPH ROUTING DATA

 184 RS            STORAGE ROUTING
                        NSTPS            3  NUMBER OF SUBREACHES
                         ITYP         FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC        -1.00  INITIAL CONDITION
                            X          .00  WORKING R AND D COEFFICIENT

 185 RC            NORMAL DEPTH CHANNEL
                          ANL         .035  LEFT OVERBANK N-VALUE
                         ANCH         .030  MAIN CHANNEL N-VALUE
                          ANR         .035  RIGHT OVERBANK N-VALUE
                        RLNTH        2059.  REACH LENGTH
                          SEL        .0107  ENERGY SLOPE
                        ELMAX           .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                 CROSS-SECTION DATA
                               --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 187 RY         ELEVATION      5.00      3.00      1.00       .00       .00      1.00      3.00      3.00
 186 RX         DISTANCE        .00     30.00     40.00     90.00    100.00    100.50    101.00    110.00

                                                                       ***

                                                    COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

             STORAGE          .00        .21        .58       1.12       1.82       2.58       3.36       4.16       4.98       5.81
             OUTFLOW          .00       7.35      30.20      73.31     144.92     258.55     397.85     561.28     747.76     956.50
           ELEVATION          .00        .26        .53        .79       1.05       1.32       1.58       1.84       2.11       2.37

             STORAGE         6.66       7.53       8.49       9.54      10.64      11.78      12.98      14.22      15.52      16.86
             OUTFLOW      1186.91    1438.53    1709.11    2006.82    2332.23    2684.97    3065.11    3472.90    3908.69    4372.87
           ELEVATION         2.63       2.89       3.16       3.42       3.68       3.95       4.21       4.47       4.74       5.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN       748. TO       4373.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                            HYDROGRAPH AT STATION     RCPDI

 PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                          (CFS)
+    2291.      4.50                  372.         226.         226.          226.
                         (INCHES)    1.754        1.770        1.770         1.770
                          (AC-FT)     185.         186.         186.          186.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                      6-HR        24-HR        72-HR        9.97-HR
+  (AC-FT)      (HR)
        3.      4.50                    1.           1.           1.            1.

 PEAK STAGE     TIME                               MAXIMUM AVERAGE STAGE
                                      6-HR        24-HR        72-HR        9.97-HR
+   (FEET)      (HR)
```

```
 3.65     4.50                 1.22          .79          .79          .79

                    CUMULATIVE AREA =    1.97 SQ MI


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

            **************
            *            *
 188 KK     *     S2E    *
            *            *
            **************
                      SUB-BASIN S2E

              SUBBASIN RUNOFF DATA

 190 BA         SUBBASIN CHARACTERISTICS
                   TAREA         .03  SUBBASIN AREA

                PRECIPITATION DATA

  15 PB            STORM        3.13  BASIN TOTAL PRECIPITATION

  15 PI           INCREMENTAL PRECIPITATION PATTERN
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                    .01      .01      .01      .01      .01      .03      .03      .03      .03      .03
                    .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                    .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                    .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                    .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

 191 LG         GREEN AND AMPT LOSS RATE
                   STRTL         .10  STARTING LOSS
                     DTH         .25  MOISTURE DEFICIT
                    PSIF        4.30  WETTING FRONT SUCTION
                   XKSAT         .40  HYDRAULIC CONDUCTIVITY
                   RTIMP       20.00  PERCENT IMPERVIOUS AREA

 192 UC         CLARK UNITGRAPH
                      TC         .37  TIME OF CONCENTRATION
                       R         .44  STORAGE COEFFICIENT

 193 UA         ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                     .0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
                  100.0

                                         ***

                                         UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=   .37 HR,       R=   .44 HR
                                   SNYDER  TP=   .24 HR,      CP=   .37

                                              UNIT HYDROGRAPH
                                         75 END-OF-PERIOD ORDINATES
            1.        4.        9.       17.       26.       31.       32.       32.       32.       31.
           30.       28.       26.       25.       23.       21.       20.       18.       17.       16.
           14.       13.       12.       12.       11.       10.        9.        9.        8.        7.
            7.        6.        6.        5.        5.        5.        4.        4.        4.        3.
            3.        3.        3.        3.        2.        2.        2.        2.        2.        2.
            2.        1.        1.        1.        1.        1.        1.        1.        1.        1.
            1.        1.        1.        1.        1.        0.        0.        0.        0.        0.
            0.        0.        0.        0.        0.

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

                     HYDROGRAPH AT STATION       S2E

   TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.51, TOTAL EXCESS =    1.62

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR       9.97-HR
+  (CFS)        (HR)
                            (CFS)
+      32.       4.17                    6.           3.          3.           3.
                         (INCHES)    1.608        1.616       1.616        1.616
                          (AC-FT)       3.           3.          3.           3.

                    CUMULATIVE AREA =     .03 SQ MI


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

            **************
            *            *
 195 KK     *    CP2E    *
            *            *
            **************
                      AT SHEA BLVD, POTENTIAL DETENTION BASIN SITE 5
```

```
197 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                        ***

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

                           HYDROGRAPH AT STATION      CP2E

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                                (CFS)
+    2315.       4.50                  378.         229.         229.          229.
                              (INCHES)   1.752        1.767        1.767         1.767
                              (AC-FT)    187.         189.         189.          189.

                              CUMULATIVE AREA =     2.01 SQ MI

-----DSS---ZWRITE Unit  71; Vers.    2:  /C4/CP2E/FLOW/20FEB1995/2MIN/CALC/
-----DSS---ZWRITE Unit  71; Vers.    2:  /C4/CP2E/FLOW/21FEB1995/2MIN/CALC/


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


             **************
             *            *
199 KK       *     S2F    *
             *            *
             **************

                        SUB-BASIN S2F

             SUBBASIN RUNOFF DATA

201 BA          SUBBASIN CHARACTERISTICS
                      TAREA           .01  SUBBASIN AREA

                PRECIPITATION DATA

 15 PB                STORM          3.13  BASIN TOTAL PRECIPITATION

 15 PI              INCREMENTAL PRECIPITATION PATTERN
```

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.04	.04	.04	.04	.04	.04	.04
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

```
202 LG          GREEN AND AMPT LOSS RATE
                      STRTL           .10  STARTING LOSS
                        DTH           .25  MOISTURE DEFICIT
                       PSIF          4.30  WETTING FRONT SUCTION
                      XKSAT           .40  HYDRAULIC CONDUCTIVITY
                      RTIMP         15.00  PERCENT IMPERVIOUS AREA

203 UC          CLARK UNITGRAPH
                         TC           .22  TIME OF CONCENTRATION
                          R           .32  STORAGE COEFFICIENT

204 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                         .0        5.0       16.0       30.0       65.0       77.0       84.0       90.0       94.0       97.0
                      100.0

                                                                        ***

                                                        UNIT HYDROGRAPH PARAMETERS
                                                   CLARK     TC=   .22 HR,        R=   .32 HR
                                                  SNYDER     TP=   .16 HR,       CP=   .36

                                                             UNIT HYDROGRAPH
                                                        54 END-OF-PERIOD ORDINATES
```

1.	3.	7.	11.	11.	11.	11.	10.	9.	8.
7.	7.	6.	5.	5.	4.	4.	3.	3.	3.
3.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.						

```
      ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION       S2F

    TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.60, TOTAL EXCESS =     1.53

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                                (CFS)
+       9.       4.10                    1.           1.           1.            1.
                              (INCHES)   1.519        1.523        1.523         1.523
                              (AC-FT)    1.           1.           1.            1.
```

CUMULATIVE AREA = .01 SQ MI

*** ***

```
              **************
              *            *
206 KK        *    RCPF    *
              *            *
              **************
```

HYDROGRAPH ROUTING DATA

```
207 RS        STORAGE ROUTING
                  NSTPS          2  NUMBER OF SUBREACHES
                   ITYP       FLOW  TYPE OF INITIAL CONDITION
                 RSVRIC      -1.00  INITIAL CONDITION
                      X        .00  WORKING R AND D COEFFICIENT

208 RC        NORMAL DEPTH CHANNEL
                    ANL       .035  LEFT OVERBANK N-VALUE
                   ANCH       .030  MAIN CHANNEL N-VALUE
                    ANR       .035  RIGHT OVERBANK N-VALUE
                  RLNTH      1144.  REACH LENGTH
                    SEL      .0105  ENERGY SLOPE
                  ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

--- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---

210 RY	ELEVATION	1.00	1.00	.00	1.00	2.00	2.50	2.50	2.50
209 RX	DISTANCE	.00	10.00	15.00	35.00	50.00	65.00	80.00	90.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.01	.02	.05	.09	.14	.20	.28	.38	.50
OUTFLOW	.00	.17	1.10	3.25	7.01	12.71	20.66	31.17	42.19	62.48
ELEVATION	.00	.13	.26	.39	.53	.66	.79	.92	1.05	1.18
STORAGE	.64	.78	.93	1.08	1.24	1.41	1.59	1.78	1.98	2.20
OUTFLOW	87.07	115.90	148.98	186.34	228.02	274.10	319.07	368.40	423.75	485.27
ELEVATION	1.32	1.45	1.58	1.71	1.84	1.97	2.11	2.24	2.37	2.50

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

HYDROGRAPH AT STATION RCPF

```
PEAK FLOW      TIME                         MAXIMUM AVERAGE FLOW
                                 6-HR        24-HR       72-HR       9.97-HR
+  (CFS)       (HR)
                        (CFS)
+      9.      4.20                 1.          1.          1.          1.
                     (INCHES)    1.517       1.523       1.523       1.523
                      (AC-FT)       1.          1.          1.          1.

PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                 6-HR        24-HR       72-HR       9.97-HR
+  (AC-FT)     (HR)
        0.     4.17                 0.          0.          0.          0.

PEAK STAGE     TIME                         MAXIMUM AVERAGE STAGE
                                 6-HR        24-HR       72-HR       9.97-HR
+  (FEET)      (HR)
       .57     4.20                .18         .11         .11         .11
```

CUMULATIVE AREA = .01 SQ MI

*** ***

```
              **************
              *            *
211 KK        *     S2G    *
              *            *
              **************
```

SUB-BASIN S2G

SUBBASIN RUNOFF DATA

```
213 BA         SUBBASIN CHARACTERISTICS
                  TAREA        .19  SUBBASIN AREA
```

PRECIPITATION DATA

```
15 PB             STORM       3.13  BASIN TOTAL PRECIPITATION
```

15 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03

```
                      .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                      .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                      .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

 214 LG        GREEN AND AMPT LOSS RATE
                     STRTL         .15  STARTING LOSS
                       DTH         .25  MOISTURE DEFICIT
                      PSIF        4.30  WETTING FRONT SUCTION
                     XKSAT         .40  HYDRAULIC CONDUCTIVITY
                     RTIMP       20.00  PERCENT IMPERVIOUS AREA

 215 UC        CLARK UNITGRAPH
                        TC         .40  TIME OF CONCENTRATION
                         R         .28  STORAGE COEFFICIENT

 216 UA        ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                        .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                     100.0

                                                    ***

                                           UNIT HYDROGRAPH PARAMETERS
                                      CLARK   TC=   .40 HR,       R=   .28 HR
                                     SNYDER   TP=   .34 HR,      CP=   .77

                                                UNIT HYDROGRAPH
                                           52 END-OF-PERIOD ORDINATES
                5.       14.       21.       29.       40.       60.      109.      191.      259.      283.
              279.      263.      239.      212.      188.      167.      148.      131.      116.      103.
               91.       81.       72.       64.       56.       50.       44.       39.       35.       31.
               27.       24.       21.       19.       17.       15.       13.       12.       10.        9.
                8.        7.        6.        6.        5.        4.        4.        4.        3.        3.
                2.        2.

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

                        HYDROGRAPH AT STATION       S2G

    TOTAL RAINFALL =    3.13, TOTAL LOSS =    1.52, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR       9.97-HR
+   (CFS)       (HR)
                         (CFS)
+     228.      4.23                32.         20.         20.          20.
                       (INCHES)   1.597       1.602       1.602        1.602
                        (AC-FT)     16.         16.         16.          16.

                       CUMULATIVE AREA =      .19 SQ MI


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

           **************
           *            *
 218 KK    *     CP1    *
           *            *
           **************
                        AT 44TH STREET INTERSECTION

 220 HC        HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                    ***

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

                        HYDROGRAPH AT STATION       CP1

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR       9.97-HR
+   (CFS)       (HR)
                         (CFS)
+     237.      4.23                34.         20.         20.          20.
                       (INCHES)   1.593       1.599       1.599        1.599
                        (AC-FT)     17.         17.         17.          17.

                       CUMULATIVE AREA =      .20 SQ MI


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

           **************
           *            *
 221 KK    *    RCP2G   *
           *            *
           **************

           HYDROGRAPH ROUTING DATA

 222 RS        STORAGE ROUTING
                     NSTPS           5  NUMBER OF SUBREACHES
                      ITYP        FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC       -1.00  INITIAL CONDITION
                         X         .00  WORKING R AND D COEFFICIENT
```

```
223 RC          NORMAL DEPTH CHANNEL
                      ANL        .035  LEFT OVERBANK N-VALUE
                     ANCH        .030  MAIN CHANNEL N-VALUE
                      ANR        .035  RIGHT OVERBANK N-VALUE
                    RLNTH       3088.  REACH LENGTH
                      SEL       .0123  ENERGY SLOPE
                    ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
225 RY          ELEVATION      1.10      1.00      1.00       .00      1.00      1.00      1.10      2.00
224 RX          DISTANCE        .00     40.00     60.00     80.00    125.00    130.00    140.00    155.00

                                                                ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

             STORAGE        .00       .03       .10       .23       .41       .64       .92      1.25      1.63      2.07
             OUTFLOW        .00       .28      1.77      5.21     11.23     20.36     33.10     49.93     71.29     97.60
           ELEVATION        .00       .11       .21       .32       .42       .53       .63       .74       .84       .95

             STORAGE       2.69      3.70      4.75      5.83      6.91      8.01      9.12     10.24     11.38     12.53
             OUTFLOW     129.26    184.71    254.83    337.19    430.87    535.29    650.00    774.70    909.12   1053.04
           ELEVATION       1.05      1.16      1.26      1.37      1.47      1.58      1.68      1.79      1.89      2.00

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

                      HYDROGRAPH AT STATION     RCP2G

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR       9.97-HR
+   (CFS)        (HR)
                              (CFS)
+     224.       4.43                    34.         20.         20.         20.
                            (INCHES)   1.591       1.599       1.599       1.599
                             (AC-FT)     17.         17.         17.         17.

PEAK STORAGE     TIME                         MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR       9.97-HR
+  (AC-FT)       (HR)
        1.       4.43                     0.          0.          0.          0.

  PEAK STAGE     TIME                         MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR       9.97-HR
+   (FEET)       (HR)
      1.22       4.43                    .46         .30         .30         .30

                     CUMULATIVE AREA =      .20 SQ MI


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


           **************
           *            *
226 KK     *     S2H    *
           *            *
           **************

                         SUB-BASIN S2H

             SUBBASIN RUNOFF DATA

228 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .05  SUBBASIN AREA

                PRECIPITATION DATA

 15 PB              STORM        3.13  BASIN TOTAL PRECIPITATION

 15 PI           INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
                      .03       .03       .03       .04       .04       .04       .04       .04       .04       .04
                      .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                      .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

229 LG          GREEN AND AMPT LOSS RATE
                    STRTL         .10  STARTING LOSS
                      DTH         .28  MOISTURE DEFICIT
                     PSIF        3.20  WETTING FRONT SUCTION
                    XKSAT         .49  HYDRAULIC CONDUCTIVITY
                    RTIMP       15.00  PERCENT IMPERVIOUS AREA

230 UC          CLARK UNITGRAPH
                       TC         .16  TIME OF CONCENTRATION
                        R         .20  STORAGE COEFFICIENT

231 UA          ACCUMULATED-AREA VS. TIME, 11 ORDINATES
                       .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                    100.0
```

***

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .16 HR, R= .20 HR
SNYDER TP= .11 HR, CP= .39

UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

12.	60.	101.	106.	101.	89.	75.	63.	53.	45.
38.	32.	27.	23.	19.	16.	14.	12.	10.	8.
7.	6.	5.	4.	3.	3.	2.	2.	2.	1.
1.	1.	1.	1.						

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

HYDROGRAPH AT STATION S2H

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.66, TOTAL EXCESS = 1.47

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 66.	4.03		8.	5.	5.	5.
		(INCHES)	1.459	1.461	1.461	1.461
		(AC-FT)	4.	4.	4.	4.

CUMULATIVE AREA = .05 SQ MI

*** ***

233 KK * CP2 *

234 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP2

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 250.	4.40		41.	25.	25.	25.
		(INCHES)	1.563	1.571	1.571	1.571
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .25 SQ MI

*** ***

235 KK * RCP2 *

HYDROGRAPH ROUTING DATA

236 RS STORAGE ROUTING
NSTPS 2 NUMBER OF SUBREACHES
ITYP FLOW TYPE OF INITIAL CONDITION
RSVRIC -1.00 INITIAL CONDITION
X .00 WORKING R AND D COEFFICIENT

237 RC NORMAL DEPTH CHANNEL
ANL .035 LEFT OVERBANK N-VALUE
ANCH .030 MAIN CHANNEL N-VALUE
ANR .035 RIGHT OVERBANK N-VALUE
RLNTH 1160. REACH LENGTH
SEL .0138 ENERGY SLOPE
ELMAX .0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA
--- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---

239 RY	ELEVATION	5.50	4.50	2.50	.50	.00	.50	2.50	4.50
238 RX	DISTANCE	.00	45.00	55.00	75.00	80.00	85.00	93.00	100.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.02	.09	.19	.32	.49	.68	.91	1.16	1.45
OUTFLOW	.00	1.34	8.81	25.62	52.49	90.93	142.41	208.35	290.10	396.43
ELEVATION	.00	.29	.58	.87	1.16	1.45	1.74	2.03	2.32	2.61
STORAGE	1.76	2.09	2.44	2.80	3.19	3.59	4.02	4.54	5.16	5.89
OUTFLOW	534.08	690.53	866.07	1061.04	1275.77	1510.62	1759.78	2042.44	2364.36	2727.23
ELEVATION	2.89	3.18	3.47	3.76	4.05	4.34	4.63	4.92	5.21	5.50

```
*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      290. TO      2727.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                     HYDROGRAPH AT STATION      RCP2

  PEAK FLOW     TIME                       MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR      9.97-HR
+   (CFS)       (HR)
                          (CFS)
+    249.       4.43                41.         25.         25.         25.
                        (INCHES)  1.563       1.571       1.571       1.571
                        (AC-FT)     21.         21.         21.         21.

 PEAK STORAGE   TIME                       MAXIMUM AVERAGE STORAGE
                                  6-HR       24-HR       72-HR      9.97-HR
+  (AC-FT)      (HR)
        1.      4.43                 0.          0.          0.          0.

  PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                  6-HR       24-HR       72-HR      9.97-HR
+   (FEET)      (HR)
      2.17      4.43                .77         .49         .49         .49

                      CUMULATIVE AREA =      .25 SQ MI


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


              *************
              *           *
 240 KK       *     S2J   *
              *           *
              *************

                SUBBASIN RUNOFF DATA

 241 BA           SUBBASIN CHARACTERISTICS
                       TAREA        .02  SUBBASIN AREA

                  PRECIPITATION DATA

  15 PB                STORM       3.13  BASIN TOTAL PRECIPITATION

  15 PI             INCREMENTAL PRECIPITATION PATTERN
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                       .01      .01      .01      .01      .01      .03      .03      .03      .03      .03
                       .03      .03      .03      .04      .04      .04      .04      .04      .04      .04
                       .02      .02      .02      .02      .02      .02      .02      .01      .01      .01
                       .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

 242 LG           GREEN AND AMPT LOSS RATE
                       STRTL        .10  STARTING LOSS
                         DTH        .25  MOISTURE DEFICIT
                        PSIF       4.30  WETTING FRONT SUCTION
                       XKSAT        .40  HYDRAULIC CONDUCTIVITY
                       RTIMP      20.00  PERCENT IMPERVIOUS AREA

 243 UC           CLARK UNITGRAPH
                          TC        .28  TIME OF CONCENTRATION
                           R        .23  STORAGE COEFFICIENT

 244 UA           ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                         .0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
                      100.0

                                                 ***

                                               UNIT HYDROGRAPH PARAMETERS
                                         CLARK   TC=   .28 HR,      R=   .23 HR
                                        SNYDER   TP=   .16 HR,     CP=   .44

                                                    UNIT HYDROGRAPH
                                               40 END-OF-PERIOD ORDINATES
                 2.        9.       21.       35.       40.       39.       37.       34.       31.       27.
                23.       20.       17.       15.       13.       11.       10.        8.        7.        6.
                 5.        5.        4.        3.        3.        3.        2.        2.        2.        1.
                 1.        1.        1.        1.        1.        1.        1.        0.        0.        0.

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

                     HYDROGRAPH AT STATION       S2J

    TOTAL RAINFALL =     3.13, TOTAL LOSS =     1.51, TOTAL EXCESS =     1.62

  PEAK FLOW     TIME                       MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR      9.97-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+        30.      4.10             4.          2.          2.          2.
                       (INCHES)  1.613       1.617       1.617       1.617
                        (AC-FT)     2.          2.          2.          2.

                       CUMULATIVE AREA =     .02 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
***

               **************
               *            *
  246 KK       *     CP3    *
               *            *
               **************
                         AT TATUM BLVD

  248 HC          HYDROGRAPH COMBINATION
                         ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                             ***

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

                        HYDROGRAPH AT STATION      CP3

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR       9.97-HR
+   (CFS)       (HR)
                        (CFS)
+    265.       4.43                  45.         27.         27.          27.
                       (INCHES)     1.566       1.575       1.575        1.575
                        (AC-FT)       22.         23.         23.          23.

                       CUMULATIVE AREA =     .27 SQ MI
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	S1B	319.	4.20	44.	27.	27.	.23		
+	ROUTED TO	RS1B	311.	4.27	44.	27.	27.	.23		
+									1.04	4.27
+	HYDROGRAPH AT	S1A	458.	4.20	63.	38.	38.	.33		
+	ROUTED TO	RS1A	450.	4.27	63.	38.	38.	.33		
+									1.49	4.27
+	HYDROGRAPH AT	S1C	138.	4.20	21.	13.	13.	.11		
+	3 COMBINED AT	CP1C	892.	4.27	128.	77.	77.	.67		
+	ROUTED TO	RCP1C	881.	4.33	128.	77.	77.	.67		
+									2.30	4.33
+	HYDROGRAPH AT	S1D	418.	4.20	59.	36.	36.	.31		
+	ROUTED TO	RS1D	413.	4.27	59.	36.	36.	.31		
+									1.40	4.27
+	HYDROGRAPH AT	S1E	647.	4.27	97.	59.	59.	.51		
+	3 COMBINED AT	CP1E	1911.	4.30	284.	172.	172.	1.49		
+	ROUTED TO	RCP1E	1895.	4.33	284.	172.	172.	1.49		
+									5.06	4.33
+	HYDROGRAPH AT	S1F	331.	4.27	53.	32.	32.	.28		
+	2 COMBINED AT	CP1F	2212.	4.33	337.	204.	204.	1.77		
+	ROUTED TO	RCFI	2171.	4.40	337.	204.	204.	1.77		
+									4.93	4.40
+	HYDROGRAPH AT	S2A1	88.	4.10	11.	7.	7.	.06		
+	2 COMBINED AT	CP2A1	2219.	4.40	348.	211.	211.	1.83		
+	ROUTED TO	RCP21	2213.	4.43	348.	211.	211.	1.83		
+									3.99	4.43

+	HYDROGRAPH AT	S2A2	32.	4.30	7.	4.	4.	.04	
+	2 COMBINED AT	CP2A2	2244.	4.43	355.	215.	215.	1.87	
+	ROUTED TO	RCP22	2244.	4.43	355.	215.	215.	1.87	5.51 4.43
+	HYDROGRAPH AT	S2B	36.	4.07	4.	3.	3.	.03	
+	2 COMBINED AT	CP2B	2261.	4.43	359.	218.	218.	1.89	
+	ROUTED TO	RCP2B	2252.	4.47	359.	218.	218.	1.89	2.84 4.47
+	HYDROGRAPH AT	S2C	37.	4.07	5.	3.	3.	.03	
+	2 COMBINED AT	CP2C	2268.	4.47	364.	221.	221.	1.92	
+	ROUTED TO	RCP2C	2268.	4.47	364.	221.	221.	1.92	3.49 4.47
+	HYDROGRAPH AT	S2D	28.	4.10	4.	2.	2.	.02	
+	HYDROGRAPH AT	S2I	38.	4.07	5.	3.	3.	.03	
+	3 COMBINED AT	CP2DI	2301.	4.47	372.	226.	226.	1.97	
+	ROUTED TO	RCPDI	2291.	4.50	372.	226.	226.	1.97	3.65 4.50
+	HYDROGRAPH AT	S2E	32.	4.17	6.	3.	3.	.03	
+	2 COMBINED AT	CP2E	2315.	4.50	378.	229.	229.	2.01	
+	HYDROGRAPH AT	S2F	9.	4.10	1.	1.	1.	.01	
+	ROUTED TO	RCPF	9.	4.20	1.	1.	1.	.01	.57 4.20
+	HYDROGRAPH AT	S2G	228.	4.23	32.	20.	20.	.19	
+	2 COMBINED AT	CP1	237.	4.23	34.	20.	20.	.20	
+	ROUTED TO	RCP2G	224.	4.43	34.	20.	20.	.20	1.22 4.43
+	HYDROGRAPH AT	S2H	66.	4.03	8.	5.	5.	.05	
+	2 COMBINED AT	CP2	250.	4.40	41.	25.	25.	.25	
+	ROUTED TO	RCP2	249.	4.43	41.	25.	25.	.25	2.17 4.43
+	HYDROGRAPH AT	S2J	30.	4.10	4.	2.	2.	.02	
+	2 COMBINED AT	CP3	265.	4.43	45.	27.	27.	.27	

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

-----DSS---ZCLOSE Unit: 71, File: TATMS1S2.DSS
Pointer Utilization: .25
Number of Records: 14
File Size: 53.8 Kbytes
Percent Inactive: .00

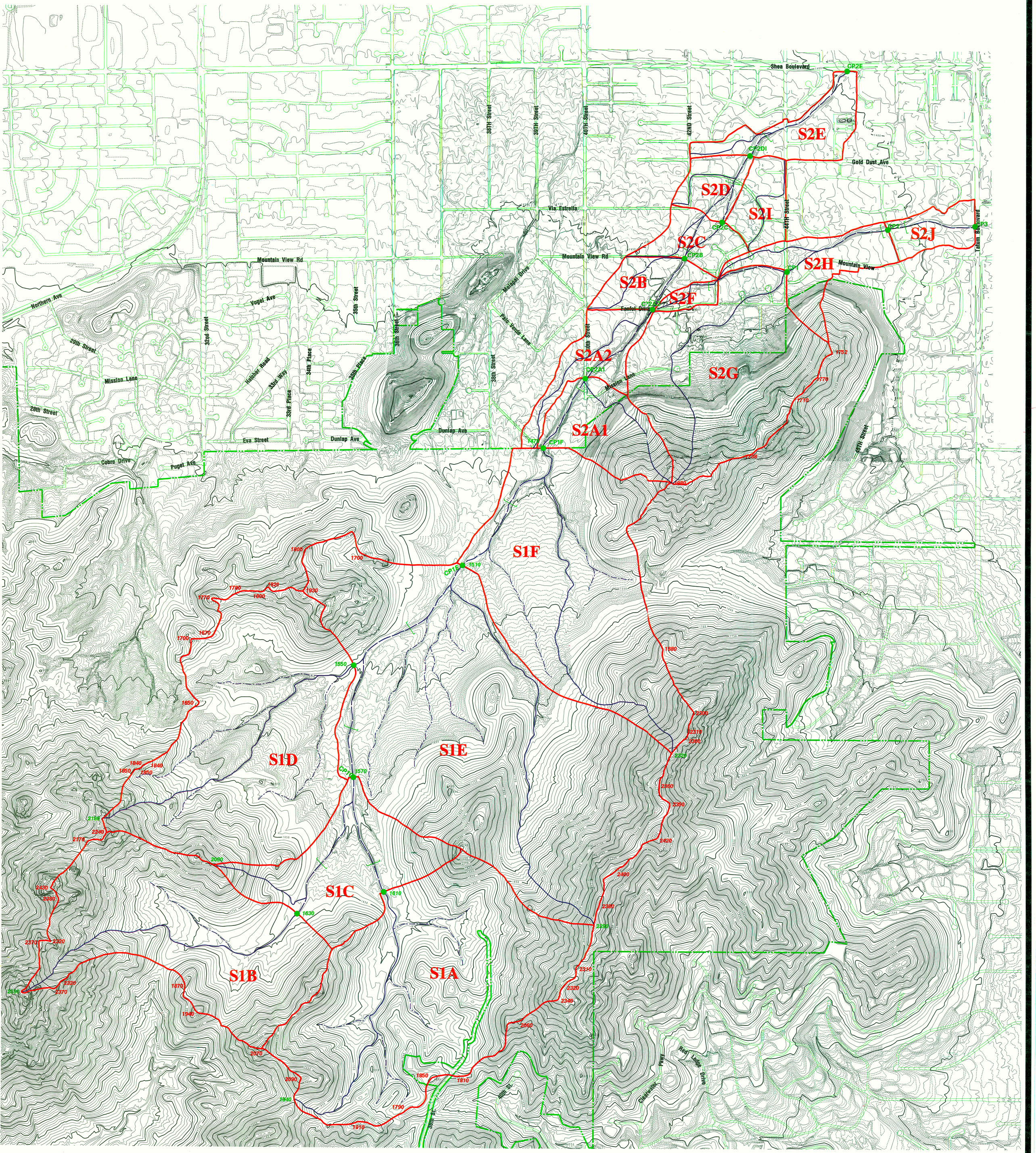
Tatum Wash Watershed

Scale 1" = 400'

0 200 400 800 1600

Legend

- Potential Detention Basin Site
- 50 Foot Index Contour
- 10 Foot Index Contour
- 2 Foot Intermediate Contour
- Roads
- Watershed Basins Boundary
- Streamlines
- Longest Flowpath
- Routing Reaches
- Cross Section
- Phoenix Mountains Preserve Boundary


Shea Boulevard
CP2E
S2E
CP2DI
Gold Dust Ave
S2D
S2I
Via Estrella
CP2C
S2C
Mountain View Rd
CP2B
S2B
S2F
Fanfol Drive
CP2A2
S2A2
CP2A1
S2G
Mission Lane
S2A1
CP1F
1472
Dunlap Ave
Eva Street
Puget Ave
Cobre Drive
20th Street
Northern Ave
Vogel Ave
Mountain View Rd
Malaga Drive
Palo Verde Lane
Hatcher Road
32nd Street
33rd Place
33rd Way
34th Place
35th Place
35th Street
36th Street
38th Street
39th Street
40th Street
42ND Street
44TH Street
48TH Street
Tatum Boulevard
CP2
CP3
Mountain View
1752
1770
1710
1980
1538
1519
CP1E
1700
1800
1770
1780
1820
1930
1890
1670
1700
1550
S1F
S1E
S1D
CP1D
1570
1840
1650
1840
1850
2186
2540
2176
2090
2430
2360
2310
2320
2590
2320
2370
1870
1940
2070
2690
1940
1910
1790
1630
1810
S1C
S1B
S1A
1850
1810
2060
2310
2320
2340
2380
2330
2400
2420
2450
2350
2360
2310
2320
1880
2300
2310
2360
2220
Alta St.
Clearwater Place
Red Ledge Drive