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RESPONSE TO

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY REVIEW COMMENTS (MEMO DATE 5/5/95)

FOR

CONCEPT DESIGN REPORT
DRAINAGE IMPROVEMENTS
AMENDMENT TO VOLUME II OF II

84TH STREET & CHOLLA ROAD
ROADWAY IMPROVEMENTS
and
83RD PLACE & SHEA BOULEVARD
NEIGHBORHOOD DRAINAGE IMPROVEMENTS

CITY OF SCOTTSDALE PROJECT NUMBERS
F2708, S2709 & F4702

Prepared by
SMF Engineering Corporation
1915 W. Adobe Drive, Suite D
Phoenix, AZ 85027
Phone (602) 516-0605 Fax (602) 516-0068

September 1, 1995

S M F Scott, Meyer, Ferguson
ENGINEERING CORPORATION

Charles D. Scott, PE & RLS
Rob Meyer, PE
Mark Crigler, PE
David R. Ferguson, RLS

September 1, 1995

Mr. Greg Crossman, PE
Project Coordinator
City of Scottsdale
Capital Project Management
3939 Civic Center Boulevard
Scottsdale, AZ 85251

RE: City of Scottsdale Projects S-2709 & F-2708
Interoffice Memorandum Dated 5/5/95 (FCDMC)
84th Street & Cholla Road Concept Design Report

Dear Mr. Crossman:

We first sincerely apologize for not discovering our errors in the HEC-1 input data which were subsequently detected by the FCDMC reviewers. Errors such as these are normally caught in our formal checking process.

As you know, Rob is currently in Holland. Therefore, I have been reviewing his past work in order to respond to FCDMC's comments.

The FCDMC's primary concerns are: 1) The use of NSTPS values of 100, and; 2) the use of the 2 year, 24 hour (~1.44 in) rainfall to calculate the sheet flow component of the Time of Concentration, T_C.

First, the NSTPS value of 100 is obviously incorrect. We used a constant value of 100 for all channel reaches in the HEC-1 model. Before Rob left, he told me that he failed to divide by 60 to convert seconds to minutes, which would give a value of 1 or 2. A new value of NSTPS was calculated and entered on the RS card for all reaches in the Cholla Basin Model as follows: the number of routing steps (NSTPS) was calculated for each channel or waterway according to page A-69 of the HEC-1 manual. That is, NSTPS=(reach length/avg. velocity) ÷ NMIN. The NMIN value initially used and input on the IT card is two (2). The NSTPS value calculated for each reach ranged from 1 to 7. However, the peak outflow is somewhat greater using the NSTPS value of 100; using the recently calculated valued of NSTPS (1 to 7) results in a slightly decreased peak outflow value.

Second, using the 2 year, 24 hour rainfall of 1.44 inches in lieu of the specified 10 year, 6 hour rainfall of 2.08 inches increased T_C and thus decreased the estimated flows. We also changed this value in the Cholla Basin HEC-1 computer model. For the first 300 feet of sheet flow, the TR-55 manual says

$$T_t = \frac{0.007\,(nL)^{.8}}{(P_2)^{.5} S^{.4}}$$

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and P_2=2 year, 24 hour rainfall (in). P_2 = 1.44 (2 year, 24 hour). P_{10} = 2.08 (10 year, 6 hour).

In conclusion, the NSTPS value of 100 increased the estimated flow values, and the use of the 2 year, 24 hour rainfall decreased estimated values. The corrected output discharge values were tabulated and compared (corrected HEC-1 model vs. old HEC-1 model). Values in excess of 150 cfs decreased while values less than 150 cfs increased. Percent of changes are as follows:

Note: See Column Descriptions Below

	(1)	(2)	(3)	(4)	(5)
Concentration Point No.	NSTPS 100 P=1.44	** NSTPS Calc. P=1.44	NSTPS 100 P=2.08	** NSTPS Calc. P=2.08	$100*\frac{(4)-(1)}{(1)}$
310	35	35	37	37	6%
C320	17	17	18	18	6%
330	81	81	82	82	1%
C330	111	110	114	111	0%
C380F	117	116	120	118	1%
SD700	122	121	124	122	0%
C380B	103	103	106	105	2%
C390	220	221	224	224	2%
C430	72	71	73	73	1%
C510	53	53	53	53	0%
C520	76	75	78	77	1%
C530	91	90	94	93	2%
C540	34	33	35	34	0%
C560	161	154	167	158	<2%>
C590	195	189	202	194	<<1%>
C610	199	190	203	194	<2.5%>
C470	165	164	169	167	<1%>
C600	214	210	217	214	0%
C610	403	390	413	398	<1%>

** NSTPS Calculated for Each Reach
(1) Original HEC-1 Model
(2) Revised NSTPS Only
(3) Revised T_C Only
(4) Combined Revisions (NSTPS and T_C)
(5) Percent Change from Original Model, Combined Revisions

Questions and Clarifications:

1) Is a subbasin map for the Interim Condition HEC-1 model available?

   Ans: We did not prepare a separate map specifically for the Interim Conditions. However, all of the drainage areas and concentration points are shown on pages 3 and 4 of Section 1.

2) Is the St. Patrick's Church detention basin in place and can it be used?

   Ans: The basin is in place; however, it is in use now for St. Patrick's on-site drainage system. Our initial report (page 15, Section 2) describes the results of our study. The site is less than 1 acre (too small) and the church was not willing to allow the City its use or dedicate a drainage easement.

3) In table 2.3, the Existing Conditions Water Surface Elevation of 1635.4 should be 1365.4.

   Ans: The FCDMC is correct; the error is noted and will be corrected.

4) What is the basis for the fencing, 48" RCP, and 60" RCP cost estimates? The fencing costs are higher than expected, while 48" and 60" RCP costs appear to be low.

   Ans: The basis for the unit prices is the City of Scottsdale's Unit Cost Database. The unit cost for fencing used in our estimate is $100/LF. The conditions estimated in the report were that the fence would be 8 feet high, masonry block, and the footing may also function as small retaining walls in some areas. The COS Database shows $100/LF for 8 foot concrete block walls, Item No. 510008. For 48" and 60" RCP, the COS Database shows $96/LF and $122/LF respectively; our estimates used $100/LF and $122/LF respectively.

5) Please locate Detention Basin 1040 which is used in the HEC-1 model on the Drainage Area Map.

   Ans: The existing Detention Basin (ED 1040) is shown on the map but it is not labeled. It is located at the south edge of subbasin 1040.

6) In order to follow the last portion of the HEC-1 model, the drainage basin map should delineate the subbasins and related routings after Subbasin 970. Also, the location of the Pima Channel south and north should be provided.

   Ans: Subbasin 970 is outside the study area; the HEC-1 stream network as modeled does not continue south along Pima Channel. The Pima Channel location is shown on the Existing Drainage Facilities Map. Notice that the channel <u>does not exist</u> from Sutton Drive to Thunderbird Road.

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7) The last questions refer to Volume I of II, Article 1.3, Section 1, page 3.

Ans: 86th Street should have read 86th Place.

Please feel free to contact our office should you have any questions or require further information on any of the above.

Respectfully,

Charles D. Scott, PE & RLS
President
SMF Engineering Corporation

CDS/lr

c:\wp51\cos\cactusrd\fcdmc.gc

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1	ORIGINAL HEC-1 MODEL
2	HEC-1 MODEL WITH ONLY NSTPS CHANGED
3	HEC-1 MODEL WITH ONLY T_C CHANGED
4	HEC-1 MODEL WITH NSTPS AND T_C CHANGED
5	TR55 RUN WITH P=2.08

AVERY® READY INDEX™ INDEXING SYSTEM

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/31/1995  TIME  08:33:43 *
*                                       *
*****************************************
```

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

HEC-1 INPUT PAGE 1

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

  1           ID        84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
  2           ID        2-5-10-25-50-100 yr STORM
  3           ID        INTERIM and ULTIMATE CONDITION:
  4           ID        FINAL DESIGN ********************* CHOLLA BASIN
  5           ID        --STORM DRAIN IN CHOLLA ROAD
  6           ID        --DETENTION BASIN AT SITE 1 (4 acres)
  7           ID        --cactus sd intercepts 100-yr flow
  8           ID        --NO STORM DRAIN IN DESERT COVE
  9           ID        --no CONNECTOR AT CORTEZ TO INTERCEPT
 10           ID        --FILE = NSTP VALUES ARE 100 (RS CARDS)
 11           ID        --TIME OF CONCENTRATION = 1.44 2-HOUR 24-YEAR STORM
 12           ID
 13           ID        FILE CNTYNOCG.DAT
              *DIAGRAM
 14           IT       2                    300
 15           IO       5
 16           JR    PREC     .36     .53     .62     .76     .88     1.0

 17           KK     310      subbasin 310 runoff
```

```
 18          BA  .01647
 19          PH                    0.88    1.61     2.6    2.84     3.0     3.3
 20          LS              77      20
 21          UD     .16

 22          KK    C320      DIVERT C310 TO 320
 23          DT    D310
 24          DI       0     100
 25          DQ       0      50

 26          KK    C330      ROUTE C310 TO 330
 27          RS     100    STOR      -1       0
 28          RC    .040    .016    .040     750   .0030
 29          RX       0      24    24.1      40    40.1      56    56.1      80
 30          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101
 31          RS     100    STOR      -1       0
 32          RC    .040    .016    .040    2000   .0060
 33          RX       0      24    24.1      40    40.1      56    56.1      80
 34          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 35          KK     350      subbasin 350 runoff
 36          BA  .00225
 37          LS              77      20
 38          UD     .06

 39          KK    C350      DIVERT C350 TO 360
 40          DT    D350
 41          DI       0     100
 42          DQ       0      50

 43          KK    C330      ROUTE 350 TO 330
 44          RS     100    STOR      -1       0
 45          RC    .040    .016    .040    2200   .0060
 46          RX       0      24    24.1      40    40.1      56    56.1      80
 47          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21
```



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

 48          KK     330      subbasin 330 runoff
 49          BA  .06322
 50          LS              77      20
 51          UD     .38

 52          KK    C330      COMBINE C310 AND 330 AND C350
 53          HC       3

 54          KK     340      subbasin 340 runoff
 55          BA  .01031
 56          LS              77      20
 57          UD     .15

 58          KK    C330      ROUTE 340 TO 330
 59          RS     100    STOR      -1       0
 60          RC    .040    .016    .040     440   .0022
 61          RX       0    19.8    19.8      40    40.1      42      50      60
```

```
 62          RY    82.9   82.41   81.91   82.31   82.31   82.22    82.1    82.4

 63          KK    C330       COMBINE C310 AND 340
 64          HC       2

 65          KK   C380F       ROUTE C330 TO 380F
 66          RD     300  0.0030   0.012            CIRC       4

 67          KK    380F       subbasin 380F runoff
 68          BA  .00688
 69          LS               77      20
 70          UD     .13

 71          KK   C380F       COMBINE 380F AND C330
 72          HC       2

 73          KK   C380E       ROUTE C380F TO 380E
 74          RD     300  0.0030   0.012            CIRC       4

 75          KK    380E       subbasin 380E runoff
 76          BA  .00505
 77          LS               77      20
 78          UD     .10

 79          KK   C380E       COMBINE 380E AND C380F
 80          HC       2

 81          KK   C380D       ROUTE C380E TO 380D
 82          RD     240  0.0030   0.012            CIRC       4

 83          KK    380D       subbasin 380D runoff
 84          BA  .00198
 85          LS               77      20
 86          UD     .10
```



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


 87          KK   C380D       COMBINE C380D AND 380E
 88          HC       2

 89          KK   SD700       ROUTE C380D TO SD700
 90          RD     100  0.0030   0.012            CIRC       4

 91          KK    D350       RETRIEVE D350
 92          DR    D350

 93          KK    C360       ROUTE C350 TO 360
 94          RS     100    STOR      -1       0
 95          RC    .040    .016    .040     850   .0040
 96          RX       0      24    24.1      40    40.1      56    56.1      80
 97          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

 98          KK     360       SUBBASIN 360 RUNOFF
 99          BA  .01320
100          LS               77      20
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101          UD     .14

102          KK     370      SUBBASIN 370 RUNOFF
103          BA  .00592
104          LS              77      20
105          UD     .11

106          KK    C370      COMBINE D350 AND 360 AND 370
107          HC       3

108          KK   C380A      ROUTE C370 TO 380A
109          RS     100    STOR      -1       0
110          RC    .040    .016    .040     620   .0054
111          RX       0      20    20.1      40    40.1      60    60.1      80
112          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

113          KK    380A      subbasin 380A runoff
114          BA  .00588
115          LS              77      20
116          UD     .13

117          KK   C380A      COMBINE C370 AND C380A
118          HC       2

119          KK   C380B      ROUTE C380A TO 380B
120          RS     100    STOR      -1       0
121          RC    .040    .016    .040     700   .0077
122          RX       0      20    20.1      40    40.1      60    60.1      80
123          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

124          KK    380B      subbasin 380B runoff
125          BA  .02333
126          LS              77      20
127          UD     .20
```



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


128          KK   C380B      COMBINE C380A AND C380B
129          HC       2

130          KK   SD700      ROUTE C380B TO SD700
131          RD     150  0.0030   0.012            CIRC       2

132          KK    380C      subbasin 380C runoff
133          BA  .00288
134          LS              77      20
135          UD     .10

136          KK   SD700      ROUTE C380C TO SD700
137          RD      80  0.0030   0.012            CIRC       2

138          KK     390      subbasin 390 runoff
139          BA  .00938
140          LS              77
141          UD     .17
```

```
142          KK    C390      COMBINE C380D AND 380B AND 380C AND 390
143          HC       4

144          KK   SD700      NEW DETENTION BASIN (bottom avg=1373, outfall pipe=1372.20)
145          RS       1    STOR       0
146          SV       0    2.22    4.58    7.08    9.44
147          SE      73      74      75      76      77
148          SQ       5      16      32      46      60

149          KK    C510      ROUTE SD700 TO 510
150          RS     100    STOR      -1       0
151          RC    .050    .035    .050     700   .0070
152          RX       0      .1      17      22      28      33      50    50.1
153          RY     102     100      99    96.5    96.5      99     100     102

154          KK     510      SUBBASIN 510 RUNOFF
155          BA  .01044
156          LS              77      20
157          UD     .06

158          KK    C510      COMBINE SD700 AND 510
159          HC       2

160          KK    C520      ROUTE C510 TO 520
161          RS     100    STOR      -1       0
162          RC    .050    .035    .050     440   .0030
163          RX       0      .1      17      22      28      33      50    50.1
164          RY     102     100      99    96.5    96.5      99     100     102

165          KK     520      SUBBASIN 520 RUNOFF
166          BA  .01402
167          LS              77      20
168          UD     .10
```



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

169          KK    C520      COMBINE C510 AND 520
170          HC       2

171          KK     530      SUBBASIN 530 RUNOFF
172          BA  .00806
173          LS              77      20
174          UD     .15

175          KK    C530      COMBINE C520 AND 530
176          HC       2

177          KK    C550      ROUTE C530 TO 550
178          RS     100    STOR      -1       0
179          RC    .050    .035    .050     350   .0050
180          RX       0      .1      17      22      28      33      50    50.1
181          RY     102     100      99    96.5    96.5      99     100     102

182          KK     420      SUBBASIN 420 RUNOFF
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183          BA  .01719
184          LS              77      20
185          UD     .21

186          KK    C430      ROUTE C420 TO 430
187          RS     100    STOR      -1       0
188          RC    .040    .016    .040     480   .0020
189          RX       0      20      23      30    30.1      37      40      60
190          RY     102    99.7   99.93     100     100   99.93    99.7     102

191          KK     430      SUBBASIN 430 RUNOFF
192          BA  .02202
193          LS              77      20
194          UD     .20

195          KK    C430      COMBINE C420 AND 430
196          HC       2

197          KK     440      SUBBASIN 440 RUNOFF
198          BA  .00731
199          LS              77      20
200          UD     .14

201          KK    C440      COMBINE C430 AND 440
202          HC       2

203          KK    C440      DIVERT C440 TO 470
204          DT    D440
205          DI       0     100     200     300
206          DQ       0      70     140     210
```



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


207          KK    C540      ROUTE C440 TO C540
208          RS     100    STOR      -1       0
209          RC    .040    .016    .040     540   .0080
210          RX       0      20      23      30    30.1      37      40      60
211          RY     102    99.7   99.93     100     100   99.93    99.7     102

212          KK     540      SUBBASIN 540 RUNOFF
213          BA  .00517
214          LS              77      20
215          UD     .13

216          KK    C540      COMBINE C440 AND 540
217          HC       2

218          KK    C550      ROUTE 540 TO C550
219          RS     100    STOR      -1       0
220          RC    .040    .016    .040     200   .0080
221          RX       0      20      23      30    30.1      37      40      60
222          RY     101    99.7   99.93     100     100   99.93    99.7     101

223          KK     550      SUBBASIN 550
224          BA  .00703
```

```
225          LS              77      20
226          UD     .08

227          KK    C550      COMBINE 550 AND C530 AND 540
228          HC       3

229          KK    C560      ROUTE C550 TO 560
230          RS     100    STOR      -1       0
231          RC    .050    .035    .050     900   .0060
232          RX       0      .1      20      22      28      30      50    50.1
233          RY     102     100      99      97      97      99     100     102

234          KK     570      SUBBASIN 570 RUNOFF
235          BA  .00492
236          LS              77      20
237          UD     .16

238          KK     580      SUBBASIN 580 RUNOFF
239          BA  .00575
240          LS              77      20
241          UD     .14

242          KK     560      SUBBASIN 560 RUNOFF
243          BA  .00386
244          LS              77      20
245          UD     .12
```



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

246          KK    C560      COMBINE C550 AND 560 AND 570 AND 580
247          HC       4

248          KK    C590      ROUTE C560 TO 590
249          RS     100    STOR      -1       0
250          RC    .050    .035    .050      55   .0030
251          RX       0      .1      20    20.1      32    32.1      50    50.1
252          RY     102     100      99      96      96      99     100     102

253          KK     590      SUBBASIN 590 RUNOFF
254          BA  .01931
255          LS              77      20
256          UD    0.21

257          KK    C590      COMBINE C560 AND 590
258          HC       2

259          KK    C610      ROUTE C590 TO 610
260          RS     100    STOR      -1       0
261          RC    .050    .035    .050     600   .0030
262          RX       0      .1      20      24      32      36      50    50.1
263          RY     102     100      99      96      96      99     100     102

264          KK     610      SUBBASIN 610 RUNOFF
265          BA   .0035
266          LS              77      20
```

```
 267          UD    0.06

 268          KK    C610      COMBINE 610 AND C590
 269          HC       2

 270          KK    D440      RETRIEVE D440
 271          DR    D440

 272          KK    C470      ROUTE D440 TO 470
 273          RS     100    STOR      -1       0
 274          RC    .040    .016    .040    1200   .0070
 275          RX       0      24    24.1      40    40.1      56    56.1      80
 276          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 277          KK     410      SUBBASIN 410 RUNOFF
 278          BA  .04406
 279          LS              77      20
 280          UD    0.30

 281          KK    C450      ROUTE 410 TO C450
 282          RS     100    STOR      -1       0
 283          RC    .040   0.016    .016     130   .0020
 284          RX      20      40      65      70      70      72     100     100
 285          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63
```



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

 286          KK     450      SUBBASIN 450 RUNOFF
 287          BA  .00803
 288          LS              77      20
 289          UD    0.22

 290          KK    C450      COMBINE C410 AND 450
 291          HC       2

 292          KK    C460      ROUTE C450 TO 460
 293          RS     100    STOR      -1       0
 294          RC    .040   0.016    .016     600   .0020
 295          RX      20      40      65      70      70      72     100     100
 296          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

 297          KK     460      SUBBASIN 460 RUNOFF
 298          BA  .01398
 299          LS              77
 300          UD    0.15

 301          KK    C460      COMBINE C450 AND 460
 302          HC       2

 303          KK     470      SUBBASIN 470 RUNOFF
 304          BA  .00717
 305          LS              98
 306          UD    0.14

 307          KK    C470      COMBINE C460 AND C440 AND 470
```

```
308          HC       3

309          KK    C600      ROUTE C470 TO 600
310          RS     100    STOR      -1       0
311          RC    .040   0.016    .016     980   .0020
312          RX      20      40      65      70      70      72     100     100
313          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

314          KK     600      SUBBASIN 600 RUNOFF
315          BA  .03036
316          LS              77      20
317          UD     .23

318          KK    C600      COMBINE C470 AND 600
319          HC       2

320          KK    C610      ROUTE C600 TO 610
321          RS     100    STOR      -1       0
322          RC    .040   0.016   0.016     250   .0020
323          RX       0      20      40      46      54      60      80     100
324          RY     101     100      99      96      96      99     100     101
```



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

325          KK    C610      COMBINE 610 AND C600
326          HC       2
327          ZZ
```

```
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  17        310
              .
              .
  23          .------->    D310
  22      C320
              V
              V
  26      C330
              .
              .
  35          .         350
              .           .
              .           .
  40          .           .------->    D350
  39          .       C350
              .           V
              .           V
  43          .       C330
              .           .
              .           .
  48          .           .         330
```

```
            .           .           .
            .           .           .
52        C330.......................
            .
            .
54          .         340
            .           V
            .           V
58          .        C330
            .           .
            .           .
63        C330............
            V
            V
65       C380F
            .
            .
67          .        380F
            .           .
            .           .
71       C380F............
            V
            V
73       C380E
            .
            .
75          .        380E
            .           .
            .           .
79       C380E............
            V
            V
81       C380D
            .
            .
83          .        380D
            .           .
            .           .
87       C380D............
            V
            V
89       SD700
            .
            .
92          .           .<-------    D350
91          .        D350
            .           V
            .           V
93          .        C360
            .           .
            .           .
98          .           .         360
            .           .           .
            .           .           .
102         .           .           .         370
            .           .           .           .
            .           .           .           .
```

```
106          .        C370.......................
             .           V
             .           V
108          .       C380A
             .           .
             .           .
113          .           .         380A
             .           .           .
             .           .           .
117          .       C380A............
             .           V
             .           V
119          .       C380B
             .           .
             .           .
124          .           .         380B
             .           .           .
             .           .           .
128          .       C380B............
             .           V
             .           V
130          .       SD700
             .           .
             .           .
132          .           .         380C
             .           .           V
             .           .           V
136          .           .       SD700
             .           .           .
             .           .           .
138          .           .           .         390
             .           .           .           .
             .           .           .           .
142       C390.....................................
             V
             V
144       SD700
             V
             V
149       C510
             .
             .
154          .         510
             .           .
             .           .
158       C510............
             V
             V
160       C520
             .
             .
165          .         520
             .           .
             .           .
169       C520............
             .
             .
```

```
171          .          530
             .            .
             .            .
175       C530............
             V
             V
177       C550
             .
             .
182          .          420
             .            V
             .            V
186          .         C430
             .            .
             .            .
191          .            .          430
             .            .            .
             .            .            .
195          .         C430............
             .            .
             .            .
197          .            .          440
             .            .            .
             .            .            .
201          .         C440............
             .            .
             .            .
204          .            .------->     D440
203          .         C440
             .            V
             .            V
207          .         C540
             .            .
             .            .
212          .            .          540
             .            .            .
             .            .            .
216          .         C540............
             .            V
             .            V
218          .         C550
             .            .
             .            .
223          .            .          550
             .            .            .
             .            .            .
227       C550........................
             V
             V
229       C560
             .
             .
234          .          570
             .            .
             .            .
238          .            .          580
             .            .            .
```

```
            .           .           .
242         .           .           .          560
            .           .           .            .
            .           .           .            .
246       C560.................................
            V
            V
248       C590
            .
            .
253         .         590
            .           .
            .           .
257       C590............
            V
            V
259       C610
            .
            .
264         .         610
            .           .
            .           .
268       C610............
            .
            .
271         .           .<-------     D440
270         .       D440
            .           V
            .           V
272         .       C470
            .           .
            .           .
277         .           .         410
            .           .           V
            .           .           V
281         .           .       C450
            .           .           .
            .           .           .
286         .           .           .          450
            .           .           .            .
            .           .           .            .
290         .           .       C450............
            .           .           V
            .           .           V
292         .           .       C460
            .           .           .
            .           .           .
297         .           .           .          460
            .           .           .            .
            .           .           .            .
301         .           .       C460............
            .           .           .
            .           .           .
303         .           .           .          470
            .           .           .            .
            .           .           .            .
307         .       C470......................
```

```
              .          V
              .          V
309           .        C600
              .          .
              .          .
314           .          .         600
              .          .           .
              .          .           .
318           .        C600............
              .          V
              .          V
320           .        C610
              .          .
              .          .
325        C610............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*            SEPTEMBER 1990                  *
*             VERSION 4.0                    *
*                                            *
*  RUN DATE  08/31/1995  TIME  08:33:43      *
*                                            *
**********************************************
```

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

84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
2-5-10-25-50-100 yr STORM
INTERIM and ULTIMATE CONDITION:
FINAL DESIGN ********** CHOLLA BASIN
--STORM DRAIN IN CHOLLA ROAD
--DETENTION BASIN AT SITE 1 (4 acres)
--cactus sd intercepts 100-yr flow
--NO STORM DRAIN IN DESERT COVE
--no CONNECTOR AT CORTEZ TO INTERCEPT
--FILE = NSTP VALUES ARE 100 (RS CARDS)
--TIME OF CONCENTRATION = 1.44 2-HOUR 24-YEAR STORM

FILE CNTYNOCG.DAT

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

   IT          HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME       0958  ENDING TIME
```

ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.36 .53 .62 .76 .88 1.00

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .36	RATIO 2 .53	RATIO 3 .62	RATIO 4 .76	RATIO 5 .88	RATIO 6 1.00
HYDROGRAPH AT										
+	310	.02	1	FLOW	5.	11.	15.	22.	28.	35.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
DIVERSION TO										
+	D310	.02	1	FLOW	3.	6.	8.	11.	14.	17.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
HYDROGRAPH AT										
+	C320	.02	1	FLOW	3.	6.	8.	11.	14.	17.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
ROUTED TO										
+	C330	.02	1	FLOW	3.	6.	8.	11.	16.	20.
				TIME	3.47	3.43	3.43	3.40	3.37	3.33
			** PEAK STAGES IN FEET **							
			1	STAGE	99.87	99.93	99.96	100.00	100.04	100.07
				TIME	3.47	3.43	3.43	3.40	3.37	3.33
HYDROGRAPH AT										
+	350	.00	1	FLOW	1.	2.	3.	4.	6.	7.
				TIME	3.10	3.10	3.10	3.10	3.10	3.10
DIVERSION TO										
+	D350	.00	1	FLOW	1.	1.	1.	2.	3.	3.

```
                                        TIME        3.10     3.10     3.10     3.10     3.10     3.10

HYDROGRAPH AT
+                C350      .00    1    FLOW         1.       1.       1.       2.       3.       3.
                                        TIME        3.10     3.10     3.10     3.10     3.10     3.10

ROUTED TO
+                C330      .00    1    FLOW         0.       1.       1.       2.       3.       4.
                                        TIME        3.63     3.53     3.53     3.47     3.43     3.43

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE      99.77    99.81    99.82    99.85    99.87    99.89
                                        TIME        3.63     3.53     3.53     3.47     3.43     3.43

HYDROGRAPH AT
+                 330      .06    1    FLOW        13.      27.      36.      51.      65.      81.
                                        TIME        3.43     3.47     3.47     3.47     3.47     3.43

 3 COMBINED AT
+                C330      .08    1    FLOW        16.      33.      44.      63.      80.      99.
                                        TIME        3.47     3.47     3.43     3.47     3.43     3.43

HYDROGRAPH AT
+                 340      .01    1    FLOW         3.       7.      10.      14.      18.      22.
                                        TIME        3.20     3.20     3.20     3.20     3.20     3.20

ROUTED TO
+                C330      .01    1    FLOW         3.       7.      10.      14.      18.      23.
                                        TIME        3.30     3.27     3.23     3.23     3.27     3.23

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE      82.23    82.32    82.36    82.41    82.46    82.50
                                        TIME        3.30     3.27     3.23     3.23     3.27     3.23

 2 COMBINED AT
+                C330      .09    1    FLOW        18.      37.      50.      71.      91.     111.
                                        TIME        3.47     3.43     3.43     3.43     3.37     3.43

ROUTED TO
+                C380F     .09    1    FLOW        18.      37.      50.      71.      90.     111.
                                        TIME        3.47     3.47     3.43     3.47     3.37     3.43

HYDROGRAPH AT
+                380F      .01    1    FLOW         2.       5.       7.      10.      13.      16.
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C380F     .10    1    FLOW        19.      39.      52.      74.      96.     117.
                                        TIME        3.47     3.47     3.43     3.43     3.37     3.37

ROUTED TO
+                C380E     .10    1    FLOW        19.      39.      52.      74.      95.     117.
                                        TIME        3.47     3.47     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                380E      .01    1    FLOW         2.       4.       6.       8.      11.      13.
                                        TIME        3.13     3.13     3.13     3.13     3.13     3.13
```

```
2 COMBINED AT
+                C380E      .10    1   FLOW        20.      40.      54.      76.      98.     121.
                                       TIME      3.47     3.47     3.43     3.43     3.37     3.37

ROUTED TO
+                C380D      .10    1   FLOW        19.      40.      53.      76.      98.     121.
                                       TIME      3.50     3.47     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                 380D      .00    1   FLOW         1.       2.       2.       3.       4.       5.
                                       TIME      3.13     3.13     3.13     3.13     3.13     3.13

2 COMBINED AT
+                C380D      .11    1   FLOW        20.      40.      54.      77.      99.     122.
                                       TIME      3.47     3.47     3.43     3.43     3.40     3.37

ROUTED TO
+                SD700      .11    1   FLOW        20.      40.      54.      77.      99.     122.
                                       TIME      3.50     3.47     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                 D350      .00    1   FLOW         1.       1.       1.       2.       3.       3.
                                       TIME      3.10     3.10     3.10     3.10     3.10     3.10

ROUTED TO
+                 C360      .00    1   FLOW         0.       1.       2.       2.       3.       3.
                                       TIME      3.37     3.27     3.27     3.23     3.23     3.27

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE     98.71    98.76    98.78    98.80    98.82    98.84
                                       TIME      3.37     3.27     3.27     3.23     3.23     3.27

HYDROGRAPH AT
+                  360      .01    1   FLOW         5.      10.      13.      19.      24.      30.
                                       TIME      3.17     3.20     3.20     3.20     3.17     3.17

HYDROGRAPH AT
+                  370      .01    1   FLOW         2.       5.       6.       9.      12.      15.
                                       TIME      3.13     3.17     3.17     3.13     3.13     3.13

3 COMBINED AT
+                 C370      .02    1   FLOW         7.      14.      19.      28.      37.      46.
                                       TIME      3.17     3.17     3.17     3.20     3.17     3.17

ROUTED TO
+                C380A      .02    1   FLOW         7.      14.      20.      28.      37.      46.
                                       TIME      3.23     3.27     3.23     3.20     3.23     3.20

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE     98.88    98.95    99.00    99.04    99.09    99.13
                                       TIME      3.23     3.27     3.23     3.20     3.23     3.20

HYDROGRAPH AT
+                 380A      .01    1   FLOW         2.       4.       6.       9.      11.      14.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17
```

```
 2 COMBINED AT
+                C380A      .03    1   FLOW          9.      18.      25.      37.      47.      59.
                                       TIME        3.23     3.23     3.23     3.20     3.23     3.20

ROUTED TO
+                C380B      .03    1   FLOW          9.      18.      26.      38.      47.      59.
                                       TIME        3.30     3.30     3.27     3.23     3.23     3.23

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE      98.88    98.96    99.01    99.06    99.10    99.15
                                       TIME        3.30     3.30     3.27     3.23     3.23     3.23

HYDROGRAPH AT
+                 380B      .02    1   FLOW          7.      14.      19.      27.      35.      44.
                                       TIME        3.23     3.27     3.27     3.27     3.23     3.23

 2 COMBINED AT
+                C380B      .05    1   FLOW         16.      32.      45.      65.      82.     103.
                                       TIME        3.30     3.27     3.27     3.23     3.23     3.23

ROUTED TO
+                SD700      .05    1   FLOW         16.      32.      45.      64.      81.     101.
                                       TIME        3.30     3.30     3.27     3.23     3.27     3.23

HYDROGRAPH AT
+                 380C      .00    1   FLOW          1.       2.       3.       5.       6.       8.
                                       TIME        3.13     3.13     3.13     3.13     3.13     3.13

ROUTED TO
+                SD700      .00    1   FLOW          1.       2.       3.       5.       6.       7.
                                       TIME        3.13     3.13     3.13     3.13     3.13     3.13

HYDROGRAPH AT
+                  390      .01    1   FLOW          1.       3.       5.       9.      12.      15.
                                       TIME        3.33     3.27     3.23     3.23     3.23     3.23

 4 COMBINED AT
+                 C390      .17    1   FLOW         34.      70.      94.     136.     177.     220.
                                       TIME        3.30     3.30     3.27     3.30     3.30     3.30

ROUTED TO
+                SD700      .17    1   FLOW         10.      18.      24.      34.      43.      52.
                                       TIME        3.93     3.97     3.93     3.93     3.93     3.93

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE      73.49    74.14    74.52    75.17    75.76    76.42
                                       TIME        3.93     3.97     3.93     3.93     3.93     3.93

ROUTED TO
+                 C510      .17    1   FLOW         10.      18.      24.      34.      43.      52.
                                       TIME        3.97     4.00     3.97     3.97     4.00     3.97

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE      97.12    97.36    97.50    97.72    97.87    98.02
                                       TIME        4.00     4.00     3.97     3.97     4.00     3.97

HYDROGRAPH AT
```

```
+                 510      .01    1  FLOW        5.      10.      14.      20.      26.      32.
                                     TIME      3.10     3.10     3.10     3.10     3.10     3.10

 2 COMBINED AT
+                 C510     .18    1  FLOW       11.      19.      25.      35.      44.      53.
                                     TIME      3.93     4.00     3.97     3.97     4.00     3.97

ROUTED TO
+                 C520     .18    1  FLOW       11.      19.      25.      35.      44.      53.
                                     TIME      4.00     4.03     4.03     3.97     4.00     3.97

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    97.30    97.60    97.79    98.05    98.24    98.42
                                     TIME      4.00     4.03     4.03     3.97     4.00     3.97

HYDROGRAPH AT
+                 520      .01    1  FLOW        6.      12.      16.      23.      30.      37.
                                     TIME      3.13     3.13     3.13     3.13     3.13     3.13

 2 COMBINED AT
+                 C520     .19    1  FLOW       15.      27.      35.      49.      62.      76.
                                     TIME      3.13     3.13     3.13     3.13     3.13     3.13

HYDROGRAPH AT
+                 530      .01    1  FLOW        3.       6.       8.      11.      14.      18.
                                     TIME      3.20     3.20     3.20     3.20     3.20     3.20

 2 COMBINED AT
+                 C530     .20    1  FLOW       18.      32.      42.      59.      75.      91.
                                     TIME      3.17     3.13     3.13     3.13     3.13     3.13

ROUTED TO
+                 C550     .20    1  FLOW       18.      33.      43.      59.      75.      91.
                                     TIME      3.17     3.17     3.17     3.17     3.17     3.17

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    97.43    97.80    98.00    98.29    98.52    98.74
                                     TIME      3.17     3.17     3.17     3.17     3.17     3.17

HYDROGRAPH AT
+                 420      .02    1  FLOW        5.      10.      14.      20.      25.      31.
                                     TIME      3.27     3.27     3.27     3.27     3.27     3.27

ROUTED TO
+                 C430     .02    1  FLOW        5.      10.      14.      20.      26.      31.
                                     TIME      3.37     3.30     3.37     3.33     3.30     3.30

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE   100.12   100.23   100.28   100.37   100.44   100.51
                                     TIME      3.37     3.30     3.37     3.33     3.30     3.30

HYDROGRAPH AT
+                 430      .02    1  FLOW        6.      13.      18.      26.      33.      41.
                                     TIME      3.23     3.27     3.27     3.27     3.23     3.23

 2 COMBINED AT
+                 C430     .04    1  FLOW       11.      23.      31.      45.      57.      72.
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```
                                        TIME        3.27     3.30     3.27     3.27     3.30     3.27

HYDROGRAPH AT
+                440       .01    1    FLOW         3.       5.       7.      10.      13.      16.
                                        TIME        3.17     3.20     3.20     3.20     3.17     3.17

 2 COMBINED AT
+                C440      .05    1    FLOW        13.      27.      37.      53.      68.      85.
                                        TIME        3.27     3.30     3.27     3.27     3.27     3.27

DIVERSION TO
+                D440      .05    1    FLOW         9.      19.      26.      37.      48.      59.
                                        TIME        3.27     3.30     3.27     3.27     3.27     3.27

HYDROGRAPH AT
+                C440      .05    1    FLOW         4.       8.      11.      16.      20.      25.
                                        TIME        3.27     3.30     3.27     3.27     3.27     3.27

ROUTED TO
+                C540      .05    1    FLOW         4.       8.      11.      16.      21.      25.
                                        TIME        3.40     3.30     3.33     3.30     3.27     3.30

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE     100.02   100.09   100.13   100.19   100.23   100.27
                                        TIME        3.40     3.30     3.33     3.30     3.27     3.30

HYDROGRAPH AT
+                540       .01    1    FLOW         2.       4.       5.       8.      10.      12.
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C540      .05    1    FLOW         5.      11.      14.      21.      28.      34.
                                        TIME        3.37     3.30     3.33     3.30     3.27     3.23

ROUTED TO
+                C550      .05    1    FLOW         5.      11.      14.      21.      28.      34.
                                        TIME        3.37     3.30     3.27     3.33     3.30     3.27

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE     100.03   100.12   100.15   100.21   100.26   100.31
                                        TIME        3.37     3.30     3.27     3.33     3.30     3.27

HYDROGRAPH AT
+                550       .01    1    FLOW         3.       6.       8.      12.      16.      20.
                                        TIME        3.10     3.13     3.13     3.10     3.10     3.10

 3 COMBINED AT
+                C550      .26    1    FLOW        23.      44.      58.      83.     107.     133.
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

ROUTED TO
+                C560      .26    1    FLOW        23.      45.      58.      82.     106.     132.
                                        TIME        3.23     3.23     3.23     3.23     3.27     3.23

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE      98.10    98.61    98.87    99.22    99.48    99.70
                                        TIME        3.23     3.23     3.23     3.23     3.27     3.23
```

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HYDROGRAPH AT
+                570       .00    1   FLOW          2.      3.      5.      7.      8.     10.
                                     TIME        3.20    3.20    3.20    3.20    3.20    3.20

HYDROGRAPH AT
+                580       .01    1   FLOW          2.      4.      6.      8.     10.     13.
                                     TIME        3.17    3.20    3.20    3.20    3.17    3.17

HYDROGRAPH AT
+                560       .00    1   FLOW          1.      3.      4.      6.      8.      9.
                                     TIME        3.17    3.17    3.17    3.17    3.17    3.17

 4 COMBINED AT
+               C560       .27    1   FLOW         28.     55.     71.    101.    129.    161.
                                     TIME        3.23    3.23    3.23    3.23    3.23    3.23

ROUTED TO
+               C590       .27    1   FLOW         28.     55.     72.    100.    129.    160.
                                     TIME        3.27    3.23    3.23    3.23    3.23    3.23

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE       97.06   97.65   97.97   98.47   98.92   99.32
                                     TIME        3.27    3.23    3.23    3.23    3.23    3.23

HYDROGRAPH AT
+                590       .02    1   FLOW          6.     11.     15.     22.     29.     35.
                                     TIME        3.27    3.27    3.27    3.27    3.27    3.27

 2 COMBINED AT
+               C590       .29    1   FLOW         33.     66.     87.    122.    157.    195.
                                     TIME        3.27    3.23    3.23    3.23    3.23    3.23

ROUTED TO
+               C610       .29    1   FLOW         33.     66.     88.    122.    157.    196.
                                     TIME        3.30    3.27    3.27    3.27    3.30    3.30

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE       97.38   98.04   98.38   98.86   99.23   99.55
                                     TIME        3.30    3.27    3.27    3.27    3.30    3.30

HYDROGRAPH AT
+                610       .00    1   FLOW          2.      3.      5.      7.      9.     11.
                                     TIME        3.10    3.10    3.10    3.10    3.10    3.10

 2 COMBINED AT
+               C610       .30    1   FLOW         34.     68.     90.    125.    160.    199.
                                     TIME        3.30    3.27    3.27    3.27    3.30    3.30

HYDROGRAPH AT
+               D440       .00    1   FLOW          9.     19.     26.     37.     48.     59.
                                     TIME        3.27    3.30    3.27    3.27    3.27    3.27

ROUTED TO
+               C470       .00    1   FLOW          9.     19.     26.     37.     48.     59.
                                     TIME        3.43    3.33    3.33    3.33    3.30    3.30
```

```
                                   ** PEAK STAGES IN FEET **
                                   1  STAGE      99.97   100.05   100.10   100.16   100.21   100.26
                                      TIME        3.43     3.33     3.33     3.33     3.30     3.30

HYDROGRAPH AT
+                 410       .04    1  FLOW         11.      22.      29.      41.      53.      65.
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.37

ROUTED TO
+                 C450      .04    1  FLOW         11.      21.      29.      41.      53.      65.
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.71   101.83   101.89   101.98   102.06   102.13
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.37

HYDROGRAPH AT
+                 450       .01    1  FLOW          2.       5.       6.       9.      12.      14.
                                      TIME        3.27     3.27     3.27     3.27     3.27     3.27

 2 COMBINED AT
+                 C450      .05    1  FLOW         13.      26.      34.      49.      63.      78.
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.33

ROUTED TO
+                 C460      .05    1  FLOW         13.      26.      34.      49.      63.      78.
                                      TIME        3.40     3.40     3.43     3.40     3.40     3.40

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.73   101.87   101.93   102.04   102.12   102.20
                                      TIME        3.40     3.40     3.43     3.40     3.40     3.40

HYDROGRAPH AT
+                 460       .01    1  FLOW          1.       5.       8.      14.      19.      24.
                                      TIME        3.30     3.23     3.23     3.20     3.20     3.20

 2 COMBINED AT
+                 C460      .07    1  FLOW         14.      29.      39.      57.      74.      92.
                                      TIME        3.40     3.40     3.37     3.37     3.37     3.37

HYDROGRAPH AT
+                 470       .01    1  FLOW         10.      15.      18.      22.      26.      29.
                                      TIME        3.17     3.17     3.17     3.17     3.17     3.17

 3 COMBINED AT
+                 C470      .07    1  FLOW         26.      54.      73.     104.     134.     165.
                                      TIME        3.40     3.33     3.33     3.33     3.30     3.33

ROUTED TO
+                 C600      .07    1  FLOW         26.      55.      72.     104.     135.     167.
                                      TIME        3.43     3.40     3.40     3.40     3.40     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.87   102.07   102.17   102.33   102.46   102.59
                                      TIME        3.43     3.40     3.40     3.40     3.40     3.37

HYDROGRAPH AT
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+                 600       .03     1   FLOW          8.      17.      23.      33.      43.      53.
                                          TIME        3.27     3.30     3.30     3.30     3.27     3.27

 2 COMBINED AT
+                 C600      .10     1   FLOW         32.      70.      93.     133.     172.     214.
                                          TIME        3.43     3.40     3.37     3.37     3.37     3.37

ROUTED TO
+                 C610      .10     1   FLOW         33.      70.      92.     134.     172.     214.
                                          TIME        3.43     3.40     3.40     3.37     3.37     3.37

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE      96.94    97.44    97.69    98.06    98.35    98.64
                                          TIME        3.43     3.40     3.40     3.37     3.37     3.37

 2 COMBINED AT
+                 C610      .40     1   FLOW         61.     123.     167.     246.     322.     403.
                                          TIME        3.33     3.37     3.33     3.33     3.30     3.30
1
                                          SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                              (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                   INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                    PEAK                                     PEAK

                              (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .75     18.37    208.70       .28     2.00     18.30    208.00        .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1395E+01 EXCESS= .0000E+00 OUTFLOW= .1395E+01 BASIN STORAGE= .5270E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .65     37.26    207.48       .54     2.00     37.24    208.00        .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2679E+01 EXCESS= .0000E+00 OUTFLOW= .2679E+01 BASIN STORAGE= .5186E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .62     49.80    206.24       .71     2.00     49.78    206.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3481E+01 EXCESS= .0000E+00 OUTFLOW= .3481E+01 BASIN STORAGE= .5259E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .58     70.74    207.89       .99     2.00     70.69    208.00        .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4852E+01 EXCESS= .0000E+00 OUTFLOW= .4851E+01 BASIN STORAGE= .5123E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
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          C380F  MANE          .55     90.19    202.58      1.24      2.00     89.85    202.00        1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6121E+01 EXCESS= .0000E+00 OUTFLOW= .6119E+01 BASIN STORAGE= .5278E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380F  MANE          .53    111.13    205.69      1.51      2.00    110.97    206.00        1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7456E+01 EXCESS= .0000E+00 OUTFLOW= .7454E+01 BASIN STORAGE= .5148E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .75     19.09    208.63       .29      2.00     19.01    208.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+01 EXCESS= .0000E+00 OUTFLOW= .1510E+01 BASIN STORAGE= .5188E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .65     38.98    207.58       .55      2.00     38.97    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2901E+01 EXCESS= .0000E+00 OUTFLOW= .2901E+01 BASIN STORAGE= .5302E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .61     52.20    206.09       .71      2.00     52.17    206.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3770E+01 EXCESS= .0000E+00 OUTFLOW= .3769E+01 BASIN STORAGE= .5133E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .57     74.22    206.44       .99      2.00     74.22    206.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5254E+01 EXCESS= .0000E+00 OUTFLOW= .5253E+01 BASIN STORAGE= .5159E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .54     95.18    203.20      1.25      2.00     94.94    204.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6629E+01 EXCESS= .0000E+00 OUTFLOW= .6627E+01 BASIN STORAGE= .5085E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .52    117.06    204.09      1.53      2.00    117.06    204.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8074E+01 EXCESS= .0000E+00 OUTFLOW= .8071E+01 BASIN STORAGE= .5244E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380D  MANE          .60     19.51    208.54       .29      2.00     19.45    210.00         .29
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+01 EXCESS= .0000E+00 OUTFLOW= .1595E+01 BASIN STORAGE= .4215E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .52     40.02    208.02       .55      2.00     40.02    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3064E+01 EXCESS= .0000E+00 OUTFLOW= .3064E+01 BASIN STORAGE= .4126E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .49     53.58    206.37       .72      2.00     53.50    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3982E+01 EXCESS= .0000E+00 OUTFLOW= .3981E+01 BASIN STORAGE= .4129E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .45     76.33    205.96      1.00      2.00     76.33    206.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5549E+01 EXCESS= .0000E+00 OUTFLOW= .5548E+01 BASIN STORAGE= .4075E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .43     98.02    203.65      1.26      2.00     98.01    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7001E+01 EXCESS= .0000E+00 OUTFLOW= .6999E+01 BASIN STORAGE= .4146E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .41    120.89    203.14      1.53      2.00    120.84    204.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8527E+01 EXCESS= .0000E+00 OUTFLOW= .8525E+01 BASIN STORAGE= .4073E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .25     19.65    209.06       .29      2.00     19.64    210.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1629E+01 EXCESS= .0000E+00 OUTFLOW= .1629E+01 BASIN STORAGE= .1715E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .21     40.42    208.01       .55      2.00     40.42    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3128E+01 EXCESS= .0000E+00 OUTFLOW= .3128E+01 BASIN STORAGE= .1701E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .20     54.03    206.38       .72      2.00     54.00    206.00         .72
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .4065E+01 EXCESS= .0000E+00 OUTFLOW= .4064E+01 BASIN STORAGE= .1698E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .19     77.13    206.00      1.00      2.00     77.13    206.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+01 EXCESS= .0000E+00 OUTFLOW= .5664E+01 BASIN STORAGE= .1696E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .18     99.17    203.97      1.26      2.00     99.16    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7146E+01 EXCESS= .0000E+00 OUTFLOW= .7145E+01 BASIN STORAGE= .1700E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .17    122.31    203.88      1.54      2.00    122.29    204.00        1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8704E+01 EXCESS= .0000E+00 OUTFLOW= .8703E+01 BASIN STORAGE= .1695E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .43     15.69    198.05       .32      2.00     15.67    198.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8324E+00 EXCESS= .0000E+00 OUTFLOW= .8321E+00 BASIN STORAGE= .2880E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .37     32.05    196.91       .62      2.00     31.97    198.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1599E+01 EXCESS= .0000E+00 OUTFLOW= .1598E+01 BASIN STORAGE= .2899E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .35     44.56    196.16       .81      2.00     44.50    196.00         .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+01 EXCESS= .0000E+00 OUTFLOW= .2076E+01 BASIN STORAGE= .2796E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .32     64.38    194.05      1.12      2.00     64.25    194.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2895E+01 EXCESS= .0000E+00 OUTFLOW= .2893E+01 BASIN STORAGE= .2810E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .31     81.40    195.65      1.42      2.00     81.33    196.00        1.42
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .3652E+01 EXCESS= .0000E+00 OUTFLOW= .3649E+01 BASIN STORAGE= .2867E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .29    101.59    194.09      1.72      2.00    101.47    194.00        1.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4449E+01 EXCESS= .0000E+00 OUTFLOW= .4445E+01 BASIN STORAGE= .2841E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .39      1.13    188.37       .32      2.00      1.12    188.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4848E-01 EXCESS= .0000E+00 OUTFLOW= .4847E-01 BASIN STORAGE= .1587E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .33      2.38    188.64       .61      2.00      2.36    188.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9311E-01 EXCESS= .0000E+00 OUTFLOW= .9309E-01 BASIN STORAGE= .1510E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .31      3.22    188.46       .79      2.00      3.19    188.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+00 EXCESS= .0000E+00 OUTFLOW= .1210E+00 BASIN STORAGE= .1528E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .29      4.67    188.19      1.10      2.00      4.65    188.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1686E+00 EXCESS= .0000E+00 OUTFLOW= .1686E+00 BASIN STORAGE= .1543E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .28      6.03    188.19      1.38      2.00      6.01    188.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2127E+00 EXCESS= .0000E+00 OUTFLOW= .2127E+00 BASIN STORAGE= .1496E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .26      7.46    188.01      1.69      2.00      7.45    188.00        1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2591E+00 EXCESS= .0000E+00 OUTFLOW= .2590E+00 BASIN STORAGE= .1490E-04 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/31/1995  TIME  08:32:55 *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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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
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

HEC-1 INPUT PAGE 1

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

  1           ID        84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
  2           ID        2-5-10-25-50-100 yr STORM
  3           ID        INTERIM and ULTIMATE CONDITION:
  4           ID        FINAL DESIGN ********************* CHOLLA BASIN
  5           ID        --STORM DRAIN IN CHOLLA ROAD
  6           ID        --DETENTION BASIN AT SITE 1 (4 acres)
  7           ID        --cactus sd intercepts 100-yr flow
  8           ID        --NO STORM DRAIN IN DESERT COVE
  9           ID        --no CONNECTOR AT CORTEZ TO INTERCEPT
 10           ID
 11           ID        FILE COUNTY.DAT
              *DIAGRAM
 12           IT       2                    300
 13           IO       5
 14           JR    PREC     .36     .53     .62     .76     .88     1.0

 15           KK     310      subbasin 310 runoff
 16           BA  .01647
 17           PH                   0.88    1.61     2.6    2.84     3.0     3.3
```

```
 18          LS              77      20
 19          UD     .16

 20          KK    C320      DIVERT C310 TO 320
 21          DT    D310
 22          DI       0     100
 23          DQ       0      50

 24          KK    C330      ROUTE C310 TO 330
 25          RS       3    STOR      -1       0
 26          RC    .040    .016    .040     750   .0030
 27          RX       0      24    24.1      40    40.1      56    56.1      80
 28          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101
 29          RS       7    STOR      -1       0
 30          RC    .040    .016    .040    2000   .0060
 31          RX       0      24    24.1      40    40.1      56    56.1      80
 32          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 33          KK     350      subbasin 350 runoff
 34          BA  .00225
 35          LS              77      20
 36          UD     .06

 37          KK    C350      DIVERT C350 TO 360
 38          DT    D350
 39          DI       0     100
 40          DQ       0      50

 41          KK    C330      ROUTE 350 TO 330
 42          RS       7    STOR      -1       0
 43          RC    .040    .016    .040    2200   .0060
 44          RX       0      24    24.1      40    40.1      56    56.1      80
 45          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21
```



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

 46          KK     330      subbasin 330 runoff
 47          BA  .06322
 48          LS              77      20
 49          UD     .38

 50          KK    C330      COMBINE C310 AND 330 AND C350
 51          HC       3

 52          KK     340      subbasin 340 runoff
 53          BA  .01031
 54          LS              77      20
 55          UD     .15

 56          KK    C330      ROUTE 340 TO 330
 57          RS       4    STOR      -1       0
 58          RC    .040    .016    .040     440   .0022
 59          RX       0    19.8    19.8      40    40.1      42      50      60
 60          RY    82.9   82.41   81.91   82.31   82.31   82.22    82.1    82.4
```

```
 61          KK    C330      COMBINE C310 AND 340
 62          HC       2

 63          KK   C380F      ROUTE C330 TO 380F
 64          RD     300  0.0030   0.012            CIRC       4

 65          KK    380F      subbasin 380F runoff
 66          BA  .00688
 67          LS              77      20
 68          UD     .13

 69          KK   C380F      COMBINE 380F AND C330
 70          HC       2

 71          KK   C380E      ROUTE C380F TO 380E
 72          RD     300  0.0030   0.012            CIRC       4

 73          KK    380E      subbasin 380E runoff
 74          BA  .00505
 75          LS              77      20
 76          UD     .10

 77          KK   C380E      COMBINE 380E AND C380F
 78          HC       2

 79          KK   C380D      ROUTE C380E TO 380D
 80          RD     240  0.0030   0.012            CIRC       4

 81          KK    380D      subbasin 380D runoff
 82          BA  .00198
 83          LS              77      20
 84          UD     .10
```



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


 85          KK   C380D      COMBINE C380D AND 380E
 86          HC       2

 87          KK   SD700      ROUTE C380D TO SD700
 88          RD     100  0.0030   0.012            CIRC       4

 89          KK    D350      RETRIEVE D350
 90          DR    D350

 91          KK    C360      ROUTE C350 TO 360
 92          RS       5    STOR      -1       0
 93          RC    .040    .016    .040     850   .0040
 94          RX       0      24    24.1      40    40.1      56    56.1      80
 95          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

 96          KK     360      SUBBASIN 360 RUNOFF
 97          BA  .01320
 98          LS              77      20
 99          UD     .14
```

```
100          KK     370      SUBBASIN 370 RUNOFF
101          BA  .00592
102          LS              77      20
103          UD     .11

104          KK    C370      COMBINE D350 AND 360 AND 370
105          HC       3

106          KK   C380A      ROUTE C370 TO 380A
107          RS       5    STOR      -1       0
108          RC    .040    .016    .040     620   .0054
109          RX       0      20    20.1      40    40.1      60    60.1      80
110          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

111          KK    380A      subbasin 380A runoff
112          BA  .00588
113          LS              77      20
114          UD     .13

115          KK   C380A      COMBINE C370 AND C380A
116          HC       2

117          KK   C380B      ROUTE C380A TO 380B
118          RS       5    STOR      -1       0
119          RC    .040    .016    .040     700   .0077
120          RX       0      20    20.1      40    40.1      60    60.1      80
121          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

122          KK    380B      subbasin 380B runoff
123          BA  .02333
124          LS              77      20
125          UD     .20
```



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

126          KK   C380B      COMBINE C380A AND C380B
127          HC       2

128          KK   SD700      ROUTE C380B TO SD700
129          RD     150  0.0030   0.012            CIRC       2

130          KK    380C      subbasin 380C runoff
131          BA  .00288
132          LS              77      20
133          UD     .10

134          KK   SD700      ROUTE C380C TO SD700
135          RD      80  0.0030   0.012            CIRC       2

136          KK     390      subbasin 390 runoff
137          BA  .00938
138          LS              77
139          UD     .17

140          KK    C390      COMBINE C380D AND 380B AND 380C AND 390
```

```
141          HC       4

142          KK   SD700      NEW DETENTION BASIN (bottom avg=1373, outfall pipe=1372.20)
143          RS       1    STOR       0
144          SV       0    2.22    4.58    7.08    9.44
145          SE      73      74      75      76      77
146          SQ       5      16      32      46      60

147          KK    C510      ROUTE SD700 TO 510
148          RS       5    STOR      -1       0
149          RC    .050    .035    .050     700   .0070
150          RX       0      .1      17      22      28      33      50    50.1
151          RY     102     100      99    96.5    96.5      99     100     102

152          KK     510      SUBBASIN 510 RUNOFF
153          BA  .01044
154          LS              77      20
155          UD     .06

156          KK    C510      COMBINE SD700 AND 510
157          HC       2

158          KK    C520      ROUTE C510 TO 520
159          RS       5    STOR      -1       0
160          RC    .050    .035    .050     440   .0030
161          RX       0      .1      17      22      28      33      50    50.1
162          RY     102     100      99    96.5    96.5      99     100     102

163          KK     520      SUBBASIN 520 RUNOFF
164          BA  .01402
165          LS              77      20
166          UD     .10
```



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

167          KK    C520      COMBINE C510 AND 520
168          HC       2

169          KK     530      SUBBASIN 530 RUNOFF
170          BA  .00806
171          LS              77      20
172          UD     .15

173          KK    C530      COMBINE C520 AND 530
174          HC       2

175          KK    C550      ROUTE C530 TO 550
176          RS       4    STOR      -1       0
177          RC    .050    .035    .050     350   .0050
178          RX       0      .1      17      22      28      33      50    50.1
179          RY     102     100      99    96.5    96.5      99     100     102

180          KK     420      SUBBASIN 420 RUNOFF
181          BA  .01719
182          LS              77      20
```

```
183          UD     .21

184          KK    C430      ROUTE C420 TO 430
185          RS       4    STOR      -1       0
186          RC    .040    .016    .040     480   .0020
187          RX       0      20      23      30    30.1      37      40      60
188          RY     102    99.7   99.93     100     100   99.93    99.7     102

189          KK     430      SUBBASIN 430 RUNOFF
190          BA  .02202
191          LS              77      20
192          UD     .20

193          KK    C430      COMBINE C420 AND 430
194          HC       2

195          KK     440      SUBBASIN 440 RUNOFF
196          BA  .00731
197          LS              77      20
198          UD     .14

199          KK    C440      COMBINE C430 AND 440
200          HC       2

201          KK    C440      DIVERT C440 TO 470
202          DT    D440
203          DI       0     100     200     300
204          DQ       0      70     140     210
```



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

205          KK    C540      ROUTE C440 TO C540
206          RS       4    STOR      -1       0
207          RC    .040    .016    .040     540   .0080
208          RX       0      20      23      30    30.1      37      40      60
209          RY     102    99.7   99.93     100     100   99.93    99.7     102

210          KK     540      SUBBASIN 540 RUNOFF
211          BA  .00517
212          LS              77      20
213          UD     .13

214          KK    C540      COMBINE C440 AND 540
215          HC       2

216          KK    C550      ROUTE 540 TO C550
217          RS       2    STOR      -1       0
218          RC    .040    .016    .040     200   .0080
219          RX       0      20      23      30    30.1      37      40      60
220          RY     101    99.7   99.93     100     100   99.93    99.7     101

221          KK     550      SUBBASIN 550
222          BA  .00703
223          LS              77      20
224          UD     .08
```

```
225          KK    C550      COMBINE 550 AND C530 AND 540
226          HC       3

227          KK    C560      ROUTE C550 TO 560
228          RS       5    STOR      -1       0
229          RC    .050    .035    .050     900   .0060
230          RX       0      .1      20      22      28      30      50    50.1
231          RY     102     100      99      97      97      99     100     102

232          KK     570      SUBBASIN 570 RUNOFF
233          BA  .00492
234          LS              77      20
235          UD     .16

236          KK     580      SUBBASIN 580 RUNOFF
237          BA  .00575
238          LS              77      20
239          UD     .14

240          KK     560      SUBBASIN 560 RUNOFF
241          BA  .00386
242          LS              77      20
243          UD     .12
```



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

244          KK    C560      COMBINE C550 AND 560 AND 570 AND 580
245          HC       4

246          KK    C590      ROUTE C560 TO 590
247          RS       1    STOR      -1       0
248          RC    .050    .035    .050      55   .0030
249          RX       0      .1      20    20.1      32    32.1      50    50.1
250          RY     102     100      99      96      96      99     100     102

251          KK     590      SUBBASIN 590 RUNOFF
252          BA  .01931
253          LS              77      20
254          UD    0.21

255          KK    C590      COMBINE C560 AND 590
256          HC       2

257          KK    C610      ROUTE C590 TO 610
258          RS       5    STOR      -1       0
259          RC    .050    .035    .050     600   .0030
260          RX       0      .1      20      24      32      36      50    50.1
261          RY     102     100      99      96      96      99     100     102

262          KK     610      SUBBASIN 610 RUNOFF
263          BA   .0035
264          LS              77      20
265          UD    0.06
```

```
266          KK    C610      COMBINE 610 AND C590
267          HC       2

268          KK    D440      RETRIEVE D440
269          DR    D440

270          KK    C470      ROUTE D440 TO 470
271          RS       6    STOR      -1       0
272          RC    .040    .016    .040    1200   .0070
273          RX       0      24    24.1      40    40.1      56    56.1      80
274          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

275          KK     410      SUBBASIN 410 RUNOFF
276          BA  .04406
277          LS              77      20
278          UD    0.30

279          KK    C450      ROUTE 410 TO C450
280          RS       1    STOR      -1       0
281          RC    .040   0.016    .016     130   .0020
282          RX      20      40      65      70      70      72     100     100
283          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63
```



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

284          KK     450      SUBBASIN 450 RUNOFF
285          BA  .00803
286          LS              77      20
287          UD    0.22

288          KK    C450      COMBINE C410 AND 450
289          HC       2

290          KK    C460      ROUTE C450 TO 460
291          RS       4    STOR      -1       0
292          RC    .040   0.016    .016     600   .0020
293          RX      20      40      65      70      70      72     100     100
294          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

295          KK     460      SUBBASIN 460 RUNOFF
296          BA  .01398
297          LS              77
298          UD    0.15

299          KK    C460      COMBINE C450 AND 460
300          HC       2

301          KK     470      SUBBASIN 470 RUNOFF
302          BA  .00717
303          LS              98
304          UD    0.14

305          KK    C470      COMBINE C460 AND C440 AND 470
306          HC       3
```

```
307          KK    C600      ROUTE C470 TO 600
308          RS       5    STOR      -1       0
309          RC    .040   0.016    .016     980   .0020
310          RX      20      40      65      70      70      72     100     100
311          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

312          KK     600      SUBBASIN 600 RUNOFF
313          BA  .03036
314          LS              77      20
315          UD     .23

316          KK    C600      COMBINE C470 AND 600
317          HC       2

318          KK    C610      ROUTE C600 TO 610
319          RS       2    STOR      -1       0
320          RC    .040   0.016   0.016     250   .0020
321          RX       0      20      40      46      54      60      80     100
322          RY     101     100      99      96      96      99     100     101
```



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


323          KK    C610      COMBINE 610 AND C600
324          HC       2
325          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  15         310
               .
               .
  21           .------->    D310
  20        C320
               V
               V
  24        C330
               .
               .
  33           .         350
               .           .
               .           .
  38           .           .------->    D350
  37           .        C350
               .           V
               .           V
  41           .        C330
               .           .
               .           .
  46           .           .         330
               .           .           .
               .           .           .
```

```
50        C330.......................
             .
             .
52           .         340
             .           V
             .           V
56           .        C330
             .           .
             .           .
61        C330............
             V
             V
63       C380F
             .
             .
65           .        380F
             .           .
             .           .
69       C380F............
             V
             V
71       C380E
             .
             .
73           .        380E
             .           .
             .           .
77       C380E............
             V
             V
79       C380D
             .
             .
81           .        380D
             .           .
             .           .
85       C380D............
             V
             V
87       SD700
             .
             .
90           .           .<-------    D350
89           .        D350
             .           V
             .           V
91           .        C360
             .           .
             .           .
96           .           .         360
             .           .           .
             .           .           .
100          .           .           .         370
             .           .           .           .
             .           .           .           .
104          .        C370.......................
             .           V
```

```
            .          V
106         .       C380A
            .          .
            .          .
111         .          .        380A
            .          .          .
            .          .          .
115         .       C380A............
            .          V
            .          V
117         .       C380B
            .          .
            .          .
122         .          .        380B
            .          .          .
            .          .          .
126         .       C380B............
            .          V
            .          V
128         .       SD700
            .          .
            .          .
130         .          .        380C
            .          .          V
            .          .          V
134         .          .       SD700
            .          .          .
            .          .          .
136         .          .          .         390
            .          .          .           .
            .          .          .           .
140       C390.................................
            V
            V
142      SD700
            V
            V
147       C510
            .
            .
152         .         510
            .          .
            .          .
156       C510............
            V
            V
158       C520
            .
            .
163         .         520
            .          .
            .          .
167       C520............
            .
            .
169         .         530
            .          .
```

```
            .           .
173       C530............
            V
            V
175       C550
            .
            .
180         .         420
            .           V
            .           V
184         .        C430
            .           .
            .           .
189         .           .         430
            .           .           .
            .           .           .
193         .        C430............
            .           .
            .           .
195         .           .         440
            .           .           .
            .           .           .
199         .        C440............
            .           .
            .           .
202         .           .------->    D440
201         .        C440
            .           V
            .           V
205         .        C540
            .           .
            .           .
210         .           .         540
            .           .           .
            .           .           .
214         .        C540............
            .           V
            .           V
216         .        C550
            .           .
            .           .
221         .           .         550
            .           .           .
            .           .           .
225       C550........................
            V
            V
227       C560
            .
            .
232         .         570
            .           .
            .           .
236         .           .         580
            .           .           .
            .           .           .
240         .           .           .        560
```

```
            .           .           .           .
            .           .           .           .
244       C560.....................................
            V
            V
246       C590
            .
            .
251         .         590
            .           .
            .           .
255       C590............
            V
            V
257       C610
            .
            .
262         .         610
            .           .
            .           .
266       C610............
            .
            .
269         .           .<-------     D440
268         .       D440
            .           V
            .           V
270         .       C470
            .           .
            .           .
275         .           .         410
            .           .           V
            .           .           V
279         .           .       C450
            .           .           .
            .           .           .
284         .           .           .         450
            .           .           .           .
            .           .           .           .
288         .           .       C450............
            .           .           V
            .           .           V
290         .           .       C460
            .           .           .
            .           .           .
295         .           .           .         460
            .           .           .           .
            .           .           .           .
299         .           .       C460............
            .           .           .
            .           .           .
301         .           .           .         470
            .           .           .           .
            .           .           .           .
305         .       C470........................
            .           V
            .           V
```

```
307          .        C600
             .          .
             .          .
312          .          .        600
             .          .          .
             .          .          .
316          .        C600............
             .          V
             .          V
318          .        C610
             .          .
             .          .
323        C610............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/31/1995  TIME  08:32:55 *
*                                       *
*****************************************
```

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

84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
2-5-10-25-50-100 yr STORM
INTERIM and ULTIMATE CONDITION:
FINAL DESIGN ********** CHOLLA BASIN
--STORM DRAIN IN CHOLLA ROAD
--DETENTION BASIN AT SITE 1 (4 acres)
--cactus sd intercepts 100-yr flow
--NO STORM DRAIN IN DESERT COVE
--no CONNECTOR AT CORTEZ TO INTERCEPT

FILE COUNTY.DAT

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

   IT          HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1    0  ENDING DATE
                    NDTIME        0958  ENDING TIME
                     ICENT         19  CENTURY MARK

               COMPUTATION INTERVAL     .03 HOURS
                    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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.36 .53 .62 .76 .88 1.00

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

					RATIOS APPLIED TO PRECIPITATION					
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					.36	.53	.62	.76	.88	1.00
HYDROGRAPH AT										
+	310	.02	1	FLOW	5.	11.	15.	22.	28.	35.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
DIVERSION TO										
+	D310	.02	1	FLOW	3.	6.	8.	11.	14.	17.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
HYDROGRAPH AT										
+	C320	.02	1	FLOW	3.	6.	8.	11.	14.	17.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
ROUTED TO										
+	C330	.02	1	FLOW	2.	4.	6.	9.	12.	16.
				TIME	3.50	3.50	3.47	3.43	3.40	3.37
			** PEAK STAGES IN FEET **							
			1	STAGE	99.85	99.91	99.94	99.98	100.01	100.04
				TIME	3.50	3.50	3.47	3.43	3.40	3.37
HYDROGRAPH AT										
+	350	.00	1	FLOW	1.	2.	3.	4.	6.	7.
				TIME	3.10	3.10	3.10	3.10	3.10	3.10
DIVERSION TO										
+	D350	.00	1	FLOW	1.	1.	1.	2.	3.	3.
				TIME	3.10	3.10	3.10	3.10	3.10	3.10
HYDROGRAPH AT										
+	C350	.00	1	FLOW	1.	1.	1.	2.	3.	3.

				TIME	3.10	3.10	3.10	3.10	3.10	3.10
ROUTED TO										
+	C330	.00	1	FLOW	0.	1.	1.	1.	1.	2.
				TIME	3.77	3.57	3.53	3.50	3.50	3.47
			** PEAK STAGES IN FEET **							
			1	STAGE	99.74	99.77	99.79	99.81	99.82	99.84
				TIME	3.77	3.57	3.53	3.50	3.50	3.47
HYDROGRAPH AT										
+	330	.06	1	FLOW	13.	27.	36.	51.	65.	81.
				TIME	3.43	3.47	3.47	3.47	3.47	3.43
3 COMBINED AT										
+	C330	.08	1	FLOW	15.	32.	43.	61.	78.	96.
				TIME	3.47	3.47	3.47	3.47	3.43	3.43
HYDROGRAPH AT										
+	340	.01	1	FLOW	3.	7.	10.	14.	18.	22.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20
ROUTED TO										
+	C330	.01	1	FLOW	3.	7.	9.	14.	18.	22.
				TIME	3.30	3.30	3.27	3.27	3.23	3.23
			** PEAK STAGES IN FEET **							
			1	STAGE	82.22	82.31	82.35	82.41	82.45	82.49
				TIME	3.30	3.30	3.27	3.27	3.23	3.23
2 COMBINED AT										
+	C330	.09	1	FLOW	18.	36.	49.	69.	89.	110.
				TIME	3.43	3.43	3.43	3.43	3.40	3.40
ROUTED TO										
+	C380F	.09	1	FLOW	18.	36.	48.	69.	88.	109.
				TIME	3.47	3.47	3.43	3.43	3.40	3.40
HYDROGRAPH AT										
+	380F	.01	1	FLOW	2.	5.	7.	10.	13.	16.
				TIME	3.17	3.17	3.17	3.17	3.17	3.17
2 COMBINED AT										
+	C380F	.10	1	FLOW	19.	38.	51.	73.	94.	116.
				TIME	3.43	3.43	3.43	3.43	3.40	3.40
ROUTED TO										
+	C380E	.10	1	FLOW	19.	38.	51.	73.	93.	116.
				TIME	3.47	3.47	3.43	3.43	3.40	3.40
HYDROGRAPH AT										
+	380E	.01	1	FLOW	2.	4.	6.	8.	11.	13.
				TIME	3.13	3.13	3.13	3.13	3.13	3.13
2 COMBINED AT										
+	C380E	.10	1	FLOW	19.	39.	52.	75.	96.	119.
				TIME	3.43	3.43	3.43	3.43	3.40	3.40

```
ROUTED TO
+                C380D      .10    1   FLOW        19.      39.      52.      75.      96.     119.
                                       TIME      3.43     3.47     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                380D       .00    1   FLOW         1.       2.       2.       3.       4.       5.
                                       TIME      3.13     3.13     3.13     3.13     3.13     3.13

2 COMBINED AT
+                C380D      .11    1   FLOW        19.      40.      53.      76.      97.     121.
                                       TIME      3.43     3.47     3.43     3.43     3.40     3.40

ROUTED TO
+                SD700      .11    1   FLOW        19.      39.      53.      76.      97.     121.
                                       TIME      3.47     3.47     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                D350       .00    1   FLOW         1.       1.       1.       2.       3.       3.
                                       TIME      3.10     3.10     3.10     3.10     3.10     3.10

ROUTED TO
+                C360       .00    1   FLOW         0.       1.       1.       2.       2.       3.
                                       TIME      3.33     3.30     3.27     3.27     3.23     3.23

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE    98.68    98.74    98.75    98.77    98.79    98.81
                                       TIME      3.33     3.30     3.27     3.27     3.23     3.23

HYDROGRAPH AT
+                360        .01    1   FLOW         5.      10.      13.      19.      24.      30.
                                       TIME      3.17     3.20     3.20     3.20     3.17     3.17

HYDROGRAPH AT
+                370        .01    1   FLOW         2.       5.       6.       9.      12.      15.
                                       TIME      3.13     3.17     3.17     3.13     3.13     3.13

3 COMBINED AT
+                C370       .02    1   FLOW         7.      14.      20.      29.      37.      46.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17

ROUTED TO
+                C380A      .02    1   FLOW         7.      14.      20.      28.      36.      46.
                                       TIME      3.23     3.23     3.23     3.20     3.23     3.20

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE    98.87    98.95    99.00    99.04    99.09    99.13
                                       TIME      3.23     3.23     3.23     3.20     3.23     3.20

HYDROGRAPH AT
+                380A       .01    1   FLOW         2.       4.       6.       9.      11.      14.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17

2 COMBINED AT
+                C380A      .03    1   FLOW         9.      18.      25.      37.      47.      59.
                                       TIME      3.23     3.23     3.23     3.20     3.20     3.20
```

```
ROUTED TO
+                C380B      .03    1   FLOW        8.      18.      25.      37.      47.      59.
                                      TIME      3.30     3.30     3.27     3.23     3.23     3.23

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    98.87    98.96    99.00    99.06    99.10    99.15
                                      TIME      3.30     3.30     3.27     3.23     3.23     3.23

HYDROGRAPH AT
+                380B       .02    1   FLOW        7.      14.      19.      27.      35.      44.
                                      TIME      3.23     3.27     3.27     3.27     3.23     3.23

 2 COMBINED AT
+                C380B      .05    1   FLOW       15.      31.      44.      64.      82.     103.
                                      TIME      3.30     3.27     3.27     3.23     3.23     3.23

ROUTED TO
+                SD700      .05    1   FLOW       15.      31.      43.      63.      81.     101.
                                      TIME      3.30     3.30     3.27     3.27     3.27     3.23

HYDROGRAPH AT
+                380C       .00    1   FLOW        1.       2.       3.       5.       6.       8.
                                      TIME      3.13     3.13     3.13     3.13     3.13     3.13

ROUTED TO
+                SD700      .00    1   FLOW        1.       2.       3.       5.       6.       7.
                                      TIME      3.13     3.13     3.13     3.13     3.13     3.13

HYDROGRAPH AT
+                390        .01    1   FLOW        1.       3.       5.       9.      12.      15.
                                      TIME      3.33     3.27     3.23     3.23     3.23     3.23

 4 COMBINED AT
+                C390       .17    1   FLOW       33.      70.      94.     137.     177.     221.
                                      TIME      3.33     3.33     3.30     3.30     3.27     3.27

ROUTED TO
+                SD700      .17    1   FLOW       10.      18.      24.      34.      43.      52.
                                      TIME      3.93     3.97     3.93     3.93     3.93     3.93

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    73.49    74.14    74.52    75.17    75.76    76.41
                                      TIME      3.93     3.97     3.93     3.93     3.93     3.93

ROUTED TO
+                C510       .17    1   FLOW       10.      18.      24.      34.      43.      52.
                                      TIME      3.97     4.00     4.00     3.97     3.97     3.97

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    97.12    97.36    97.50    97.72    97.87    98.02
                                      TIME      3.97     4.00     4.00     3.97     3.97     3.97

HYDROGRAPH AT
+                510        .01    1   FLOW        5.      10.      14.      20.      26.      32.
                                      TIME      3.10     3.10     3.10     3.10     3.10     3.10

 2 COMBINED AT
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                C510      .18   1  FLOW      11.     19.     25.     35.     43.     53.
                                   TIME     3.97    4.00    3.97    3.97    3.97    3.97

ROUTED TO
+               C520      .18   1  FLOW      11.     19.     25.     35.     43.     53.
                                   TIME     4.00    4.03    4.03    4.00    4.00    4.00

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE   97.30   97.60   97.78   98.05   98.24   98.42
                                    TIME     4.00    4.03    4.03    4.00    4.00    4.00

HYDROGRAPH AT
+               520       .01   1  FLOW       6.     12.     16.     23.     30.     37.
                                   TIME     3.13    3.13    3.13    3.13    3.13    3.13

 2 COMBINED AT
+               C520      .19   1  FLOW      15.     27.     35.     49.     61.     75.
                                   TIME     3.13    3.13    3.13    3.13    3.13    3.13

HYDROGRAPH AT
+               530       .01   1  FLOW       3.      6.      8.     11.     14.     18.
                                   TIME     3.20    3.20    3.20    3.20    3.20    3.20

 2 COMBINED AT
+               C530      .20   1  FLOW      17.     32.     41.     58.     74.     90.
                                   TIME     3.17    3.17    3.17    3.13    3.13    3.13

ROUTED TO
+               C550      .20   1  FLOW      17.     32.     42.     58.     74.     90.
                                   TIME     3.17    3.17    3.17    3.17    3.17    3.17

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE   97.42   97.78   97.98   98.28   98.51   98.72
                                    TIME     3.17    3.17    3.17    3.17    3.17    3.17

HYDROGRAPH AT
+               420       .02   1  FLOW       5.     10.     14.     20.     25.     31.
                                   TIME     3.27    3.27    3.27    3.27    3.27    3.27

ROUTED TO
+               C430      .02   1  FLOW       5.     10.     13.     19.     25.     31.
                                   TIME     3.37    3.33    3.33    3.33    3.30    3.30

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE  100.11  100.22  100.28  100.37  100.44  100.50
                                    TIME     3.37    3.33    3.33    3.33    3.30    3.30

HYDROGRAPH AT
+               430       .02   1  FLOW       6.     13.     18.     26.     33.     41.
                                   TIME     3.23    3.27    3.27    3.27    3.23    3.23

 2 COMBINED AT
+               C430      .04   1  FLOW      11.     23.     30.     44.     57.     71.
                                   TIME     3.30    3.30    3.30    3.27    3.27    3.27

HYDROGRAPH AT
+               440       .01   1  FLOW       3.      5.      7.     10.     13.     16.
```

				TIME	3.17	3.20	3.20	3.20	3.17	3.17
2 COMBINED AT										
+	C440	.05	1	FLOW	13.	27.	36.	52.	68.	84.
				TIME	3.27	3.30	3.27	3.27	3.27	3.27
DIVERSION TO										
+	D440	.05	1	FLOW	9.	19.	25.	37.	47.	59.
				TIME	3.27	3.30	3.27	3.27	3.27	3.27
HYDROGRAPH AT										
+	C440	.05	1	FLOW	4.	8.	11.	16.	20.	25.
				TIME	3.27	3.30	3.27	3.27	3.27	3.27
ROUTED TO										
+	C540	.05	1	FLOW	4.	8.	11.	15.	20.	25.
				TIME	3.37	3.33	3.33	3.33	3.30	3.30
			** PEAK STAGES IN FEET **							
			1	STAGE	100.01	100.09	100.13	100.18	100.22	100.26
				TIME	3.37	3.33	3.33	3.33	3.30	3.30
HYDROGRAPH AT										
+	540	.01	1	FLOW	2.	4.	5.	8.	10.	12.
				TIME	3.17	3.17	3.17	3.17	3.17	3.17
2 COMBINED AT										
+	C540	.05	1	FLOW	5.	10.	14.	20.	27.	33.
				TIME	3.33	3.30	3.30	3.30	3.27	3.27
ROUTED TO										
+	C550	.05	1	FLOW	5.	10.	14.	20.	27.	33.
				TIME	3.37	3.33	3.30	3.30	3.27	3.27
			** PEAK STAGES IN FEET **							
			1	STAGE	100.03	100.11	100.15	100.21	100.26	100.30
				TIME	3.37	3.33	3.30	3.30	3.27	3.27
HYDROGRAPH AT										
+	550	.01	1	FLOW	3.	6.	8.	12.	16.	20.
				TIME	3.10	3.13	3.13	3.10	3.10	3.10
3 COMBINED AT										
+	C550	.26	1	FLOW	23.	43.	57.	82.	106.	131.
				TIME	3.20	3.17	3.17	3.17	3.17	3.17
ROUTED TO										
+	C560	.26	1	FLOW	23.	43.	57.	80.	102.	125.
				TIME	3.27	3.23	3.23	3.23	3.23	3.27
			** PEAK STAGES IN FEET **							
			1	STAGE	98.08	98.58	98.85	99.20	99.44	99.65
				TIME	3.27	3.23	3.23	3.23	3.23	3.27
HYDROGRAPH AT										
+	570	.00	1	FLOW	2.	3.	5.	7.	8.	10.
				TIME	3.20	3.20	3.20	3.20	3.20	3.20

```
HYDROGRAPH AT
+                580      .01    1  FLOW        2.      4.      6.      8.     10.     13.
                                    TIME      3.17    3.20    3.20    3.20    3.17    3.17

HYDROGRAPH AT
+                560      .00    1  FLOW        1.      3.      4.      6.      8.      9.
                                    TIME      3.17    3.17    3.17    3.17    3.17    3.17

 4 COMBINED AT
+               C560      .27    1  FLOW       27.     53.     70.     99.    125.    154.
                                    TIME      3.23    3.23    3.23    3.23    3.23    3.23

ROUTED TO
+               C590      .27    1  FLOW       27.     53.     70.     99.    126.    154.
                                    TIME      3.23    3.23    3.23    3.23    3.23    3.23

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    97.04   97.61   97.94   98.44   98.87   99.25
                                    TIME      3.23    3.23    3.23    3.23    3.23    3.23

HYDROGRAPH AT
+                590      .02    1  FLOW        6.     11.     15.     22.     29.     35.
                                    TIME      3.27    3.27    3.27    3.27    3.27    3.27

 2 COMBINED AT
+               C590      .29    1  FLOW       32.     64.     85.    120.    154.    189.
                                    TIME      3.23    3.23    3.23    3.23    3.23    3.23

ROUTED TO
+               C610      .29    1  FLOW       32.     63.     85.    120.    152.    187.
                                    TIME      3.30    3.27    3.27    3.27    3.27    3.30

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    97.35   97.99   98.34   98.84   99.18   99.48
                                    TIME      3.30    3.27    3.27    3.27    3.27    3.30

HYDROGRAPH AT
+                610      .00    1  FLOW        2.      3.      5.      7.      9.     11.
                                    TIME      3.10    3.10    3.10    3.10    3.10    3.10

 2 COMBINED AT
+               C610      .30    1  FLOW       33.     65.     86.    123.    155.    190.
                                    TIME      3.30    3.27    3.27    3.27    3.27    3.30

HYDROGRAPH AT
+               D440      .00    1  FLOW        9.     19.     25.     37.     47.     59.
                                    TIME      3.27    3.30    3.27    3.27    3.27    3.27

ROUTED TO
+               C470      .00    1  FLOW        8.     18.     25.     36.     47.     58.
                                    TIME      3.40    3.37    3.33    3.33    3.33    3.33

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    99.96  100.05  100.09  100.15  100.20  100.25
                                    TIME      3.40    3.37    3.33    3.33    3.33    3.33
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HYDROGRAPH AT
+                410       .04    1   FLOW        11.     22.     29.     41.     53.     65.
                                      TIME      3.37    3.37    3.37    3.37    3.37    3.37

ROUTED TO
+                C450      .04    1   FLOW        11.     21.     29.     41.     53.     65.
                                      TIME      3.37    3.37    3.37    3.37    3.37    3.37

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE    101.71  101.83  101.89  101.98  102.06  102.13
                                      TIME      3.37    3.37    3.37    3.37    3.37    3.37

HYDROGRAPH AT
+                450       .01    1   FLOW         2.      5.      6.      9.     12.     14.
                                      TIME      3.27    3.27    3.27    3.27    3.27    3.27

 2 COMBINED AT
+                C450      .05    1   FLOW        13.     26.     34.     49.     63.     78.
                                      TIME      3.37    3.37    3.37    3.37    3.37    3.33

ROUTED TO
+                C460      .05    1   FLOW        12.     25.     34.     49.     63.     77.
                                      TIME      3.43    3.43    3.40    3.40    3.40    3.40

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE    101.73  101.86  101.93  102.03  102.12  102.20
                                      TIME      3.43    3.43    3.40    3.40    3.40    3.40

HYDROGRAPH AT
+                460       .01    1   FLOW         1.      5.      8.     14.     19.     24.
                                      TIME      3.30    3.23    3.23    3.20    3.20    3.20

 2 COMBINED AT
+                C460      .07    1   FLOW        13.     29.     39.     57.     74.     92.
                                      TIME      3.43    3.40    3.40    3.37    3.37    3.37

HYDROGRAPH AT
+                470       .01    1   FLOW        10.     15.     18.     22.     26.     29.
                                      TIME      3.17    3.17    3.17    3.17    3.17    3.17

 3 COMBINED AT
+                C470      .07    1   FLOW        25.     53.     72.    103.    133.    164.
                                      TIME      3.37    3.37    3.33    3.33    3.33    3.33

ROUTED TO
+                C600      .07    1   FLOW        25.     53.     71.    102.    131.    163.
                                      TIME      3.47    3.43    3.40    3.40    3.37    3.37

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE    101.86  102.06  102.16  102.32  102.45  102.57
                                      TIME      3.47    3.43    3.40    3.40    3.37    3.37

HYDROGRAPH AT
+                600       .03    1   FLOW         8.     17.     23.     33.     43.     53.
                                      TIME      3.27    3.30    3.30    3.30    3.27    3.27

 2 COMBINED AT
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                C600      .10    1  FLOW        31.     67.     90.    131.    170.    210.
                                    TIME       3.43    3.40    3.40    3.37    3.37    3.37

ROUTED TO
                C610      .10    1  FLOW        31.     67.     90.    131.    170.    210.
                                    TIME       3.43    3.40    3.40    3.37    3.37    3.37

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE     96.91   97.41   97.66   98.04   98.34   98.62
                                    TIME       3.43    3.40    3.40    3.37    3.37    3.37

2 COMBINED AT
                C610      .40    1  FLOW        60.    121.    164.    240.    312.    390.
                                    TIME       3.33    3.37    3.33    3.33    3.33    3.33

                                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                      INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
        ISTAQ    ELEMENT      DT       PEAK    TIME TO    VOLUME     DT      PEAK    TIME TO    VOLUME
                                                  PEAK                                  PEAK

                            (MIN)     (CFS)     (MIN)     (IN)    (MIN)    (CFS)     (MIN)      (IN)

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE         .76     17.64    206.78      .28     2.00    17.62    208.00       .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1395E+01 EXCESS= .0000E+00 OUTFLOW= .1395E+01 BASIN STORAGE= .5187E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE         .66     36.17    207.42      .54     2.00    36.17    208.00       .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2679E+01 EXCESS= .0000E+00 OUTFLOW= .2679E+01 BASIN STORAGE= .5282E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE         .62     48.36    206.81      .71     2.00    48.29    206.00       .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3481E+01 EXCESS= .0000E+00 OUTFLOW= .3481E+01 BASIN STORAGE= .5155E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE         .58     69.09    205.92      .99     2.00    69.08    206.00       .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4852E+01 EXCESS= .0000E+00 OUTFLOW= .4851E+01 BASIN STORAGE= .5187E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE         .55     88.60    204.67     1.24     2.00    88.42    204.00      1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6121E+01 EXCESS= .0000E+00 OUTFLOW= .6119E+01 BASIN STORAGE= .5207E-04 PERCENT ERROR=    .0
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```
FOR PLAN = 1  RATIO=  .00
   C380F  MANE          .53    109.51    204.13      1.52      2.00    109.47    204.00        1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7456E+01 EXCESS= .0000E+00 OUTFLOW= .7454E+01 BASIN STORAGE= .5143E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .75     18.53    206.98       .29      2.00     18.50    208.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+01 EXCESS= .0000E+00 OUTFLOW= .1510E+01 BASIN STORAGE= .5244E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .65     37.97    207.35       .55      2.00     37.96    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2901E+01 EXCESS= .0000E+00 OUTFLOW= .2901E+01 BASIN STORAGE= .5297E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .62     50.79    206.66       .71      2.00     50.74    206.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3770E+01 EXCESS= .0000E+00 OUTFLOW= .3769E+01 BASIN STORAGE= .5295E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .57     72.63    206.18       .99      2.00     72.63    206.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5255E+01 EXCESS= .0000E+00 OUTFLOW= .5253E+01 BASIN STORAGE= .5237E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .54     93.38    204.71      1.25      2.00     93.27    204.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6628E+01 EXCESS= .0000E+00 OUTFLOW= .6626E+01 BASIN STORAGE= .5235E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380E  MANE          .52    115.70    204.03      1.53      2.00    115.69    204.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8074E+01 EXCESS= .0000E+00 OUTFLOW= .8071E+01 BASIN STORAGE= .5094E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .60     19.08    206.54       .29      2.00     19.05    206.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+01 EXCESS= .0000E+00 OUTFLOW= .1595E+01 BASIN STORAGE= .4117E-04 PERCENT ERROR=    .0
```

```
FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .52     39.08    207.49       .55      2.00     39.07    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3064E+01 EXCESS= .0000E+00 OUTFLOW= .3064E+01 BASIN STORAGE= .4218E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .49     52.24    206.50       .72      2.00     52.20    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3982E+01 EXCESS= .0000E+00 OUTFLOW= .3981E+01 BASIN STORAGE= .4139E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .46     74.77    205.92      1.00      2.00     74.76    206.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5550E+01 EXCESS= .0000E+00 OUTFLOW= .5548E+01 BASIN STORAGE= .4228E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .43     96.18    204.40      1.26      2.00     96.14    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7000E+01 EXCESS= .0000E+00 OUTFLOW= .6998E+01 BASIN STORAGE= .4168E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   C380D  MANE          .41    119.31    204.12      1.53      2.00    119.31    204.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8527E+01 EXCESS= .0000E+00 OUTFLOW= .8525E+01 BASIN STORAGE= .4170E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .25     19.28    206.63       .29      2.00     19.26    208.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1629E+01 EXCESS= .0000E+00 OUTFLOW= .1629E+01 BASIN STORAGE= .1695E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .22     39.50    207.93       .55      2.00     39.49    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3128E+01 EXCESS= .0000E+00 OUTFLOW= .3128E+01 BASIN STORAGE= .1703E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .20     52.76    206.36       .72      2.00     52.75    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4065E+01 EXCESS= .0000E+00 OUTFLOW= .4064E+01 BASIN STORAGE= .1704E-04 PERCENT ERROR=    .0
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```
FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .19     75.57    205.90      1.00      2.00     75.57    206.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+01 EXCESS= .0000E+00 OUTFLOW= .5665E+01 BASIN STORAGE= .1717E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .18     97.25    204.03      1.26      2.00     97.23    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7146E+01 EXCESS= .0000E+00 OUTFLOW= .7145E+01 BASIN STORAGE= .1715E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .17    120.71    204.05      1.54      2.00    120.71    204.00        1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8704E+01 EXCESS= .0000E+00 OUTFLOW= .8703E+01 BASIN STORAGE= .1722E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .43     14.80    198.31       .32      2.00     14.80    198.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8324E+00 EXCESS= .0000E+00 OUTFLOW= .8322E+00 BASIN STORAGE= .2840E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .37     31.29    197.68       .62      2.00     31.27    198.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1599E+01 EXCESS= .0000E+00 OUTFLOW= .1598E+01 BASIN STORAGE= .2808E-04 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .35     43.27    196.28       .81      2.00     43.27    196.00         .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+01 EXCESS= .0000E+00 OUTFLOW= .2076E+01 BASIN STORAGE= .2792E-04 PERCENT ERROR=    .1

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .32     63.15    194.94      1.12      2.00     62.94    196.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2896E+01 EXCESS= .0000E+00 OUTFLOW= .2893E+01 BASIN STORAGE= .2915E-04 PERCENT ERROR=    .1

FOR PLAN = 1  RATIO=  .00
   SD700  MANE          .31     81.11    195.07      1.42      2.00     81.00    196.00        1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3652E+01 EXCESS= .0000E+00 OUTFLOW= .3649E+01 BASIN STORAGE= .2830E-04 PERCENT ERROR=    .1

FOR PLAN = 1  RATIO=  .00
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```
        SD700  MANE          .29    101.30    194.13      1.72      2.00    101.14    194.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4449E+01 EXCESS= .0000E+00 OUTFLOW= .4445E+01 BASIN STORAGE= .2851E-04 PERCENT ERROR=    .1

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .39      1.13    188.37       .32      2.00      1.12    188.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4848E-01 EXCESS= .0000E+00 OUTFLOW= .4847E-01 BASIN STORAGE= .1587E-04 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .33      2.38    188.64       .61      2.00      2.36    188.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9311E-01 EXCESS= .0000E+00 OUTFLOW= .9309E-01 BASIN STORAGE= .1510E-04 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .31      3.22    188.46       .79      2.00      3.19    188.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+00 EXCESS= .0000E+00 OUTFLOW= .1210E+00 BASIN STORAGE= .1528E-04 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .29      4.67    188.19      1.10      2.00      4.65    188.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1686E+00 EXCESS= .0000E+00 OUTFLOW= .1686E+00 BASIN STORAGE= .1543E-04 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .28      6.03    188.19      1.38      2.00      6.01    188.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2127E+00 EXCESS= .0000E+00 OUTFLOW= .2127E+00 BASIN STORAGE= .1496E-04 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .26      7.46    188.01      1.69      2.00      7.45    188.00        1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2591E+00 EXCESS= .0000E+00 OUTFLOW= .2590E+00 BASIN STORAGE= .1490E-04 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/30/1995  TIME  18:18:15 *
*                                       *
*****************************************
```

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

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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

HEC-1 INPUT PAGE 1

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

  1           ID        84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
  2           ID        2-5-10-25-50-100 yr STORM
  3           ID        INTERIM and ULTIMATE CONDITION:
  4           ID        FINAL DESIGN ********************** CHOLLA BASIN
  5           ID        --STORM DRAIN IN CHOLLA ROAD
  6           ID        --DETENTION BASIN AT SITE 1 (4 acres)
  7           ID        --cactus sd intercepts 100-yr flow
  8           ID        --NO STORM DRAIN IN DESERT COVE
  9           ID        --no CONNECTOR AT CORTEZ TO INTERCEPT
 10           ID        --6-HOUR 10-YEAR TIME CONCENTRATION VALUES USED FOR THE UD CARDS
 11           ID        --MULTIPLIED BY 0.6 FOR THE LAG TIME
 12           ID        --NSTP VALUES ON THE RS CARD = 100
 13           ID
 14           ID        FILE CNTYN100.DAT
              *DIAGRAM
 15           IT       2                    300
 16           IO       5
 17           JR    PREC     .36     .53     .62     .76     .88     1.0
```

```
 18          KK     310      subbasin 310 runoff
 19          BA  .01647
 20          PH                    0.88    1.61     2.6    2.84     3.0     3.3
 21          LS              77      20
 22          UD     .14

 23          KK    C320      DIVERT C310 TO 320
 24          DT    D310
 25          DI       0     100
 26          DQ       0      50

 27          KK    C330      ROUTE C310 TO 330
 28          RS     100    STOR      -1       0
 29          RC    .040    .016    .040     750   .0030   2.0
 30          RX       0      24    24.1      40    40.1      56    56.1      80
 31          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101
 32          RS     100    STOR      -1       0
 33          RC    .040    .016    .040    2000   .0060
 34          RX       0      24    24.1      40    40.1      56    56.1      80
 35          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 36          KK     350      subbasin 350 runoff
 37          BA  .00225
 38          LS              77      20
 39          UD     .04

 40          KK    C350      DIVERT C350 TO 360
 41          DT    D350
 42          DI       0     100
 43          DQ       0      50
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 44          KK    C330      ROUTE 350 TO 330
 45          RS     100    STOR      -1       0
 46          RC    .040    .016    .040    2200   .0060   2.5
 47          RX       0      24    24.1      40    40.1      56    56.1      80
 48          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 49          KK     330      subbasin 330 runoff
 50          BA  .06322
 51          LS              77      20
 52          UD     .37

 53          KK    C330      COMBINE C310 AND 330 AND C350
 54          HC       3

 55          KK     340      subbasin 340 runoff
 56          BA  .01031
 57          LS              77      20
 58          UD     .14

 59          KK    C330      ROUTE 340 TO 330
 60          RS     100    STOR      -1       0
 61          RC    .040    .016    .040     440   .0022
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 62          RX       0    19.8    19.8      40    40.1      42      50      60
 63          RY    82.9   82.41   81.91   82.31   82.31   82.22    82.1    82.4

 64          KK    C330      COMBINE C310 AND 340
 65          HC       2

 66          KK   C380F      ROUTE C330 TO 380F
 67          RD     300  0.0030   0.012            CIRC       4

 68          KK    380F      subbasin 380F runoff
 69          BA  .00688
 70          LS              77      20
 71          UD     .12

 72          KK   C380F      COMBINE 380F AND C330
 73          HC       2

 74          KK   C380E      ROUTE C380F TO 380E
 75          RD     300  0.0030   0.012            CIRC       4

 76          KK    380E      subbasin 380E runoff
 77          BA  .00505
 78          LS              77      20
 79          UD     .08

 80          KK   C380E      COMBINE 380E AND C380F
 81          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 82          KK   C380D      ROUTE C380E TO 380D
 83          RD     240  0.0030   0.012            CIRC       4

 84          KK    380D      subbasin 380D runoff
 85          BA  .00198
 86          LS              77      20
 87          UD     .08

 88          KK   C380D      COMBINE C380D AND 380E
 89          HC       2

 90          KK   SD700      ROUTE C380D TO SD700
 91          RD     100  0.0030   0.012            CIRC       4

 92          KK    D350      RETRIEVE D350
 93          DR    D350

 94          KK    C360      ROUTE C350 TO 360
 95          RS     100    STOR      -1       0
 96          RC    .040    .016    .040     850   .0040
 97          RX       0      24    24.1      40    40.1      56    56.1      80
 98          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

 99          KK     360      SUBBASIN 360 RUNOFF
100          BA  .01320
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101          LS              77      20
102          UD     .13

103          KK     370      SUBBASIN 370 RUNOFF
104          BA  .00592
105          LS              77      20
106          UD     .10

107          KK    C370      COMBINE D350 AND 360 AND 370
108          HC       3

109          KK   C380A      ROUTE C370 TO 380A
110          RS     100    STOR      -1       0
111          RC    .040    .016    .040     620   .0054
112          RX       0      20    20.1      40    40.1      60    60.1      80
113          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

114          KK    380A      subbasin 380A runoff
115          BA  .00588
116          LS              77      20
117          UD     .12

118          KK   C380A      COMBINE C370 AND C380A
119          HC       2
```



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


120          KK   C380B      ROUTE C380A TO 380B
121          RS     100    STOR      -1       0
122          RC    .040    .016    .040     700   .0077
123          RX       0      20    20.1      40    40.1      60    60.1      80
124          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

125          KK    380B      subbasin 380B runoff
126          BA  .02333
127          LS              77      20
128          UD     .19

129          KK   C380B      COMBINE C380A AND C380B
130          HC       2

131          KK   SD700      ROUTE C380B TO SD700
132          RD     150  0.0030   0.012            CIRC       2

133          KK    380C      subbasin 380C runoff
134          BA  .00288
135          LS              77      20
136          UD     .07

137          KK   SD700      ROUTE C380C TO SD700
138          RD      80  0.0030   0.012            CIRC       2

139          KK     390      subbasin 390 runoff
140          BA  .00938
141          LS              77
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 142          UD     .16

 143          KK    C390      COMBINE C380D AND 380B AND 380C AND 390
 144          HC       4

 145          KK   SD700      NEW DETENTION BASIN (bottom avg=1373, outfall pipe=1372.20)
 146          RS       1    STOR       0
 147          SV       0    2.22    4.58    7.08    9.44
 148          SE      73      74      75      76      77
 149          SQ       5      16      32      46      60

 150          KK    C510      ROUTE SD700 TO 510
 151          RS     100    STOR      -1       0
 152          RC    .050    .035    .050     700   .0070
 153          RX       0      .1      17      22      28      33      50    50.1
 154          RY     102     100      99    96.5    96.5      99     100     102

 155          KK     510      SUBBASIN 510 RUNOFF
 156          BA  .01044
 157          LS              77      20
 158          UD     .05
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 159          KK    C510      COMBINE SD700 AND 510
 160          HC       2

 161          KK    C520      ROUTE C510 TO 520
 162          RS     100    STOR      -1       0
 163          RC    .050    .035    .050     440   .0030
 164          RX       0      .1      17      22      28      33      50    50.1
 165          RY     102     100      99    96.5    96.5      99     100     102

 166          KK     520      SUBBASIN 520 RUNOFF
 167          BA  .01402
 168          LS              77      20
 169          UD     .09

 170          KK    C520      COMBINE C510 AND 520
 171          HC       2

 172          KK     530      SUBBASIN 530 RUNOFF
 173          BA  .00806
 174          LS              77      20
 175          UD     .14

 176          KK    C530      COMBINE C520 AND 530
 177          HC       2

 178          KK    C550      ROUTE C530 TO 550
 179          RS     100    STOR      -1       0
 180          RC    .050    .035    .050     350   .0050
 181          RX       0      .1      17      22      28      33      50    50.1
 182          RY     102     100      99    96.5    96.5      99     100     102
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183          KK     420      SUBBASIN 420 RUNOFF
184          BA  .01719
185          LS              77      20
186          UD     .20

187          KK    C430      ROUTE C420 TO 430
188          RS     100    STOR      -1       0
189          RC    .040    .016    .040     480   .0020
190          RX       0      20      23      30    30.1      37      40      60
191          RY     102    99.7   99.93     100     100   99.93    99.7     102

192          KK     430      SUBBASIN 430 RUNOFF
193          BA  .02202
194          LS              77      20
195          UD     .19

196          KK    C430      COMBINE C420 AND 430
197          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


198          KK     440      SUBBASIN 440 RUNOFF
199          BA  .00731
200          LS              77      20
201          UD     .13

202          KK    C440      COMBINE C430 AND 440
203          HC       2

204          KK    C440      DIVERT C440 TO 470
205          DT    D440
206          DI       0     100     200     300
207          DQ       0      70     140     210

208          KK    C540      ROUTE C440 TO C540
209          RS     100    STOR      -1       0
210          RC    .040    .016    .040     540   .0080
211          RX       0      20      23      30    30.1      37      40      60
212          RY     102    99.7   99.93     100     100   99.93    99.7     102

213          KK     540      SUBBASIN 540 RUNOFF
214          BA  .00517
215          LS              77      20
216          UD     .12

217          KK    C540      COMBINE C440 AND 540
218          HC       2

219          KK    C550      ROUTE 540 TO C550
220          RS     100    STOR      -1       0
221          RC    .040    .016    .040     200   .0080
222          RX       0      20      23      30    30.1      37      40      60
223          RY     101    99.7   99.93     100     100   99.93    99.7     101

224          KK     550      SUBBASIN 550
```

```
225          BA  .00703
226          LS              77      20
227          UD     .08

228          KK    C550      COMBINE 550 AND C530 AND 540
229          HC       3

230          KK    C560      ROUTE C550 TO 560
231          RS     100    STOR      -1       0
232          RC    .050    .035    .050     900   .0060
233          RX       0      .1      20      22      28      30      50    50.1
234          RY     102     100      99      97      97      99     100     102

235          KK     570      SUBBASIN 570 RUNOFF
236          BA  .00492
237          LS              77      20
238          UD     .16
```



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

239          KK     580      SUBBASIN 580 RUNOFF
240          BA  .00575
241          LS              77      20
242          UD     .13

243          KK     560      SUBBASIN 560 RUNOFF
244          BA  .00386
245          LS              77      20
246          UD     .11

247          KK    C560      COMBINE C550 AND 560 AND 570 AND 580
248          HC       4

249          KK    C590      ROUTE C560 TO 590
250          RS     100    STOR      -1       0
251          RC    .050    .035    .050      55   .0030
252          RX       0      .1      20    20.1      32    32.1      50    50.1
253          RY     102     100      99      96      96      99     100     102

254          KK     590      SUBBASIN 590 RUNOFF
255          BA  .01931
256          LS              77      20
257          UD    0.20

258          KK    C590      COMBINE C560 AND 590
259          HC       2

260          KK    C610      ROUTE C590 TO 610
261          RS     100    STOR      -1       0
262          RC    .050    .035    .050     600   .0030
263          RX       0      .1      20      24      32      36      50    50.1
264          RY     102     100      99      96      96      99     100     102

265          KK     610      SUBBASIN 610 RUNOFF
266          BA   .0035
```

```
 267          LS              77      20
 268          UD    0.04

 269          KK    C610      COMBINE 610 AND C590
 270          HC       2

 271          KK    D440      RETRIEVE D440
 272          DR    D440

 273          KK    C470      ROUTE D440 TO 470
 274          RS     100    STOR      -1       0
 275          RC    .040    .016    .040    1200   .0070
 276          RX       0      24    24.1      40    40.1      56    56.1      80
 277          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21
                                          HEC-1 INPUT                                          PAGE  8

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


 278          KK     410      SUBBASIN 410 RUNOFF
 279          BA  .04406
 280          LS              77      20
 281          UD    0.29

 282          KK    C450      ROUTE 410 TO C450
 283          RS     100    STOR      -1       0
 284          RC    .040   0.016    .016     130   .0020
 285          RX      20      40      65      70      70      72     100     100
 286          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

 287          KK     450      SUBBASIN 450 RUNOFF
 288          BA  .00803
 289          LS              77      20
 290          UD    0.21

 291          KK    C450      COMBINE C410 AND 450
 292          HC       2

 293          KK    C460      ROUTE C450 TO 460
 294          RS     100    STOR      -1       0
 295          RC    .040   0.016    .016     600   .0020
 296          RX      20      40      65      70      70      72     100     100
 297          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

 298          KK     460      SUBBASIN 460 RUNOFF
 299          BA  .01398
 300          LS              77
 301          UD    0.14

 302          KK    C460      COMBINE C450 AND 460
 303          HC       2

 304          KK     470      SUBBASIN 470 RUNOFF
 305          BA  .00717
 306          LS              98
 307          UD    0.13
```

```
 308          KK    C470      COMBINE C460 AND C440 AND 470
 309          HC       3

 310          KK    C600      ROUTE C470 TO 600
 311          RS     100    STOR      -1       0
 312          RC    .040   0.016    .016     980   .0020
 313          RX      20      40      65      70      70      72     100     100
 314          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

 315          KK     600      SUBBASIN 600 RUNOFF
 316          BA  .03036
 317          LS              77      20
 318          UD     .23
```



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


 319          KK    C600      COMBINE C470 AND 600
 320          HC       2

 321          KK    C610      ROUTE C600 TO 610
 322          RS     100    STOR      -1       0
 323          RC    .040   0.016   0.016     250   .0020
 324          RX       0      20      40      46      54      60      80     100
 325          RY     101     100      99      96      96      99     100     101

 326          KK    C610      COMBINE 610 AND C600
 327          HC       2
 328          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  18        310
              .
              .
  24          .------->    D310
  23       C320
              V
              V
  27       C330
              .
              .
  36          .         350
              .           .
              .           .
  41          .           .------->    D350
  40          .        C350
              .           V
              .           V
  44          .        C330
              .           .
              .           .
```

```
49          .           .         330
            .           .           .
            .           .           .
53       C330.......................
            .
            .
55          .         340
            .           V
            .           V
59          .        C330
            .           .
            .           .
64       C330............
            V
            V
66      C380F
            .
            .
68          .        380F
            .           .
            .           .
72      C380F............
            V
            V
74      C380E
            .
            .
76          .        380E
            .           .
            .           .
80      C380E............
            V
            V
82      C380D
            .
            .
84          .        380D
            .           .
            .           .
88      C380D............
            V
            V
90      SD700
            .
            .
93          .           .<-------    D350
92          .        D350
            .           V
            .           V
94          .        C360
            .           .
            .           .
99          .           .         360
            .           .           .
            .           .           .
103         .           .           .         370
            .           .           .           .
```

```
            .           .           .           .
107         .        C370.......................
            .           V
            .           V
109         .       C380A
            .           .
            .           .
114         .           .        380A
            .           .           .
            .           .           .
118         .       C380A............
            .           V
            .           V
120         .       C380B
            .           .
            .           .
125         .           .        380B
            .           .           .
            .           .           .
129         .       C380B............
            .           V
            .           V
131         .       SD700
            .           .
            .           .
133         .           .        380C
            .           .           V
            .           .           V
137         .           .       SD700
            .           .           .
            .           .           .
139         .           .           .         390
            .           .           .           .
            .           .           .           .
143       C390.................................
            V
            V
145       SD700
            V
            V
150       C510
            .
            .
155         .         510
            .           .
            .           .
159       C510............
            V
            V
161       C520
            .
            .
166         .         520
            .           .
            .           .
170       C520............
            .
```

```
            .
172         .         530
            .           .
            .           .
176       C530............
            V
            V
178       C550
            .
            .
183         .         420
            .           V
            .           V
187         .        C430
            .           .
            .           .
192         .           .         430
            .           .           .
            .           .           .
196         .        C430............
            .           .
            .           .
198         .           .         440
            .           .           .
            .           .           .
202         .        C440............
            .           .
            .           .
205         .           .-------->    D440
204         .        C440
            .           V
            .           V
208         .        C540
            .           .
            .           .
213         .           .         540
            .           .           .
            .           .           .
217         .        C540............
            .           V
            .           V
219         .        C550
            .           .
            .           .
224         .           .         550
            .           .           .
            .           .           .
228       C550........................
            V
            V
230       C560
            .
            .
235         .         570
            .           .
            .           .
239         .           .         580
```

```
            .          .          .
            .          .          .
243         .          .          .         560
            .          .          .           .
            .          .          .           .
247       C560.....................................
            V
            V
249       C590
            .
            .
254         .        590
            .          .
            .          .
258       C590............
            V
            V
260       C610
            .
            .
265         .        610
            .          .
            .          .
269       C610............
            .
            .
272         .          .<-------    D440
271         .       D440
            .          V
            .          V
273         .       C470
            .          .
            .          .
278         .          .        410
            .          .          V
            .          .          V
282         .          .       C450
            .          .          .
            .          .          .
287         .          .          .         450
            .          .          .           .
            .          .          .           .
291         .          .       C450............
            .          .          V
            .          .          V
293         .          .       C460
            .          .          .
            .          .          .
298         .          .          .         460
            .          .          .           .
            .          .          .           .
302         .          .       C460............
            .          .          .
            .          .          .
304         .          .          .         470
            .          .          .           .
            .          .          .           .
```

```
308          .        C470.......................
             .           V
             .           V
310          .        C600
             .           .
             .           .
315          .           .         600
             .           .           .
             .           .           .
319          .        C600............
             .           V
             .           V
321          .        C610
             .           .
             .           .
326        C610............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/30/1995  TIME  18:18:15 *
*                                       *
*****************************************
```

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

```
                    84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
                    2-5-10-25-50-100 yr STORM
                    INTERIM and ULTIMATE CONDITION:
                    FINAL DESIGN ********************** CHOLLA BASIN
                    --STORM DRAIN IN CHOLLA ROAD
                    --DETENTION BASIN AT SITE 1 (4 acres)
                    --cactus sd intercepts 100-yr flow
                    --NO STORM DRAIN IN DESERT COVE
                    --no CONNECTOR AT CORTEZ TO INTERCEPT
                    --6-HOUR 10-YEAR TIME CONCENTRATION VALUES USED FOR THE UD CARDS
                    --MULTIPLIED BY 0.6 FOR THE LAG TIME
                    --NSTP VALUES ON THE RS CARD = 100

                    FILE CNTYN100.DAT

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

   IT          HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
```

```
                NDDATE      1    0  ENDING DATE
                NDTIME        0958  ENDING TIME
                ICENT           19  CENTURY MARK

             COMPUTATION INTERVAL     .03 HOURS
                  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

JP           MULTI-PLAN OPTION
                  NPLAN           1  NUMBER OF PLANS

JR           MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
                 .36       .53       .62       .76       .88      1.00
1

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


                                                          RATIOS APPLIED TO PRECIPITATION
OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2  RATIO 3  RATIO 4  RATIO 5  RATIO 6
                                                       .36      .53      .62      .76      .88     1.00

HYDROGRAPH AT
+                310        .02     1   FLOW           6.      12.      16.      23.      30.      37.
                                       TIME          3.17     3.20     3.20     3.20     3.17     3.17

DIVERSION TO
+                D310       .02     1   FLOW           3.       6.       8.      12.      15.      18.
                                       TIME          3.17     3.20     3.20     3.20     3.17     3.17

HYDROGRAPH AT
+                C320       .02     1   FLOW           3.       6.       8.      12.      15.      18.
                                       TIME          3.17     3.20     3.20     3.20     3.17     3.17

ROUTED TO
+                C330       .02     1   FLOW           3.       6.       9.      12.      18.      21.
                                       TIME          3.47     3.43     3.40     3.37     3.33     3.30

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE        99.87    99.94    99.97   100.01   100.05   100.07
                                       TIME          3.47     3.43     3.40     3.37     3.33     3.30

HYDROGRAPH AT
+                350        .00     1   FLOW           1.       2.       3.       5.       6.       8.
                                       TIME          3.07     3.07     3.07     3.07     3.07     3.07
```

```
DIVERSION TO
+                D350      .00    1   FLOW        1.      1.      2.      2.      3.      4.
                                     TIME      3.07    3.07    3.07    3.07    3.07    3.07

HYDROGRAPH AT
+                C350      .00    1   FLOW        1.      1.      2.      2.      3.      4.
                                     TIME      3.07    3.07    3.07    3.07    3.07    3.07

ROUTED TO
+                C330      .00    1   FLOW        0.      1.      2.      2.      3.      4.
                                     TIME      3.60    3.50    3.50    3.47    3.43    3.40

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    99.77   99.81   99.83   99.85   99.87   99.89
                                     TIME      3.60    3.50    3.50    3.47    3.43    3.40

HYDROGRAPH AT
+                 330      .06    1   FLOW       14.     27.     36.     52.     67.     82.
                                     TIME      3.43    3.43    3.43    3.43    3.43    3.43

 3 COMBINED AT
+                C330      .08    1   FLOW       17.     34.     45.     64.     82.    101.
                                     TIME      3.47    3.43    3.43    3.43    3.43    3.40

HYDROGRAPH AT
+                 340      .01    1   FLOW        4.      7.     10.     14.     19.     23.
                                     TIME      3.17    3.20    3.20    3.20    3.17    3.17

ROUTED TO
+                C330      .01    1   FLOW        4.      8.     11.     14.     19.     23.
                                     TIME      3.30    3.27    3.23    3.20    3.23    3.23

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    82.23   82.32   82.37   82.41   82.46   82.51
                                     TIME      3.30    3.27    3.23    3.20    3.23    3.23

 2 COMBINED AT
+                C330      .09    1   FLOW       19.     38.     51.     72.     92.    114.
                                     TIME      3.43    3.43    3.40    3.40    3.33    3.40

ROUTED TO
+               C380F      .09    1   FLOW       19.     38.     51.     72.     91.    113.
                                     TIME      3.47    3.43    3.43    3.40    3.37    3.40

HYDROGRAPH AT
+               380F      .01    1   FLOW        3.      5.      7.     10.     13.     17.
                                     TIME      3.17    3.17    3.17    3.17    3.17    3.17

 2 COMBINED AT
+               C380F      .10    1   FLOW       20.     40.     53.     76.     97.    120.
                                     TIME      3.47    3.43    3.40    3.40    3.37    3.33

ROUTED TO
+               C380E      .10    1   FLOW       19.     40.     53.     76.     97.    119.
                                     TIME      3.47    3.43    3.43    3.40    3.37    3.37

HYDROGRAPH AT
```

```
+                380E      .01    1  FLOW        2.      4.      6.      9.     11.     14.
                                     TIME      3.10    3.13    3.13    3.10    3.10    3.10

 2 COMBINED AT
+                C380E     .10    1  FLOW       20.     41.     55.     78.    100.    123.
                                     TIME      3.47    3.43    3.43    3.40    3.37    3.37

ROUTED TO
+                C380D     .10    1  FLOW       20.     41.     55.     78.     99.    123.
                                     TIME      3.47    3.43    3.43    3.40    3.37    3.37

HYDROGRAPH AT
+                380D      .00    1  FLOW        1.      2.      2.      3.      4.      6.
                                     TIME      3.10    3.13    3.13    3.10    3.10    3.10

 2 COMBINED AT
+                C380D     .11    1  FLOW       20.     41.     55.     79.    101.    124.
                                     TIME      3.47    3.43    3.43    3.40    3.37    3.37

ROUTED TO
+                SD700     .11    1  FLOW       20.     41.     55.     78.    100.    124.
                                     TIME      3.47    3.47    3.43    3.40    3.37    3.37

HYDROGRAPH AT
+                D350      .00    1  FLOW        1.      1.      2.      2.      3.      4.
                                     TIME      3.07    3.07    3.07    3.07    3.07    3.07

ROUTED TO
+                C360      .00    1  FLOW        1.      1.      2.      2.      3.      4.
                                     TIME      3.37    3.27    3.23    3.23    3.20    3.23

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    98.72   98.77   98.78   98.81   98.82   98.85
                                     TIME      3.37    3.27    3.23    3.23    3.20    3.23

HYDROGRAPH AT
+                360       .01    1  FLOW        5.     10.     13.     19.     25.     31.
                                     TIME      3.17    3.17    3.17    3.17    3.17    3.17

HYDROGRAPH AT
+                370       .01    1  FLOW        2.      5.      7.     10.     13.     15.
                                     TIME      3.13    3.13    3.13    3.13    3.13    3.13

 3 COMBINED AT
+                C370      .02    1  FLOW        7.     15.     20.     30.     39.     48.
                                     TIME      3.17    3.17    3.17    3.17    3.17    3.17

ROUTED TO
+                C380A     .02    1  FLOW        7.     15.     21.     29.     38.     49.
                                     TIME      3.23    3.23    3.20    3.20    3.23    3.20

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE    98.88   98.96   99.00   99.05   99.10   99.14
                                     TIME      3.23    3.23    3.20    3.20    3.23    3.20

HYDROGRAPH AT
+                380A      .01    1  FLOW        2.      5.      6.      9.     11.     14.
```

```
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C380A      .03    1   FLOW         9.       19.      26.      38.      48.      62.
                                       TIME        3.23     3.23     3.20     3.17     3.20     3.20

ROUTED TO
+                C380B      .03    1   FLOW         9.       19.      27.      39.      49.      61.
                                       TIME        3.30     3.27     3.23     3.23     3.20     3.23

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE       98.88    98.97    99.01    99.07    99.11    99.15
                                       TIME        3.30     3.27     3.23     3.23     3.20     3.23

HYDROGRAPH AT
+                380B       .02    1   FLOW         7.       15.      20.      28.      36.      45.
                                       TIME        3.23     3.23     3.23     3.23     3.23     3.23

 2 COMBINED AT
+                C380B      .05    1   FLOW        16.       33.      46.      67.      85.     106.
                                       TIME        3.27     3.27     3.23     3.23     3.23     3.23

ROUTED TO
+                SD700      .05    1   FLOW        16.       33.      46.      66.      84.     105.
                                       TIME        3.30     3.27     3.27     3.23     3.23     3.23

HYDROGRAPH AT
+                380C       .00    1   FLOW         1.        3.       4.       5.       7.       9.
                                       TIME        3.10     3.10     3.10     3.10     3.10     3.10

ROUTED TO
+                SD700      .00    1   FLOW         1.        3.       4.       5.       7.       8.
                                       TIME        3.10     3.10     3.10     3.10     3.10     3.10

HYDROGRAPH AT
+                390        .01    1   FLOW         1.        3.       5.       9.      12.      16.
                                       TIME        3.30     3.23     3.23     3.23     3.23     3.20

 4 COMBINED AT
+                C390       .17    1   FLOW        35.       71.      96.     138.     180.     224.
                                       TIME        3.30     3.30     3.27     3.30     3.30     3.30

ROUTED TO
+                SD700      .17    1   FLOW        10.       18.      24.      34.      43.      52.
                                       TIME        3.90     3.93     3.93     3.90     3.93     3.90

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE       73.50    74.15    74.53    75.17    75.77    76.42
                                       TIME        3.90     3.93     3.93     3.90     3.93     3.90

ROUTED TO
+                C510       .17    1   FLOW        10.       18.      24.      34.      43.      52.
                                       TIME        3.97     4.00     3.97     3.97     3.97     3.97

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE       97.12    97.36    97.51    97.72    97.87    98.02
                                       TIME        3.97     4.00     3.97     3.97     3.97     3.97
```

```
HYDROGRAPH AT
+                510       .01    1   FLOW          5.      11.      14.      21.      27.      33.
                                      TIME        3.10     3.10     3.10     3.07     3.07     3.07

 2 COMBINED AT
+                C510      .18    1   FLOW         11.      19.      25.      35.      44.      53.
                                      TIME        3.93     3.97     3.93     3.97     3.97     3.93

ROUTED TO
+                C520      .18    1   FLOW         11.      19.      25.      35.      44.      53.
                                      TIME        4.00     4.03     4.03     3.97     3.97     3.97

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE       97.30    97.60    97.79    98.05    98.25    98.43
                                      TIME        4.00     4.03     4.03     3.97     3.97     3.97

HYDROGRAPH AT
+                520       .01    1   FLOW          6.      12.      16.      24.      31.      38.
                                      TIME        3.13     3.13     3.13     3.13     3.13     3.13

 2 COMBINED AT
+                C520      .19    1   FLOW         16.      29.      37.      51.      64.      78.
                                      TIME        3.13     3.13     3.13     3.13     3.13     3.13

HYDROGRAPH AT
+                530       .01    1   FLOW          3.       6.       8.      11.      15.      18.
                                      TIME        3.17     3.20     3.20     3.20     3.17     3.17

 2 COMBINED AT
+                C530      .20    1   FLOW         18.      34.      44.      61.      77.      94.
                                      TIME        3.13     3.13     3.13     3.13     3.13     3.13

ROUTED TO
+                C550      .20    1   FLOW         18.      34.      44.      61.      76.      94.
                                      TIME        3.17     3.17     3.17     3.17     3.17     3.13

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE       97.44    97.83    98.03    98.31    98.54    98.77
                                      TIME        3.17     3.17     3.17     3.17     3.17     3.13

HYDROGRAPH AT
+                420       .02    1   FLOW          5.      10.      14.      20.      26.      32.
                                      TIME        3.23     3.27     3.27     3.27     3.23     3.23

ROUTED TO
+                C430      .02    1   FLOW          5.      11.      14.      20.      26.      32.
                                      TIME        3.37     3.30     3.33     3.30     3.30     3.30

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE      100.12   100.24   100.29   100.38   100.45   100.52
                                      TIME        3.37     3.30     3.33     3.30     3.30     3.30

HYDROGRAPH AT
+                430       .02    1   FLOW          7.      14.      18.      27.      34.      43.
                                      TIME        3.23     3.23     3.23     3.23     3.23     3.23
```

```
 2 COMBINED AT
+                C430      .04    1   FLOW        12.      24.      32.      46.      59.      73.
                                      TIME      3.27     3.30     3.27     3.27     3.27     3.27

HYDROGRAPH AT
+                 440      .01    1   FLOW         3.       5.       7.      11.      14.      17.
                                      TIME      3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C440      .05    1   FLOW        14.      28.      37.      54.      69.      86.
                                      TIME      3.27     3.27     3.27     3.27     3.27     3.23

DIVERSION TO
+                D440      .05    1   FLOW        10.      19.      26.      38.      49.      60.
                                      TIME      3.27     3.27     3.27     3.27     3.27     3.23

HYDROGRAPH AT
+                C440      .05    1   FLOW         4.       8.      11.      16.      21.      26.
                                      TIME      3.27     3.27     3.27     3.27     3.27     3.23

ROUTED TO
+                C540      .05    1   FLOW         4.       8.      11.      17.      21.      26.
                                      TIME      3.37     3.27     3.33     3.30     3.27     3.30

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    100.02   100.10   100.13   100.19   100.23   100.27
                                      TIME      3.37     3.27     3.33     3.30     3.27     3.30

HYDROGRAPH AT
+                 540      .01    1   FLOW         2.       4.       5.       8.      10.      12.
                                      TIME      3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C540      .05    1   FLOW         5.      11.      15.      21.      28.      35.
                                      TIME      3.37     3.27     3.23     3.27     3.27     3.23

ROUTED TO
+                C550      .05    1   FLOW         5.      11.      15.      21.      28.      35.
                                      TIME      3.37     3.30     3.27     3.30     3.27     3.27

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    100.04   100.12   100.16   100.22   100.27   100.32
                                      TIME      3.37     3.30     3.27     3.30     3.27     3.27

HYDROGRAPH AT
+                 550      .01    1   FLOW         3.       6.       8.      12.      16.      20.
                                      TIME      3.10     3.13     3.13     3.10     3.10     3.10

 3 COMBINED AT
+                C550      .26    1   FLOW        24.      46.      60.      85.     110.     136.
                                      TIME      3.17     3.17     3.17     3.17     3.17     3.17

ROUTED TO
+                C560      .26    1   FLOW        24.      46.      61.      85.     110.     138.
                                      TIME      3.23     3.23     3.20     3.23     3.23     3.23

                                 ** PEAK STAGES IN FEET **
```

```
                                  1  STAGE      98.12    98.63    98.91    99.26    99.52    99.75
                                     TIME       3.23     3.23     3.20     3.23     3.23     3.23

HYDROGRAPH AT
+                570       .00    1  FLOW        2.       3.       5.       7.       8.      10.
                                     TIME       3.20     3.20     3.20     3.20     3.20     3.20

HYDROGRAPH AT
+                580       .01    1  FLOW        2.       4.       6.       8.      11.      13.
                                     TIME       3.17     3.17     3.17     3.17     3.17     3.17

HYDROGRAPH AT
+                560       .00    1  FLOW        1.       3.       4.       6.       8.      10.
                                     TIME       3.13     3.17     3.17     3.13     3.13     3.13

 4 COMBINED AT
+               C560       .27    1  FLOW       29.      56.      74.     103.     133.     167.
                                     TIME       3.23     3.20     3.20     3.23     3.23     3.23

ROUTED TO
+               C590       .27    1  FLOW       29.      56.      74.     103.     134.     166.
                                     TIME       3.23     3.23     3.20     3.23     3.23     3.23

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE      97.08    97.67    98.01    98.52    98.98    99.39
                                     TIME       3.23     3.23     3.20     3.23     3.23     3.23

HYDROGRAPH AT
+                590       .02    1  FLOW        6.      12.      16.      23.      29.      36.
                                     TIME       3.23     3.27     3.27     3.27     3.23     3.23

 2 COMBINED AT
+               C590       .29    1  FLOW       34.      67.      89.     126.     163.     202.
                                     TIME       3.23     3.23     3.20     3.23     3.23     3.23

ROUTED TO
+               C610       .29    1  FLOW       34.      68.      90.     126.     161.     201.
                                     TIME       3.27     3.27     3.27     3.23     3.30     3.30

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE      97.39    98.07    98.41    98.90    99.26    99.58
                                     TIME       3.27     3.27     3.27     3.23     3.30     3.30

HYDROGRAPH AT
+                610       .00    1  FLOW        2.       4.       5.       7.      10.      12.
                                     TIME       3.07     3.07     3.07     3.07     3.07     3.07

 2 COMBINED AT
+               C610       .30    1  FLOW       35.      70.      91.     128.     163.     203.
                                     TIME       3.27     3.27     3.27     3.23     3.30     3.30

HYDROGRAPH AT
+               D440       .00    1  FLOW       10.      19.      26.      38.      49.      60.
                                     TIME       3.27     3.27     3.27     3.27     3.27     3.23

ROUTED TO
+               C470       .00    1  FLOW        9.      19.      27.      38.      49.      61.
```

```
                                        TIME        3.40     3.37     3.33     3.33     3.30     3.30

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE       99.97   100.05   100.10   100.16   100.21   100.26
                                        TIME        3.40     3.37     3.33     3.33     3.30     3.30

HYDROGRAPH AT
+                   410       .04   1  FLOW         11.      22.      29.      42.      54.      67.
                                        TIME        3.33     3.37     3.37     3.37     3.37     3.33

ROUTED TO
+                   C450      .04   1  FLOW         11.      22.      29.      42.      54.      66.
                                        TIME        3.37     3.37     3.37     3.37     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE      101.71   101.83   101.90   101.99   102.07   102.14
                                        TIME        3.37     3.37     3.37     3.37     3.37     3.37

HYDROGRAPH AT
+                   450       .01   1  FLOW          2.       5.       6.       9.      12.      15.
                                        TIME        3.27     3.27     3.27     3.27     3.27     3.27

2 COMBINED AT
+                   C450      .05   1  FLOW         13.      26.      35.      50.      64.      80.
                                        TIME        3.33     3.33     3.33     3.33     3.33     3.33

ROUTED TO
+                   C460      .05   1  FLOW         13.      26.      35.      50.      64.      79.
                                        TIME        3.40     3.40     3.40     3.37     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE      101.74   101.87   101.94   102.04   102.13   102.21
                                        TIME        3.40     3.40     3.40     3.37     3.37     3.37

HYDROGRAPH AT
+                   460       .01   1  FLOW          1.       5.       9.      14.      19.      25.
                                        TIME        3.27     3.23     3.20     3.20     3.20     3.20

2 COMBINED AT
+                   C460      .07   1  FLOW         14.      30.      40.      58.      75.      94.
                                        TIME        3.40     3.40     3.37     3.37     3.37     3.33

HYDROGRAPH AT
+                   470       .01   1  FLOW         10.      15.      18.      22.      26.      30.
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

3 COMBINED AT
+                   C470      .07   1  FLOW         27.      55.      74.     106.     137.     169.
                                        TIME        3.40     3.30     3.33     3.33     3.30     3.30

ROUTED TO
+                   C600      .07   1  FLOW         26.      56.      73.     106.     137.     170.
                                        TIME        3.43     3.40     3.37     3.40     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE      101.87   102.08   102.18   102.34   102.47   102.60
                                        TIME        3.43     3.40     3.37     3.40     3.37     3.37
```

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HYDROGRAPH AT
+                 600       .03     1   FLOW          8.      17.      23.      33.      43.      53.
                                      TIME        3.27     3.30     3.30     3.30     3.27     3.27

 2 COMBINED AT
+                C600       .10     1   FLOW         33.      70.      94.     135.     175.     217.
                                      TIME        3.40     3.40     3.37     3.33     3.37     3.33

ROUTED TO
+                C610       .10     1   FLOW         33.      71.      94.     135.     175.     218.
                                      TIME        3.43     3.40     3.37     3.37     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE       96.95    97.46    97.70    98.08    98.38    98.66
                                      TIME        3.43     3.40     3.37     3.37     3.37     3.37

 2 COMBINED AT
+                C610       .40     1   FLOW         62.     125.     169.     249.     330.     413.
                                      TIME        3.30     3.37     3.33     3.30     3.30     3.30

                                      SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                          (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                       COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                    PEAK                                     PEAK

                              (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .75     18.77    207.12       .28     2.00     18.73    208.00        .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1395E+01 EXCESS= .0000E+00 OUTFLOW= .1395E+01 BASIN STORAGE= .5340E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .65     38.24    206.31       .54     2.00     38.19    206.00        .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2679E+01 EXCESS= .0000E+00 OUTFLOW= .2679E+01 BASIN STORAGE= .5228E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .61     50.96    205.15       .71     2.00     50.78    206.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3481E+01 EXCESS= .0000E+00 OUTFLOW= .3481E+01 BASIN STORAGE= .5243E-04 PERCENT ERROR=    .0

         FOR PLAN = 1  RATIO=  .00
            C380F  MANE          .57     72.23    204.11       .99     2.00     72.21    204.00        .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4852E+01 EXCESS= .0000E+00 OUTFLOW= .4851E+01 BASIN STORAGE= .5172E-04 PERCENT ERROR=    .0
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```
        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .55     91.56    201.43      1.24      2.00     91.50    202.00        1.24


CONTINUITY SUMMARY (AC-FT) - INFLOW= .6121E+01 EXCESS= .0000E+00 OUTFLOW= .6119E+01 BASIN STORAGE= .5087E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .52    113.20    204.27      1.51      2.00    113.19    204.00        1.52


CONTINUITY SUMMARY (AC-FT) - INFLOW= .7456E+01 EXCESS= .0000E+00 OUTFLOW= .7454E+01 BASIN STORAGE= .5175E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .74     19.50    207.81       .29      2.00     19.50    208.00         .29


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+01 EXCESS= .0000E+00 OUTFLOW= .1510E+01 BASIN STORAGE= .5243E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .65     39.93    206.46       .55      2.00     39.86    206.00         .55


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2901E+01 EXCESS= .0000E+00 OUTFLOW= .2901E+01 BASIN STORAGE= .5279E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .61     53.31    205.24       .71      2.00     53.25    206.00         .71


CONTINUITY SUMMARY (AC-FT) - INFLOW= .3770E+01 EXCESS= .0000E+00 OUTFLOW= .3769E+01 BASIN STORAGE= .5164E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .57     75.92    204.30       .99      2.00     75.85    204.00         .99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .5255E+01 EXCESS= .0000E+00 OUTFLOW= .5253E+01 BASIN STORAGE= .5279E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .54     96.89    202.12      1.25      2.00     96.83    202.00        1.25


CONTINUITY SUMMARY (AC-FT) - INFLOW= .6628E+01 EXCESS= .0000E+00 OUTFLOW= .6626E+01 BASIN STORAGE= .5257E-04 PERCENT ERROR=    .0


        FOR PLAN = 1  RATIO=  .00
           C380E  MANE          .52    119.12    203.77      1.53      2.00    119.07    202.00        1.53


CONTINUITY SUMMARY (AC-FT) - INFLOW= .8074E+01 EXCESS= .0000E+00 OUTFLOW= .8071E+01 BASIN STORAGE= .5236E-04 PERCENT ERROR=    .0
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```
     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .59     19.93    208.22       .29      2.00     19.91    208.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+01 EXCESS= .0000E+00 OUTFLOW= .1595E+01 BASIN STORAGE= .4093E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .51     40.84    206.61       .55      2.00     40.75    206.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3064E+01 EXCESS= .0000E+00 OUTFLOW= .3064E+01 BASIN STORAGE= .4140E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .49     54.58    206.16       .72      2.00     54.58    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3982E+01 EXCESS= .0000E+00 OUTFLOW= .3981E+01 BASIN STORAGE= .4142E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .45     77.81    204.65      1.00      2.00     77.70    204.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5550E+01 EXCESS= .0000E+00 OUTFLOW= .5548E+01 BASIN STORAGE= .4201E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .43     99.55    202.50      1.26      2.00     99.47    202.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7000E+01 EXCESS= .0000E+00 OUTFLOW= .6998E+01 BASIN STORAGE= .4163E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        C380D  MANE          .41    122.69    202.16      1.53      2.00    122.67    202.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8527E+01 EXCESS= .0000E+00 OUTFLOW= .8524E+01 BASIN STORAGE= .4118E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .25     20.07    208.13       .29      2.00     20.06    208.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1629E+01 EXCESS= .0000E+00 OUTFLOW= .1629E+01 BASIN STORAGE= .1705E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
        SD700  MANE          .21     41.13    206.86       .55      2.00     41.09    208.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3128E+01 EXCESS= .0000E+00 OUTFLOW= .3128E+01 BASIN STORAGE= .1708E-04 PERCENT ERROR=    .0

     FOR PLAN = 1  RATIO=  .00
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          SD700  MANE          .20     55.08    206.01       .72      2.00     55.08    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4065E+01 EXCESS= .0000E+00 OUTFLOW= .4065E+01 BASIN STORAGE= .1700E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .19     78.45    204.53      1.00      2.00     78.39    204.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+01 EXCESS= .0000E+00 OUTFLOW= .5665E+01 BASIN STORAGE= .1697E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .18    100.47    202.13      1.26      2.00    100.42    202.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7145E+01 EXCESS= .0000E+00 OUTFLOW= .7145E+01 BASIN STORAGE= .1707E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .17    124.03    202.08      1.54      2.00    124.01    202.00        1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8703E+01 EXCESS= .0000E+00 OUTFLOW= .8702E+01 BASIN STORAGE= .1701E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .42     15.94    197.53       .32      2.00     15.91    198.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8324E+00 EXCESS= .0000E+00 OUTFLOW= .8321E+00 BASIN STORAGE= .3021E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .37     33.09    195.97       .62      2.00     33.09    196.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1599E+01 EXCESS= .0000E+00 OUTFLOW= .1598E+01 BASIN STORAGE= .2943E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .34     45.68    195.68       .81      2.00     45.65    196.00         .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+01 EXCESS= .0000E+00 OUTFLOW= .2076E+01 BASIN STORAGE= .2837E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .32     66.48    194.01      1.12      2.00     66.47    194.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2896E+01 EXCESS= .0000E+00 OUTFLOW= .2893E+01 BASIN STORAGE= .2791E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
          SD700  MANE          .30     84.33    194.21      1.42      2.00     84.33    194.00        1.42
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .3652E+01 EXCESS= .0000E+00 OUTFLOW= .3649E+01 BASIN STORAGE= .2855E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .29    105.37    193.92      1.72      2.00    105.29    194.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4449E+01 EXCESS= .0000E+00 OUTFLOW= .4444E+01 BASIN STORAGE= .2920E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .38      1.24    186.46       .32      2.00      1.23    186.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4847E-01 EXCESS= .0000E+00 OUTFLOW= .4847E-01 BASIN STORAGE= .1580E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .32      2.67    186.52       .61      2.00      2.63    186.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9310E-01 EXCESS= .0000E+00 OUTFLOW= .9308E-01 BASIN STORAGE= .1576E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .30      3.62    186.40       .79      2.00      3.58    186.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+00 EXCESS= .0000E+00 OUTFLOW= .1210E+00 BASIN STORAGE= .1588E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .28      5.26    186.17      1.10      2.00      5.23    186.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1686E+00 EXCESS= .0000E+00 OUTFLOW= .1686E+00 BASIN STORAGE= .1598E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .27      6.79    186.31      1.38      2.00      6.77    186.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2127E+00 EXCESS= .0000E+00 OUTFLOW= .2126E+00 BASIN STORAGE= .1554E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .26      8.40    186.02      1.69      2.00      8.39    186.00        1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2591E+00 EXCESS= .0000E+00 OUTFLOW= .2590E+00 BASIN STORAGE= .1558E-04 PERCENT ERROR=    .0
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*** NORMAL END OF HEC-1 ***

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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/31/1995  TIME  08:31:54 *
*                                       *
*****************************************
```

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

HEC-1 INPUT PAGE 1

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

  1           ID        84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
  2           ID        2-5-10-25-50-100 yr STORM
  3           ID        INTERIM and ULTIMATE CONDITION:
  4           ID        FINAL DESIGN ******************** CHOLLA BASIN
  5           ID        --STORM DRAIN IN CHOLLA ROAD
  6           ID        --DETENTION BASIN AT SITE 1 (4 acres)
  7           ID        --cactus sd intercepts 100-yr flow
  8           ID        --NO STORM DRAIN IN DESERT COVE
  9           ID        --no CONNECTOR AT CORTEZ TO INTERCEPT
 10           ID        --6-HOUR 10-YEAR TIME CONCENTRATION VALUES USED FOR THE UD CARDS
 11           ID        --MULTIPLIED BY 0.6 FOR THE LAG TIME
 12           ID
 13           ID        FILE CONTYCDS.DAT
              *DIAGRAM
 14           IT       2                    300
 15           IO       5
 16           JR    PREC     .36     .53     .62     .76     .88     1.0

 17           KK     310      subbasin 310 runoff
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```
 18          BA  .01647
 19          PH                  0.88    1.61     2.6    2.84     3.0     3.3
 20          LS             77      20
 21          UD     .14

 22          KK    C320      DIVERT C310 TO 320
 23          DT    D310
 24          DI       0     100
 25          DQ       0      50

 26          KK    C330      ROUTE C310 TO 330
 27          RS       3    STOR      -1       0
 28          RC    .040    .016    .040     750   .0030
 29          RX       0      24    24.1      40    40.1      56    56.1      80
 30          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101
 31          RS       7    STOR      -1       0
 32          RC    .040    .016    .040    2000   .0060
 33          RX       0      24    24.1      40    40.1      56    56.1      80
 34          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

 35          KK     350      subbasin 350 runoff
 36          BA  .00225
 37          LS             77      20
 38          UD     .04

 39          KK    C350      DIVERT C350 TO 360
 40          DT    D350
 41          DI       0     100
 42          DQ       0      50

 43          KK    C330      ROUTE 350 TO 330
 44          RS       7    STOR      -1       0
 45          RC    .040    .016    .040    2200   .0060
 46          RX       0      24    24.1      40    40.1      56    56.1      80
 47          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 48          KK     330      subbasin 330 runoff
 49          BA  .06322
 50          LS             77      20
 51          UD     .37

 52          KK    C330      COMBINE C310 AND 330 AND C350
 53          HC       3

 54          KK     340      subbasin 340 runoff
 55          BA  .01031
 56          LS             77      20
 57          UD     .14

 58          KK    C330      ROUTE 340 TO 330
 59          RS       4    STOR      -1       0
 60          RC    .040    .016    .040     440   .0022
 61          RX       0    19.8    19.8      40    40.1      42      50      60
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 62          RY    82.9   82.41   81.91   82.31   82.31   82.22    82.1    82.4

 63          KK    C330       COMBINE C310 AND 340
 64          HC       2

 65          KK   C380F       ROUTE C330 TO 380F
 66          RD     300  0.0030   0.012            CIRC       4

 67          KK    380F       subbasin 380F runoff
 68          BA  .00688
 69          LS               77      20
 70          UD     .12

 71          KK   C380F       COMBINE 380F AND C330
 72          HC       2

 73          KK   C380E       ROUTE C380F TO 380E
 74          RD     300  0.0030   0.012            CIRC       4

 75          KK    380E       subbasin 380E runoff
 76          BA  .00505
 77          LS               77      20
 78          UD     .08

 79          KK   C380E       COMBINE 380E AND C380F
 80          HC       2

 81          KK   C380D       ROUTE C380E TO 380D
 82          RD     240  0.0030   0.012            CIRC       4

 83          KK    380D       subbasin 380D runoff
 84          BA  .00198
 85          LS               77      20
 86          UD     .08
```



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


 87          KK   C380D       COMBINE C380D AND 380E
 88          HC       2

 89          KK   SD700       ROUTE C380D TO SD700
 90          RD     100  0.0030   0.012            CIRC       4

 91          KK    D350       RETRIEVE D350
 92          DR    D350

 93          KK    C360       ROUTE C350 TO 360
 94          RS       5    STOR      -1       0
 95          RC    .040    .016    .040     850   .0040
 96          RX       0      24    24.1      40    40.1      56    56.1      80
 97          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

 98          KK     360       SUBBASIN 360 RUNOFF
 99          BA  .01320
100          LS               77      20
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101          UD     .13

102          KK     370      SUBBASIN 370 RUNOFF
103          BA  .00592
104          LS              77      20
105          UD     .10

106          KK    C370      COMBINE D350 AND 360 AND 370
107          HC       3

108          KK   C380A      ROUTE C370 TO 380A
109          RS       5    STOR      -1       0
110          RC    .040    .016    .040     620   .0054
111          RX       0      20    20.1      40    40.1      60    60.1      80
112          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

113          KK    380A      subbasin 380A runoff
114          BA  .00588
115          LS              77      20
116          UD     .12

117          KK   C380A      COMBINE C370 AND C380A
118          HC       2

119          KK   C380B      ROUTE C380A TO 380B
120          RS       5    STOR      -1       0
121          RC    .040    .016    .040     700   .0077
122          RX       0      20    20.1      40    40.1      60    60.1      80
123          RY     101   98.93   98.61   98.97   98.97   98.62   98.92     101

124          KK    380B      subbasin 380B runoff
125          BA  .02333
126          LS              77      20
127          UD     .19
```



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


128          KK   C380B      COMBINE C380A AND C380B
129          HC       2

130          KK   SD700      ROUTE C380B TO SD700
131          RD     150  0.0030   0.012            CIRC       2

132          KK    380C      subbasin 380C runoff
133          BA  .00288
134          LS              77      20
135          UD     .07

136          KK   SD700      ROUTE C380C TO SD700
137          RD      80  0.0030   0.012            CIRC       2

138          KK     390      subbasin 390 runoff
139          BA  .00938
140          LS              77
141          UD     .16
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 142          KK    C390      COMBINE C380D AND 380B AND 380C AND 390
 143          HC       4

 144          KK   SD700      NEW DETENTION BASIN (bottom avg=1373, outfall pipe=1372.20)
 145          RS       1    STOR       0
 146          SV       0    2.22    4.58    7.08    9.44
 147          SE      73      74      75      76      77
 148          SQ       5      16      32      46      60

 149          KK    C510      ROUTE SD700 TO 510
 150          RS       5    STOR      -1       0
 151          RC    .050    .035    .050     700   .0070
 152          RX       0      .1      17      22      28      33      50    50.1
 153          RY     102     100      99    96.5    96.5      99     100     102

 154          KK     510      SUBBASIN 510 RUNOFF
 155          BA  .01044
 156          LS              77      20
 157          UD     .05

 158          KK    C510      COMBINE SD700 AND 510
 159          HC       2

 160          KK    C520      ROUTE C510 TO 520
 161          RS       5    STOR      -1       0
 162          RC    .050    .035    .050     440   .0030
 163          RX       0      .1      17      22      28      33      50    50.1
 164          RY     102     100      99    96.5    96.5      99     100     102

 165          KK     520      SUBBASIN 520 RUNOFF
 166          BA  .01402
 167          LS              77      20
 168          UD     .09
```



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


 169          KK    C520      COMBINE C510 AND 520
 170          HC       2

 171          KK     530      SUBBASIN 530 RUNOFF
 172          BA  .00806
 173          LS              77      20
 174          UD     .14

 175          KK    C530      COMBINE C520 AND 530
 176          HC       2

 177          KK    C550      ROUTE C530 TO 550
 178          RS       4    STOR      -1       0
 179          RC    .050    .035    .050     350   .0050
 180          RX       0      .1      17      22      28      33      50    50.1
 181          RY     102     100      99    96.5    96.5      99     100     102

 182          KK     420      SUBBASIN 420 RUNOFF
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183          BA  .01719
184          LS              77      20
185          UD     .20

186          KK    C430      ROUTE C420 TO 430
187          RS       4    STOR      -1       0
188          RC    .040    .016    .040     480   .0020
189          RX       0      20      23      30    30.1      37      40      60
190          RY     102    99.7   99.93     100     100   99.93    99.7     102

191          KK     430      SUBBASIN 430 RUNOFF
192          BA  .02202
193          LS              77      20
194          UD     .19

195          KK    C430      COMBINE C420 AND 430
196          HC       2

197          KK     440      SUBBASIN 440 RUNOFF
198          BA  .00731
199          LS              77      20
200          UD     .13

201          KK    C440      COMBINE C430 AND 440
202          HC       2

203          KK    C440      DIVERT C440 TO 470
204          DT    D440
205          DI       0     100     200     300
206          DQ       0      70     140     210
```



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

207          KK    C540      ROUTE C440 TO C540
208          RS       4    STOR      -1       0
209          RC    .040    .016    .040     540   .0080
210          RX       0      20      23      30    30.1      37      40      60
211          RY     102    99.7   99.93     100     100   99.93    99.7     102

212          KK     540      SUBBASIN 540 RUNOFF
213          BA  .00517
214          LS              77      20
215          UD     .12

216          KK    C540      COMBINE C440 AND 540
217          HC       2

218          KK    C550      ROUTE 540 TO C550
219          RS       2    STOR      -1       0
220          RC    .040    .016    .040     200   .0080
221          RX       0      20      23      30    30.1      37      40      60
222          RY     101    99.7   99.93     100     100   99.93    99.7     101

223          KK     550      SUBBASIN 550
224          BA  .00703
```

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225          LS              77      20
226          UD     .08

227          KK    C550      COMBINE 550 AND C530 AND 540
228          HC       3

229          KK    C560      ROUTE C550 TO 560
230          RS       5    STOR      -1       0
231          RC    .050    .035    .050     900   .0060
232          RX       0      .1      20      22      28      30      50    50.1
233          RY     102     100      99      97      97      99     100     102

234          KK     570      SUBBASIN 570 RUNOFF
235          BA  .00492
236          LS              77      20
237          UD     .16

238          KK     580      SUBBASIN 580 RUNOFF
239          BA  .00575
240          LS              77      20
241          UD     .13

242          KK     560      SUBBASIN 560 RUNOFF
243          BA  .00386
244          LS              77      20
245          UD     .11
```



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

246          KK    C560      COMBINE C550 AND 560 AND 570 AND 580
247          HC       4

248          KK    C590      ROUTE C560 TO 590
249          RS       1    STOR      -1       0
250          RC    .050    .035    .050      55   .0030
251          RX       0      .1      20    20.1      32    32.1      50    50.1
252          RY     102     100      99      96      96      99     100     102

253          KK     590      SUBBASIN 590 RUNOFF
254          BA  .01931
255          LS              77      20
256          UD    0.20

257          KK    C590      COMBINE C560 AND 590
258          HC       2

259          KK    C610      ROUTE C590 TO 610
260          RS       5    STOR      -1       0
261          RC    .050    .035    .050     600   .0030
262          RX       0      .1      20      24      32      36      50    50.1
263          RY     102     100      99      96      96      99     100     102

264          KK     610      SUBBASIN 610 RUNOFF
265          BA   .0035
266          LS              77      20
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267          UD    0.04

268          KK    C610      COMBINE 610 AND C590
269          HC       2

270          KK    D440      RETRIEVE D440
271          DR    D440

272          KK    C470      ROUTE D440 TO 470
273          RS       6    STOR      -1       0
274          RC    .040    .016    .040    1200   .0070
275          RX       0      24    24.1      40    40.1      56    56.1      80
276          RY  101.21  100.01   99.68     100     100   99.68  100.01  101.21

277          KK     410      SUBBASIN 410 RUNOFF
278          BA  .04406
279          LS              77      20
280          UD    0.29

281          KK    C450      ROUTE 410 TO C450
282          RS       1    STOR      -1       0
283          RC    .040   0.016    .016     130   .0020
284          RX      20      40      65      70      70      72     100     100
285          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

286          KK     450      SUBBASIN 450 RUNOFF
287          BA  .00803
288          LS              77      20
289          UD    0.21

290          KK    C450      COMBINE C410 AND 450
291          HC       2

292          KK    C460      ROUTE C450 TO 460
293          RS       4    STOR      -1       0
294          RC    .040   0.016    .016     600   .0020
295          RX      20      40      65      70      70      72     100     100
296          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

297          KK     460      SUBBASIN 460 RUNOFF
298          BA  .01398
299          LS              77
300          UD    0.14

301          KK    C460      COMBINE C450 AND 460
302          HC       2

303          KK     470      SUBBASIN 470 RUNOFF
304          BA  .00717
305          LS              98
306          UD    0.13

307          KK    C470      COMBINE C460 AND C440 AND 470
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308          HC       3

309          KK    C600      ROUTE C470 TO 600
310          RS       5    STOR      -1       0
311          RC    .040   0.016    .016     980   .0020
312          RX      20      40      65      70      70      72     100     100
313          RY   103.1   102.9  101.75  101.74  101.27  101.35  101.63  103.63

314          KK     600      SUBBASIN 600 RUNOFF
315          BA  .03036
316          LS              77      20
317          UD     .23

318          KK    C600      COMBINE C470 AND 600
319          HC       2

320          KK    C610      ROUTE C600 TO 610
321          RS       2    STOR      -1       0
322          RC    .040   0.016   0.016     250   .0020
323          RX       0      20      40      46      54      60      80     100
324          RY     101     100      99      96      96      99     100     101
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       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


325          KK    C610      COMBINE 610 AND C600
326          HC       2
327          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  17        310
              .
              .
  23          .------->    D310
  22       C320
              V
              V
  26       C330
              .
              .
  35          .         350
              .           .
              .           .
  40          .           .------->    D350
  39          .        C350
              .           V
              .           V
  43          .        C330
              .           .
              .           .
  48          .           .         330
```

```
            .           .           .
            .           .           .
52        C330.......................
            .
            .
54          .         340
            .           V
            .           V
58          .        C330
            .           .
            .           .
63        C330............
            V
            V
65       C380F
            .
            .
67          .        380F
            .           .
            .           .
71       C380F............
            V
            V
73       C380E
            .
            .
75          .        380E
            .           .
            .           .
79       C380E............
            V
            V
81       C380D
            .
            .
83          .        380D
            .           .
            .           .
87       C380D............
            V
            V
89       SD700
            .
            .
92          .           .<-------    D350
91          .        D350
            .           V
            .           V
93          .        C360
            .           .
            .           .
98          .           .         360
            .           .           .
            .           .           .
102         .           .           .         370
            .           .           .           .
            .           .           .           .
```

```
106          .        C370.......................
             .           V
             .           V
108          .       C380A
             .           .
             .           .
113          .           .        380A
             .           .           .
             .           .           .
117          .       C380A............
             .           V
             .           V
119          .       C380B
             .           .
             .           .
124          .           .        380B
             .           .           .
             .           .           .
128          .       C380B............
             .           V
             .           V
130          .       SD700
             .           .
             .           .
132          .           .        380C
             .           .           V
             .           .           V
136          .           .       SD700
             .           .           .
             .           .           .
138          .           .           .         390
             .           .           .           .
             .           .           .           .
142       C390.....................................
             V
             V
144       SD700
             V
             V
149       C510
             .
             .
154          .         510
             .           .
             .           .
158       C510............
             V
             V
160       C520
             .
             .
165          .         520
             .           .
             .           .
169       C520............
             .
             .
```

```
171          .         530
             .           .
             .           .
175       C530............
             V
             V
177       C550
             .
             .
182          .         420
             .           V
             .           V
186          .        C430
             .           .
             .           .
191          .           .         430
             .           .           .
             .           .           .
195          .        C430............
             .           .
             .           .
197          .           .         440
             .           .           .
             .           .           .
201          .        C440............
             .           .
             .           .
204          .           .------->    D440
203          .        C440
             .           V
             .           V
207          .        C540
             .           .
             .           .
212          .           .         540
             .           .           .
             .           .           .
216          .        C540............
             .           V
             .           V
218          .        C550
             .           .
             .           .
223          .           .         550
             .           .           .
             .           .           .
227       C550........................
             V
             V
229       C560
             .
             .
234          .         570
             .           .
             .           .
238          .           .         580
             .           .           .
```

```
            .          .          .
242         .          .          .         560
            .          .          .           .
            .          .          .           .
246       C560.................................
            V
            V
248       C590
            .
            .
253         .        590
            .          .
            .          .
257       C590............
            V
            V
259       C610
            .
            .
264         .        610
            .          .
            .          .
268       C610............
            .
            .
271         .          .<-------    D440
270         .       D440
            .          V
            .          V
272         .       C470
            .          .
            .          .
277         .          .        410
            .          .          V
            .          .          V
281         .          .       C450
            .          .          .
            .          .          .
286         .          .          .         450
            .          .          .           .
            .          .          .           .
290         .          .       C450............
            .          .          V
            .          .          V
292         .          .       C460
            .          .          .
            .          .          .
297         .          .          .         460
            .          .          .           .
            .          .          .           .
301         .          .       C460............
            .          .          .
            .          .          .
303         .          .          .         470
            .          .          .           .
            .          .          .           .
307         .       C470........................
```

```
              .          V
              .          V
309           .        C600
              .          .
              .          .
314           .          .         600
              .          .           .
              .          .           .
318           .        C600............
              .          V
              .          V
320           .        C610
              .          .
              .          .
325         C610............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/31/1995  TIME  08:31:54 *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

84TH STREET AND CHOLLA ROAD ROADWAY IMPROVEMENTS
2-5-10-25-50-100 yr STORM
INTERIM and ULTIMATE CONDITION:
FINAL DESIGN ********** CHOLLA BASIN
--STORM DRAIN IN CHOLLA ROAD
--DETENTION BASIN AT SITE 1 (4 acres)
--cactus sd intercepts 100-yr flow
--NO STORM DRAIN IN DESERT COVE
--no CONNECTOR AT CORTEZ TO INTERCEPT
--6-HOUR 10-YEAR TIME CONCENTRATION VALUES USED FOR THE UD CARDS
--MULTIPLIED BY 0.6 FOR THE LAG TIME

FILE CONTYCDS.DAT

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

   IT          HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME       0958  ENDING TIME
```

ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.36 .53 .62 .76 .88 1.00

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .36	RATIO 2 .53	RATIO 3 .62	RATIO 4 .76	RATIO 5 .88	RATIO 6 1.00
HYDROGRAPH AT										
+	310	.02	1	FLOW	6.	12.	16.	23.	30.	37.
				TIME	3.17	3.20	3.20	3.20	3.17	3.17
DIVERSION TO										
+	D310	.02	1	FLOW	3.	6.	8.	12.	15.	18.
				TIME	3.17	3.20	3.20	3.20	3.17	3.17
HYDROGRAPH AT										
+	C320	.02	1	FLOW	3.	6.	8.	12.	15.	18.
				TIME	3.17	3.20	3.20	3.20	3.17	3.17
ROUTED TO										
+	C330	.02	1	FLOW	2.	5.	6.	10.	13.	16.
				TIME	3.50	3.47	3.43	3.40	3.37	3.33
			** PEAK STAGES IN FEET **							
			1	STAGE	99.85	99.91	99.94	99.98	100.02	100.04
				TIME	3.50	3.47	3.43	3.40	3.37	3.33
HYDROGRAPH AT										
+	350	.00	1	FLOW	1.	2.	3.	5.	6.	8.
				TIME	3.07	3.07	3.07	3.07	3.07	3.07
DIVERSION TO										
+	D350	.00	1	FLOW	1.	1.	2.	2.	3.	4.

```
                                        TIME        3.07     3.07     3.07     3.07     3.07     3.07

HYDROGRAPH AT
+                C350      .00    1    FLOW         1.       1.       2.       2.       3.       4.
                                        TIME        3.07     3.07     3.07     3.07     3.07     3.07

ROUTED TO
+                C330      .00    1    FLOW         0.       1.       1.       1.       1.       2.
                                        TIME        3.73     3.53     3.50     3.50     3.47     3.43

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE      99.74    99.77    99.79    99.81    99.82    99.84
                                        TIME        3.73     3.53     3.50     3.50     3.47     3.43

HYDROGRAPH AT
+                 330      .06    1    FLOW        14.      27.      36.      52.      67.      82.
                                        TIME        3.43     3.43     3.43     3.43     3.43     3.43

 3 COMBINED AT
+                C330      .08    1    FLOW        16.      32.      43.      62.      79.      98.
                                        TIME        3.47     3.47     3.43     3.43     3.43     3.40

HYDROGRAPH AT
+                 340      .01    1    FLOW         4.       7.      10.      14.      19.      23.
                                        TIME        3.17     3.20     3.20     3.20     3.17     3.17

ROUTED TO
+                C330      .01    1    FLOW         3.       7.      10.      14.      18.      23.
                                        TIME        3.30     3.27     3.27     3.23     3.23     3.23

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE      82.22    82.31    82.35    82.41    82.46    82.50
                                        TIME        3.30     3.27     3.27     3.23     3.23     3.23

 2 COMBINED AT
+                C330      .09    1    FLOW        18.      37.      49.      70.      90.     111.
                                        TIME        3.43     3.43     3.43     3.40     3.40     3.37

ROUTED TO
+                C380F     .09    1    FLOW        18.      37.      49.      70.      90.     111.
                                        TIME        3.43     3.43     3.43     3.43     3.40     3.40

HYDROGRAPH AT
+                380F      .01    1    FLOW         3.       5.       7.      10.      13.      17.
                                        TIME        3.17     3.17     3.17     3.17     3.17     3.17

 2 COMBINED AT
+                C380F     .10    1    FLOW        19.      39.      52.      74.      95.     118.
                                        TIME        3.43     3.43     3.43     3.40     3.37     3.37

ROUTED TO
+                C380E     .10    1    FLOW        19.      39.      52.      74.      95.     117.
                                        TIME        3.43     3.43     3.43     3.40     3.40     3.37

HYDROGRAPH AT
+                380E      .01    1    FLOW         2.       4.       6.       9.      11.      14.
                                        TIME        3.10     3.13     3.13     3.10     3.10     3.10
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 2 COMBINED AT
+                C380E      .10    1   FLOW        19.      40.      53.      76.      98.     121.
                                       TIME      3.43     3.43     3.43     3.40     3.40     3.37

ROUTED TO
+                C380D      .10    1   FLOW        19.      40.      53.      76.      98.     121.
                                       TIME      3.43     3.43     3.43     3.40     3.40     3.37

HYDROGRAPH AT
+                 380D      .00    1   FLOW         1.       2.       2.       3.       4.       6.
                                       TIME      3.10     3.13     3.13     3.10     3.10     3.10

 2 COMBINED AT
+                C380D      .11    1   FLOW        20.      40.      54.      77.      99.     122.
                                       TIME      3.43     3.43     3.43     3.40     3.40     3.37

ROUTED TO
+                SD700      .11    1   FLOW        20.      40.      54.      76.      99.     122.
                                       TIME      3.43     3.43     3.43     3.43     3.40     3.37

HYDROGRAPH AT
+                 D350      .00    1   FLOW         1.       1.       2.       2.       3.       4.
                                       TIME      3.07     3.07     3.07     3.07     3.07     3.07

ROUTED TO
+                 C360      .00    1   FLOW         0.       1.       1.       2.       2.       3.
                                       TIME      3.33     3.27     3.23     3.23     3.23     3.23

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE    98.68    98.74    98.76    98.78    98.80    98.82
                                       TIME      3.33     3.27     3.23     3.23     3.23     3.23

HYDROGRAPH AT
+                  360      .01    1   FLOW         5.      10.      13.      19.      25.      31.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17

HYDROGRAPH AT
+                  370      .01    1   FLOW         2.       5.       7.      10.      13.      15.
                                       TIME      3.13     3.13     3.13     3.13     3.13     3.13

 3 COMBINED AT
+                 C370      .02    1   FLOW         7.      15.      20.      30.      39.      48.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17

ROUTED TO
+                C380A      .02    1   FLOW         7.      15.      20.      30.      38.      48.
                                       TIME      3.23     3.23     3.23     3.20     3.20     3.20

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE    98.87    98.95    99.00    99.05    99.10    99.14
                                       TIME      3.23     3.23     3.23     3.20     3.20     3.20

HYDROGRAPH AT
+                 380A      .01    1   FLOW         2.       5.       6.       9.      11.      14.
                                       TIME      3.17     3.17     3.17     3.17     3.17     3.17
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 2 COMBINED AT
+                C380A      .03    1   FLOW          9.      18.      26.      38.      49.      61.
                                       TIME        3.23     3.23     3.20     3.20     3.20     3.20

ROUTED TO
+                C380B      .03    1   FLOW          9.      18.      26.      38.      48.      60.
                                       TIME        3.30     3.30     3.27     3.23     3.23     3.23

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE      98.88    98.96    99.01    99.06    99.11    99.15
                                       TIME        3.30     3.30     3.27     3.23     3.23     3.23

HYDROGRAPH AT
+                 380B      .02    1   FLOW          7.      15.      20.      28.      36.      45.
                                       TIME        3.23     3.23     3.23     3.23     3.23     3.23

 2 COMBINED AT
+                C380B      .05    1   FLOW         15.      32.      45.      66.      85.     105.
                                       TIME        3.27     3.27     3.27     3.23     3.23     3.23

ROUTED TO
+                SD700      .05    1   FLOW         15.      32.      45.      65.      84.     104.
                                       TIME        3.30     3.27     3.27     3.23     3.23     3.23

HYDROGRAPH AT
+                 380C      .00    1   FLOW          1.       3.       4.       5.       7.       9.
                                       TIME        3.10     3.10     3.10     3.10     3.10     3.10

ROUTED TO
+                SD700      .00    1   FLOW          1.       3.       4.       5.       7.       8.
                                       TIME        3.10     3.10     3.10     3.10     3.10     3.10

HYDROGRAPH AT
+                  390      .01    1   FLOW          1.       3.       5.       9.      12.      16.
                                       TIME        3.30     3.23     3.23     3.23     3.23     3.20

 4 COMBINED AT
+                 C390      .17    1   FLOW         34.      71.      95.     139.     180.     224.
                                       TIME        3.33     3.30     3.27     3.27     3.27     3.27

ROUTED TO
+                SD700      .17    1   FLOW         10.      18.      24.      34.      43.      52.
                                       TIME        3.90     3.93     3.93     3.93     3.93     3.93

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE      73.49    74.14    74.52    75.17    75.77    76.42
                                       TIME        3.90     3.93     3.93     3.93     3.93     3.93

ROUTED TO
+                 C510      .17    1   FLOW         10.      18.      24.      34.      43.      52.
                                       TIME        3.97     4.00     3.97     3.97     3.97     3.97

                                  ** PEAK STAGES IN FEET **
                                  1   STAGE      97.12    97.36    97.50    97.72    97.87    98.02
                                       TIME        3.97     4.00     3.97     3.97     3.97     3.97

HYDROGRAPH AT
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+                510      .01    1   FLOW        5.      11.      14.      21.      27.      33.
                                     TIME      3.10     3.10     3.10     3.07     3.07     3.07

 2 COMBINED AT
+                C510     .18    1   FLOW       11.      19.      25.      35.      44.      53.
                                     TIME      3.93     4.00     3.97     3.93     3.93     3.93

ROUTED TO
+                C520     .18    1   FLOW       11.      19.      25.      35.      44.      53.
                                     TIME      4.00     4.03     4.00     3.97     3.97     3.97

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    97.30    97.60    97.79    98.05    98.24    98.43
                                     TIME      4.00     4.03     4.00     3.97     3.97     3.97

HYDROGRAPH AT
+                520      .01    1   FLOW        6.      12.      16.      24.      31.      38.
                                     TIME      3.13     3.13     3.13     3.13     3.13     3.13

 2 COMBINED AT
+                C520     .19    1   FLOW       15.      28.      36.      50.      63.      77.
                                     TIME      3.13     3.13     3.13     3.13     3.13     3.13

HYDROGRAPH AT
+                530      .01    1   FLOW        3.       6.       8.      11.      15.      18.
                                     TIME      3.17     3.20     3.20     3.20     3.17     3.17

 2 COMBINED AT
+                C530     .20    1   FLOW       18.      33.      43.      60.      77.      93.
                                     TIME      3.13     3.13     3.13     3.13     3.13     3.13

ROUTED TO
+                C550     .20    1   FLOW       18.      33.      43.      60.      75.      92.
                                     TIME      3.17     3.17     3.17     3.17     3.17     3.13

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE    97.43    97.81    98.01    98.30    98.53    98.75
                                     TIME      3.17     3.17     3.17     3.17     3.17     3.13

HYDROGRAPH AT
+                420      .02    1   FLOW        5.      10.      14.      20.      26.      32.
                                     TIME      3.23     3.27     3.27     3.27     3.23     3.23

ROUTED TO
+                C430     .02    1   FLOW        5.      10.      14.      20.      26.      32.
                                     TIME      3.33     3.33     3.33     3.30     3.30     3.30

                                 ** PEAK STAGES IN FEET **
                                 1   STAGE   100.11   100.23   100.29   100.37   100.45   100.51
                                     TIME      3.33     3.33     3.33     3.30     3.30     3.30

HYDROGRAPH AT
+                430      .02    1   FLOW        7.      14.      18.      27.      34.      43.
                                     TIME      3.23     3.23     3.23     3.23     3.23     3.23

 2 COMBINED AT
+                C430     .04    1   FLOW       11.      23.      31.      45.      59.      73.
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                                    TIME        3.30     3.30     3.27     3.27     3.27     3.27

HYDROGRAPH AT
+                440       .01    1  FLOW         3.       5.       7.      11.      14.      17.
                                    TIME        3.17     3.17     3.17     3.17     3.17     3.17

2 COMBINED AT
+                C440      .05    1  FLOW        13.      27.      37.      54.      69.      86.
                                    TIME        3.27     3.27     3.27     3.27     3.27     3.23

DIVERSION TO
+                D440      .05    1  FLOW         9.      19.      26.      37.      48.      60.
                                    TIME        3.27     3.27     3.27     3.27     3.27     3.23

HYDROGRAPH AT
+                C440      .05    1  FLOW         4.       8.      11.      16.      21.      26.
                                    TIME        3.27     3.27     3.27     3.27     3.27     3.23

ROUTED TO
+                C540      .05    1  FLOW         4.       8.      11.      16.      21.      26.
                                    TIME        3.37     3.33     3.30     3.30     3.30     3.30

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE      100.01   100.09   100.13   100.19   100.23   100.27
                                    TIME        3.37     3.33     3.30     3.30     3.30     3.30

HYDROGRAPH AT
+                540       .01    1  FLOW         2.       4.       5.       8.      10.      12.
                                    TIME        3.17     3.17     3.17     3.17     3.17     3.17

2 COMBINED AT
+                C540      .05    1  FLOW         5.      11.      14.      21.      27.      34.
                                    TIME        3.33     3.27     3.27     3.27     3.27     3.23

ROUTED TO
+                C550      .05    1  FLOW         5.      10.      14.      21.      28.      34.
                                    TIME        3.37     3.30     3.30     3.30     3.27     3.27

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE      100.03   100.11   100.15   100.21   100.26   100.31
                                    TIME        3.37     3.30     3.30     3.30     3.27     3.27

HYDROGRAPH AT
+                550       .01    1  FLOW         3.       6.       8.      12.      16.      20.
                                    TIME        3.10     3.13     3.13     3.10     3.10     3.10

3 COMBINED AT
+                C550      .26    1  FLOW        24.      45.      59.      85.     109.     135.
                                    TIME        3.17     3.17     3.17     3.17     3.17     3.17

ROUTED TO
+                C560      .26    1  FLOW        23.      44.      58.      82.     105.     129.
                                    TIME        3.23     3.23     3.23     3.23     3.23     3.23

                                 ** PEAK STAGES IN FEET **
                                 1  STAGE       98.09    98.60    98.87    99.23    99.47    99.68
                                    TIME        3.23     3.23     3.23     3.23     3.23     3.23
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HYDROGRAPH AT
+                570       .00    1   FLOW        2.      3.      5.      7.      8.     10.
                                     TIME      3.20    3.20    3.20    3.20    3.20    3.20

HYDROGRAPH AT
+                580       .01    1   FLOW        2.      4.      6.      8.     11.     13.
                                     TIME      3.17    3.17    3.17    3.17    3.17    3.17

HYDROGRAPH AT
+                560       .00    1   FLOW        1.      3.      4.      6.      8.     10.
                                     TIME      3.13    3.17    3.17    3.13    3.13    3.13

 4 COMBINED AT
+               C560       .27    1   FLOW       28.     54.     72.    101.    128.    158.
                                     TIME      3.23    3.23    3.20    3.23    3.23    3.23

ROUTED TO
+               C590       .27    1   FLOW       28.     54.     71.    101.    129.    158.
                                     TIME      3.23    3.23    3.23    3.23    3.23    3.23

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE     97.06   97.63   97.96   98.47   98.91   99.30
                                     TIME      3.23    3.23    3.23    3.23    3.23    3.23

HYDROGRAPH AT
+                590       .02    1   FLOW        6.     12.     16.     23.     29.     36.
                                     TIME      3.23    3.27    3.27    3.27    3.23    3.23

 2 COMBINED AT
+               C590       .29    1   FLOW       33.     66.     87.    123.    158.    194.
                                     TIME      3.23    3.23    3.23    3.23    3.23    3.23

ROUTED TO
+               C610       .29    1   FLOW       33.     65.     87.    123.    156.    191.
                                     TIME      3.30    3.27    3.27    3.27    3.27    3.27

                                  ** PEAK STAGES IN FEET **
                                  1  STAGE     97.36   98.02   98.37   98.87   99.21   99.51
                                     TIME      3.30    3.27    3.27    3.27    3.27    3.27

HYDROGRAPH AT
+                610       .00    1   FLOW        2.      4.      5.      7.     10.     12.
                                     TIME      3.07    3.07    3.07    3.07    3.07    3.07

 2 COMBINED AT
+               C610       .30    1   FLOW       33.     66.     88.    125.    158.    194.
                                     TIME      3.27    3.27    3.27    3.27    3.27    3.27

HYDROGRAPH AT
+               D440       .00    1   FLOW        9.     19.     26.     37.     48.     60.
                                     TIME      3.27    3.27    3.27    3.27    3.27    3.23

ROUTED TO
+               C470       .00    1   FLOW        9.     19.     25.     37.     48.     60.
                                     TIME      3.40    3.37    3.33    3.33    3.30    3.30
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                                   ** PEAK STAGES IN FEET **
                                   1  STAGE      99.96   100.05   100.09   100.16   100.21   100.26
                                      TIME        3.40     3.37     3.33     3.33     3.30     3.30

HYDROGRAPH AT
+                410       .04     1  FLOW         11.       22.       29.       42.       54.       67.
                                      TIME        3.33     3.37     3.37     3.37     3.37     3.33

ROUTED TO
+                C450      .04     1  FLOW         11.       22.       29.       42.       54.       67.
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.71   101.83   101.90   101.99   102.06   102.14
                                      TIME        3.37     3.37     3.37     3.37     3.37     3.37

HYDROGRAPH AT
+                450       .01     1  FLOW          2.        5.        6.        9.       12.       15.
                                      TIME        3.27     3.27     3.27     3.27     3.27     3.27

2 COMBINED AT
+                C450      .05     1  FLOW         13.       26.       35.       50.       64.       79.
                                      TIME        3.33     3.33     3.33     3.33     3.33     3.33

ROUTED TO
+                C460      .05     1  FLOW         13.       26.       35.       50.       64.       79.
                                      TIME        3.43     3.40     3.40     3.40     3.40     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.73   101.87   101.93   102.04   102.12   102.21
                                      TIME        3.43     3.40     3.40     3.40     3.40     3.37

HYDROGRAPH AT
+                460       .01     1  FLOW          1.        5.        9.       14.       19.       25.
                                      TIME        3.27     3.23     3.20     3.20     3.20     3.20

2 COMBINED AT
+                C460      .07     1  FLOW         14.       29.       40.       58.       75.       93.
                                      TIME        3.40     3.40     3.37     3.37     3.37     3.33

HYDROGRAPH AT
+                470       .01     1  FLOW         10.       15.       18.       22.       26.       30.
                                      TIME        3.17     3.17     3.17     3.17     3.17     3.17

3 COMBINED AT
+                C470      .07     1  FLOW         26.       54.       73.      105.      135.      167.
                                      TIME        3.37     3.33     3.33     3.33     3.30     3.30

ROUTED TO
+                C600      .07     1  FLOW         25.       53.       72.      103.      134.      166.
                                      TIME        3.47     3.40     3.40     3.40     3.37     3.37

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE     101.86   102.06   102.17   102.32   102.46   102.58
                                      TIME        3.47     3.40     3.40     3.40     3.37     3.37

HYDROGRAPH AT
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+                 600       .03     1   FLOW          8.      17.      23.      33.      43.      53.
                                          TIME        3.27     3.30     3.30     3.30     3.27     3.27

2 COMBINED AT
+                 C600      .10     1   FLOW         32.      68.      92.     133.     172.     214.
                                          TIME        3.43     3.40     3.37     3.37     3.37     3.33

ROUTED TO
+                 C610      .10     1   FLOW         32.      68.      92.     133.     172.     213.
                                          TIME        3.43     3.40     3.40     3.37     3.37     3.37

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE       96.92    97.43    97.68    98.06    98.36    98.64
                                          TIME        3.43     3.40     3.40     3.37     3.37     3.37

2 COMBINED AT
+                 C610      .40     1   FLOW         61.     123.     166.     243.     319.     398.
                                          TIME        3.33     3.33     3.33     3.30     3.30     3.30
1
                                          SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                              (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                   INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
        ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                  PEAK                                     PEAK

                            (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .76     18.02    206.61       .28     2.00     18.00    206.00        .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1395E+01 EXCESS= .0000E+00 OUTFLOW= .1395E+01 BASIN STORAGE= .5147E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .66     36.88    206.56       .54     2.00     36.85    206.00        .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2679E+01 EXCESS= .0000E+00 OUTFLOW= .2679E+01 BASIN STORAGE= .5142E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .62     49.28    206.11       .71     2.00     49.28    206.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3481E+01 EXCESS= .0000E+00 OUTFLOW= .3481E+01 BASIN STORAGE= .5094E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380F  MANE          .58     70.32    205.18       .99     2.00     70.23    206.00        .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4852E+01 EXCESS= .0000E+00 OUTFLOW= .4851E+01 BASIN STORAGE= .5125E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
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          C380F  MANE          .55     90.11    204.07      1.24      2.00     90.10    204.00        1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6121E+01 EXCESS= .0000E+00 OUTFLOW= .6119E+01 BASIN STORAGE= .5213E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380F  MANE          .53    111.12    202.98      1.51      2.00    111.00    204.00        1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7456E+01 EXCESS= .0000E+00 OUTFLOW= .7454E+01 BASIN STORAGE= .5129E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .75     18.88    206.19       .29      2.00     18.87    206.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+01 EXCESS= .0000E+00 OUTFLOW= .1510E+01 BASIN STORAGE= .5101E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .65     38.66    206.58       .55      2.00     38.65    206.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2901E+01 EXCESS= .0000E+00 OUTFLOW= .2901E+01 BASIN STORAGE= .5342E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .61     51.71    205.99       .71      2.00     51.70    206.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3770E+01 EXCESS= .0000E+00 OUTFLOW= .3769E+01 BASIN STORAGE= .5207E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .57     73.88    204.85       .99      2.00     73.74    204.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5255E+01 EXCESS= .0000E+00 OUTFLOW= .5253E+01 BASIN STORAGE= .5185E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .54     94.94    203.58      1.25      2.00     94.93    204.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6628E+01 EXCESS= .0000E+00 OUTFLOW= .6626E+01 BASIN STORAGE= .5235E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380E  MANE          .52    117.40    202.30      1.53      2.00    117.26    202.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8074E+01 EXCESS= .0000E+00 OUTFLOW= .8071E+01 BASIN STORAGE= .5171E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
          C380D  MANE          .60     19.38    206.47       .29      2.00     19.37    206.00         .29
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```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+01 EXCESS= .0000E+00 OUTFLOW= .1595E+01 BASIN STORAGE= .4110E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .52     39.68    206.30       .55      2.00     39.66    206.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3065E+01 EXCESS= .0000E+00 OUTFLOW= .3064E+01 BASIN STORAGE= .4112E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .49     53.04    205.89       .72      2.00     53.04    206.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3982E+01 EXCESS= .0000E+00 OUTFLOW= .3981E+01 BASIN STORAGE= .4163E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .45     75.80    204.87      1.00      2.00     75.70    204.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5550E+01 EXCESS= .0000E+00 OUTFLOW= .5549E+01 BASIN STORAGE= .4165E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .43     97.56    203.88      1.26      2.00     97.54    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7000E+01 EXCESS= .0000E+00 OUTFLOW= .6998E+01 BASIN STORAGE= .4150E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           C380D  MANE          .41    120.69    202.35      1.53      2.00    120.60    202.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8526E+01 EXCESS= .0000E+00 OUTFLOW= .8524E+01 BASIN STORAGE= .4141E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .25     19.57    206.25       .29      2.00     19.57    206.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1629E+01 EXCESS= .0000E+00 OUTFLOW= .1629E+01 BASIN STORAGE= .1700E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .22     40.05    206.03       .55      2.00     40.05    206.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3128E+01 EXCESS= .0000E+00 OUTFLOW= .3128E+01 BASIN STORAGE= .1695E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .20     53.55    205.97       .72      2.00     53.55    206.00         .72
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .4065E+01 EXCESS= .0000E+00 OUTFLOW= .4064E+01 BASIN STORAGE= .1710E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .19     76.49    204.64      1.00      2.00     76.44    206.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+01 EXCESS= .0000E+00 OUTFLOW= .5665E+01 BASIN STORAGE= .1701E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .18     98.53    204.06      1.26      2.00     98.53    204.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7145E+01 EXCESS= .0000E+00 OUTFLOW= .7145E+01 BASIN STORAGE= .1710E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .17    121.91    202.24      1.54      2.00    121.86    202.00        1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8703E+01 EXCESS= .0000E+00 OUTFLOW= .8702E+01 BASIN STORAGE= .1707E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .43     15.10    197.65       .32      2.00     15.08    198.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8324E+00 EXCESS= .0000E+00 OUTFLOW= .8321E+00 BASIN STORAGE= .2936E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .37     32.16    196.03       .62      2.00     32.14    196.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1599E+01 EXCESS= .0000E+00 OUTFLOW= .1598E+01 BASIN STORAGE= .2875E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .35     44.75    196.00       .81      2.00     44.74    196.00         .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+01 EXCESS= .0000E+00 OUTFLOW= .2076E+01 BASIN STORAGE= .2880E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .32     65.41    194.22      1.12      2.00     65.32    194.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2896E+01 EXCESS= .0000E+00 OUTFLOW= .2893E+01 BASIN STORAGE= .2928E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .30     84.09    193.96      1.42      2.00     84.07    194.00        1.42
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .3652E+01 EXCESS= .0000E+00 OUTFLOW= .3649E+01 BASIN STORAGE= .2884E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .29    104.56    193.90      1.72      2.00    104.47    194.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4449E+01 EXCESS= .0000E+00 OUTFLOW= .4444E+01 BASIN STORAGE= .2877E-04 PERCENT ERROR=    .1

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .38      1.24    186.46       .32      2.00      1.23    186.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4847E-01 EXCESS= .0000E+00 OUTFLOW= .4847E-01 BASIN STORAGE= .1580E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .32      2.67    186.52       .61      2.00      2.63    186.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9310E-01 EXCESS= .0000E+00 OUTFLOW= .9308E-01 BASIN STORAGE= .1576E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .30      3.62    186.40       .79      2.00      3.58    186.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+00 EXCESS= .0000E+00 OUTFLOW= .1210E+00 BASIN STORAGE= .1588E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .28      5.26    186.17      1.10      2.00      5.23    186.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1686E+00 EXCESS= .0000E+00 OUTFLOW= .1686E+00 BASIN STORAGE= .1598E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .27      6.79    186.31      1.38      2.00      6.77    186.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2127E+00 EXCESS= .0000E+00 OUTFLOW= .2126E+00 BASIN STORAGE= .1554E-04 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           SD700  MANE          .26      8.40    186.02      1.69      2.00      8.39    186.00        1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2591E+00 EXCESS= .0000E+00 OUTFLOW= .2590E+00 BASIN STORAGE= .1558E-04 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
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TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: Subareas of Area 380 6-HOUR 10-YEAR STORM VALUE USED

Subarea #1 - 380A

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		160	.007	U					0.033
Shallow Concent'd		220	.003	U					0.069
Open Channel		160	.007		.016	2.67	16		0.019
						Time of Concentration =			0.20*

Subarea #2 - 380B

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		700	.007	U					0.144
Open Channel		500	.003		.016	2.64	16		0.091
Open Channel		20	.007		.016	2.64	16		0.002
						Time of Concentration =			0.32*

Subarea #3 - 380C

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	160	.01	A					0.048
Shallow Concent'd		280	.007	U					0.058
						Time of Concentration =			0.11*

Subarea #4 - 380D

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	170	.01	A					0.051
Shallow Concent'd		250	.008	U					0.048
Open Channel		160	.003		.016	2.64	16		0.029
						Time of Concentration =			0.13*

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: Subareas of Area 380 6-HOUR 10-YEAR STORM VALUE USED

Subarea #5 - 380E

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	180	.01	A					0.053
Shallow Concent'd		260	.008	U					0.050
Open Channel		220	.0036		.016	2.64	16		0.036
						Time of Concentration =			0.14*

Subarea #6 - 380F

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	200	.01	A					0.058
Shallow Concent'd		650	.008	U					0.125
Open Channel		80	.0036		.016	2.64	16		0.013
						Time of Concentration =			0.20*

Subarea #7

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	170	.01	A					0.051
Shallow Concent'd		170	.002	U					0.065
Open Channel		550	.0077		.016	5	20		0.047
						Time of Concentration =			0.16*

Subarea #8

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	120	.007	A					0.044
Sheet		180	.005	A					0.084
Shallow Concent'd		210	.003	U					0.066
Open Channel		520	.003		.016	2.64	16		0.094
						Time of Concentration =			0.29*

Subarea #9

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.0045	A					0.110
Shallow Concent'd		50	.0045	U					0.013
Open Channel		650	.006		.025	1.5	6		0.099
Open Channel		220	.005		.025	1.5	6		0.037
						Time of Concentration =			0.26*

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street User: CDS Date: 08-19-95

County : Maricopa State: AZ Checked: ____ Date: _____

Subtitle: Subareas of Area 380 6-HOUR 10-YEAR STORM VALUE USED

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short		

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street and Cholla User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: East of 84th Street & South of Cholla & Area 610 6HR 10YR VALUES

Subarea #1 - 410

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	270	.007	A					0.084
Shallow Concent'd		210	.003	U					0.066
Shallow Concent'd		730	.007	U					0.150
Open Channel		180	.003		.025	0.5	2		0.039
Open Channel		1550	.007		.016	0.5	2		0.139

Time of Concentration = 0.48*
=====

Subarea #2 - 420

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	280	.007	A					0.087
Shallow Concent'd		110	.003	U					0.035
Shallow Concent'd		230	.007	U					0.047
Open Channel		1180	.007		.02	5.5	2		0.166

Time of Concentration = 0.33*
=====

Subarea #3 - 430

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.007	A					0.092
Shallow Concent'd		200	.007	U					0.041
Open Channel		1050	.007		.03	0.5	2		0.177

Time of Concentration = 0.31*
=====

Subarea #4 - 440

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	100	.007	A					0.038
Sheet		120	.003	A					0.074
Open Channel		780	.007		.02	5.5	2		0.109

Time of Concentration = 0.22*
=====

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street and Cholla User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: East of 84th Street & South of Cholla & Area 610 6HR 10YR VALUES

---------- Subarea #5 - 450 ----------

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.007	A					0.092
Shallow Concent'd		500	.007	U					0.103
Open Channel		600	.003		.030	5.5	2		0.154

Time of Concentration = 0.35*
=====

---------- Subarea #6 - 460 ----------

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.007	A					0.092
Shallow Concent'd		340	.007	U					0.070
Open Channel		400	.002		.016	7.5	30		0.067

Time of Concentration = 0.23*
=====

---------- Subarea #7 - 470 ----------

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	150	.005	A					0.060
Open Channel		1100	.007		.025	5.5	2		0.154

Time of Concentration = 0.21*
=====

---------- Subarea #8 - 610 ----------

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	130	.007	A					0.047
Shallow Concent'd		100	.010	U					0.017

Time of Concentration = 0.06*
=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street and Cholla User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: West of 84th Street and South of Cholla 6-HOUR 10-YEAR VALUES

Subarea #1 - 510

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	80	.006	A					0.034
Shallow Concent'd		300	.01	U					0.052
Open Channel		150	.0056		.04016		8		0.009
					Time of Concentration =				0.09*

Subarea #2 - 520

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	70	.006	A					0.030
Shallow Concent'd		250	.007	U					0.051
Open Channel		550	.009		.0250.5		2		0.068
					Time of Concentration =				0.15*

Subarea #3 - 530

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	260	.007	A					0.082
Shallow Concent'd		470	.006	U					0.104
Open Channel		350	.009		.025.5		2		0.043
					Time of Concentration =				0.23*

Subarea #4 - 540

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	260	.007	A					0.082
Shallow Concent'd		250	.007	U					0.051
Open Channel		300	.003		.025.5		2		0.064
					Time of Concentration =				0.20*

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street and Cholla User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: West of 84th Street and South of Cholla 6-HOUR 10-YEAR VALUES

Subarea #5 - 550

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	120	.007	A					0.044
Shallow Concent'd		300	.007	U					0.062
Open Channel		230	.012		.025.5		2		0.025
					Time of Concentration =				0.13*

Subarea #6 - 560

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	280	.0089	A					0.079
Shallow Concent'd		160	.0023	U					0.057
Open Channel		250	.0040		.04016		8		0.019
Open Channel		500	.0060		.04016		8		0.030
					Time of Concentration =				0.19*

Subarea #7 - 570

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	230	.006	A					0.079
Shallow Concent'd		400	.007	U					0.082
Open Channel		450	.003		.025.5		2		0.096
					Time of Concentration =				0.26*

Subarea #8 - 580

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.007	A					0.092
Shallow Concent'd		100	.007	U					0.021
Shallow Concent'd		150	.006	U					0.033
Open Channel		380	.005		.025.5		2		0.063
					Time of Concentration =				0.21*

Subarea #9 - 590

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.007	A					0.092
Shallow Concent'd		400	.007	U					0.082
Open Channel		400	.0073		.03 .5		2		0.066
Open Channel		570	.005		.025.5		2		0.095
					Time of Concentration =				0.33*

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street and Cholla User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: West of 84th Street and South of Cholla 6-HOUR 10-YEAR VALUES

---------- Subarea #10 - 600 ----------

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.006	A					0.098
Shallow Concent'd		400	.010	U					0.069
Open Channel		450	.0061		.030.5		2		0.081
Open Channel		700	.0060		.030.5		2		0.127

Time of Concentration = 0.38*
=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: North of Cholla Road 6-HOUR 10-YEAR VALUES USED

Subarea #1 - 310

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		160	.007	U					0.033
Open Channel		720	.003		.016	2.67	16		0.129

Time of Concentration = 0.24*
=====

Subarea #2 - 320

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		160	.007	U					0.033
Open Channel		750	.003		.016	2.64	16		0.136
Open Channel		1600	.003		.016	2.64	16		0.290

Time of Concentration = 0.54*
=====

Subarea #3 - 330

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		110	.007	U					0.023
Open Channel		800	.003		.016	2.64	16		0.145
Open Channel		2040	.003		.016	2.64	16		0.369

Time of Concentration = 0.62*
=====

Subarea #4 - 340

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		400	.006	U					0.089
Open Channel		500	.006		.016	2.64	16		0.064

Time of Concentration = 0.23*
=====

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : 84th Street User: CDS Date: 08-19-95
County : Maricopa State: AZ Checked: ____ Date: _____
Subtitle: North of Cholla Road 6-HOUR 10-YEAR VALUES USED

Subarea #5 - 350

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	70	.01	A					0.025
Open Channel		260	.006		.016	2.64	16		0.033

Time of Concentration = 0.06*
=====

Subarea #6 - 360

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.01	A					0.080
Shallow Concent'd		200	.007	U					0.041
Open Channel		650	.004		.016	2.64	16		0.102

Time of Concentration = 0.22*
=====

Subarea #7 - 370

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	170	.01	A					0.051
Shallow Concent'd		170	.002	U					0.065
Open Channel		550	.0077		.016	5	20		0.047

Time of Concentration = 0.16*
=====

Subarea #8 - 380

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	120	.007	A					0.044
Sheet		180	.005	A					0.084
Shallow Concent'd		210	.003	U					0.066
Open Channel		520	.003		.016	2.64	16		0.094

Time of Concentration = 0.29*
=====

Subarea #9 - 390

Flow Type	10 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.08	300	.0045	A					0.110
Shallow Concent'd		50	.0045	U					0.013
Open Channel		650	.006		.025	1.5	6		0.099
Open Channel		220	.005		.025	1.5	6		0.037

Time of Concentration = 0.26*
=====

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

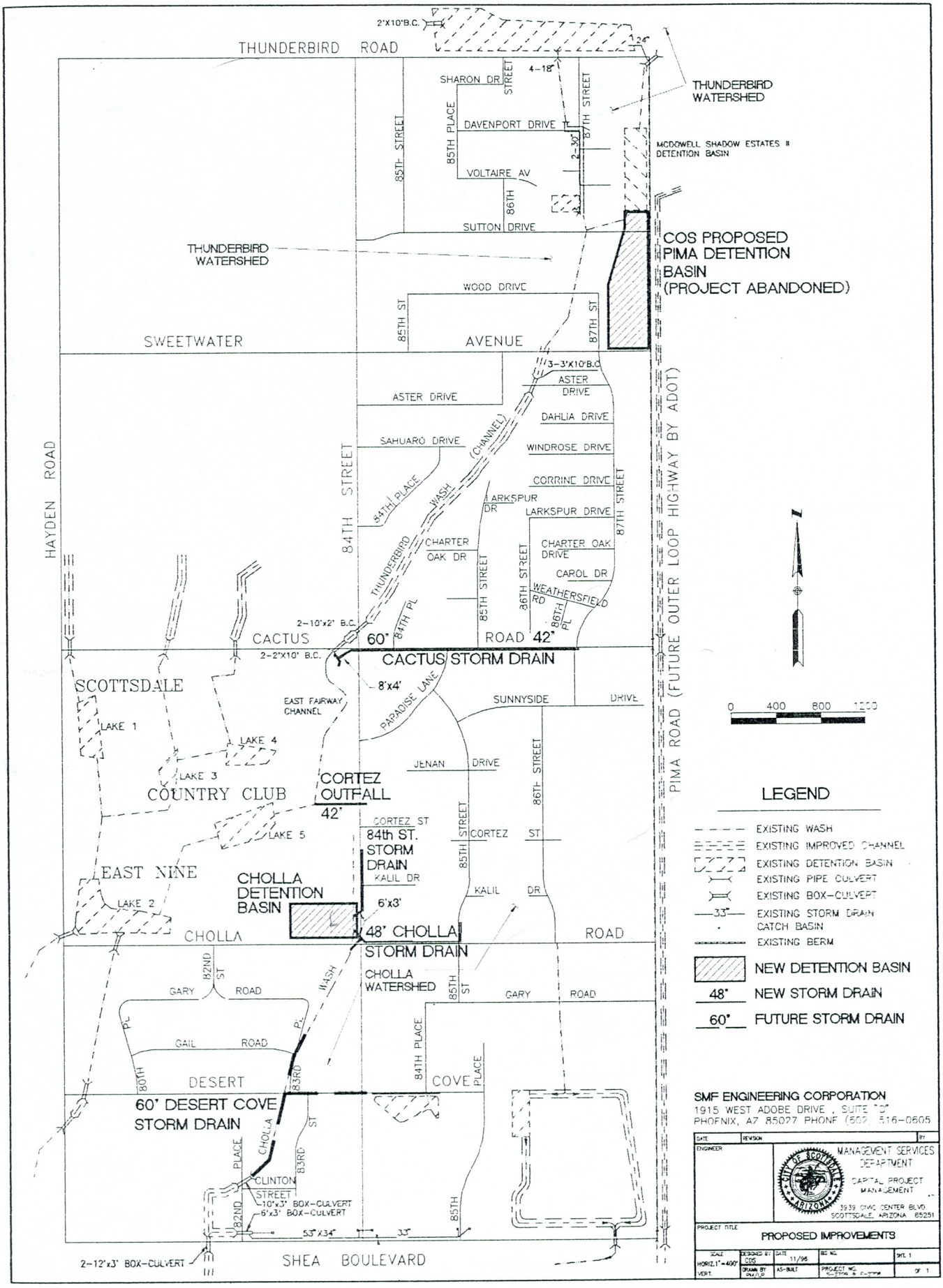
Project : 84th Street User: CDS Date: 08-19-95

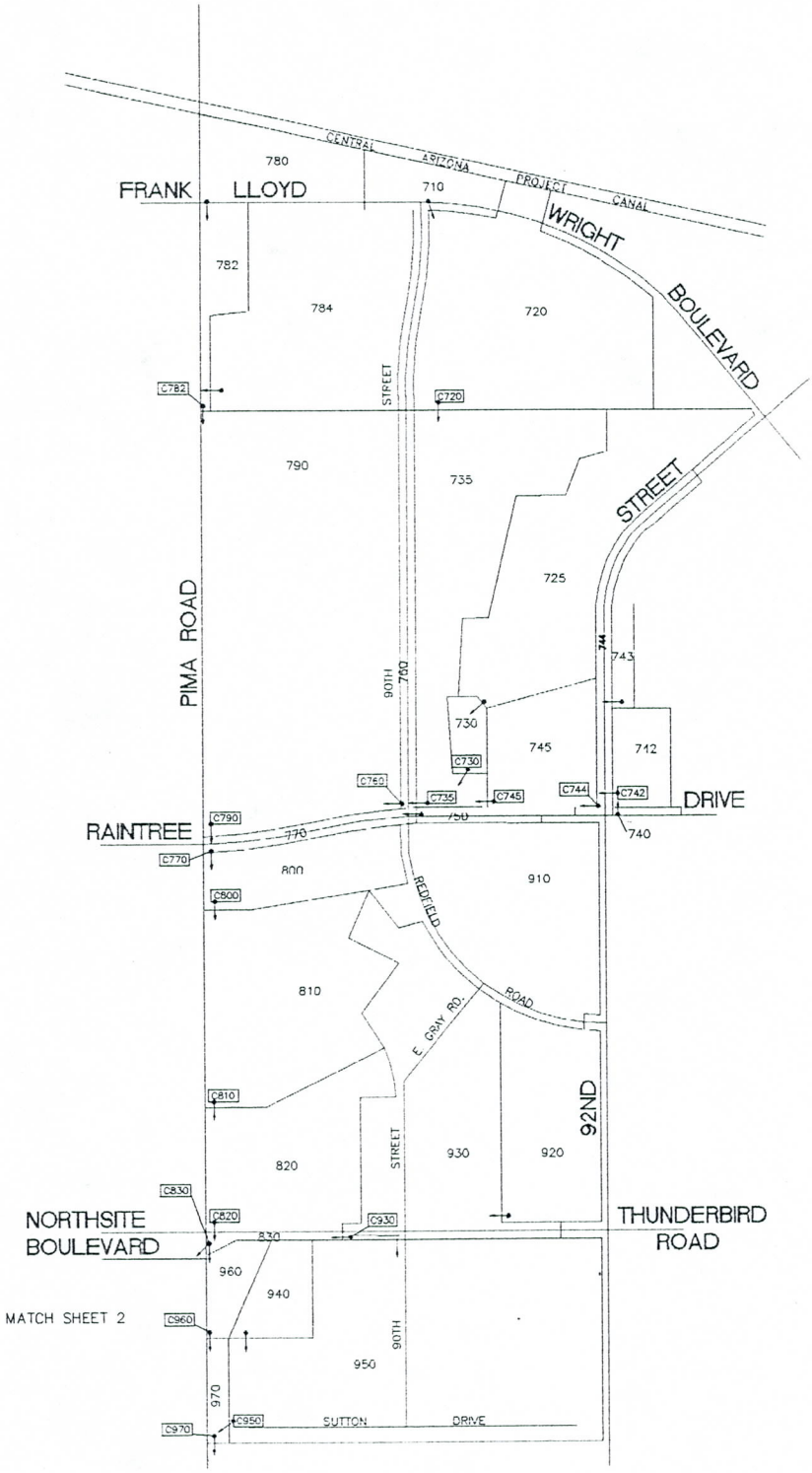
County : Maricopa State: AZ Checked: ____ Date: _____

Subtitle: North of Cholla Road 6-HOUR 10-YEAR VALUES USED

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short		


THUNDERBIRD ROAD
2'X10'B.C.
24"
4-18"
SHARON DR
STREET
THUNDERBIRD WATERSHED
DAVENPORT DRIVE
85TH PLACE
85TH STREET
87TH STREET
2-30"
MCDOWELL SHADOW ESTATES II DETENTION BASIN
VOLTAIRE AV
86TH
SUTTON DRIVE
THUNDERBIRD WATERSHED
COS PROPOSED PIMA DETENTION BASIN (PROJECT ABANDONED)
WOOD DRIVE
85TH ST
87TH ST
SWEETWATER AVENUE
3-3'X10'B.C.
ASTER DRIVE
ASTER DRIVE
DAHLIA DRIVE
SAHUARO DRIVE
WINDROSE DRIVE
(CHANNEL)
84TH STREET
84TH PLACE
WASH
CORRINE DRIVE
LARKSPUR DR
LARKSPUR DRIVE
87TH STREET
HAYDEN ROAD
CHARTER OAK DR
CHARTER OAK DRIVE
THUNDERBIRD
85TH STREET
86TH STREET
CAROL DR
WEATHERSFIELD RD
86TH PL
84TH PL
2-10'x2' B.C.
CACTUS ROAD
60"
42"
2-2'X10' B.C.
CACTUS STORM DRAIN
8'x4'
SCOTTSDALE
EAST FAIRWAY CHANNEL
PARADISE LANE
SUNNYSIDE DRIVE
LAKE 1
LAKE 4
LAKE 3
COUNTRY CLUB
JENAN DRIVE
86TH STREET
CORTEZ OUTFALL
42"
CORTEZ ST
84th ST. STORM DRAIN
LAKE 5
85TH STREET
CORTEZ ST
KALIL DR
KALIL DR
EAST NINE
CHOLLA DETENTION BASIN
6'x3'
LAKE 2
48" CHOLLA STORM DRAIN
CHOLLA ROAD
CHOLLA WATERSHED
82ND ST
WASH
85TH ST
GARY ROAD
GARY ROAD
PL
PL
GAIL ROAD
80TH
83RD
84TH PLACE
DESERT COVE PLACE
60" DESERT COVE STORM DRAIN
CHOLLA PLACE
83RD ST
CLINTON STREET
82ND
10'x3' BOX-CULVERT
6'x3' BOX-CULVERT
53"X34"
33"
85TH
2-12'x3' BOX-CULVERT
SHEA BOULEVARD
PIMA ROAD (FUTURE OUTER LOOP HIGHWAY BY ADOT)
0 400 800 1200
LEGEND
EXISTING WASH
EXISTING IMPROVED CHANNEL
EXISTING DETENTION BASIN
EXISTING PIPE CULVERT
EXISTING BOX-CULVERT
33" EXISTING STORM DRAIN
CATCH BASIN
EXISTING BERM
NEW DETENTION BASIN
48" NEW STORM DRAIN
60" FUTURE STORM DRAIN
SMF ENGINEERING CORPORATION
1915 WEST ADOBE DRIVE , SUITE "D"
PHOENIX, AZ 85027 PHONE (602) 516-0605
DATE
REVISION
BY
ENGINEER
CITY OF SCOTTSDALE ARIZONA
MANAGEMENT SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251
PROJECT TITLE
PROPOSED IMPROVEMENTS
SCALE
HORIZ. 1" = 400'
VERT.
DESIGNED BY CDS
DATE 11/96
DRAWN BY
AS-BUILT
SHT. 1
OF 1

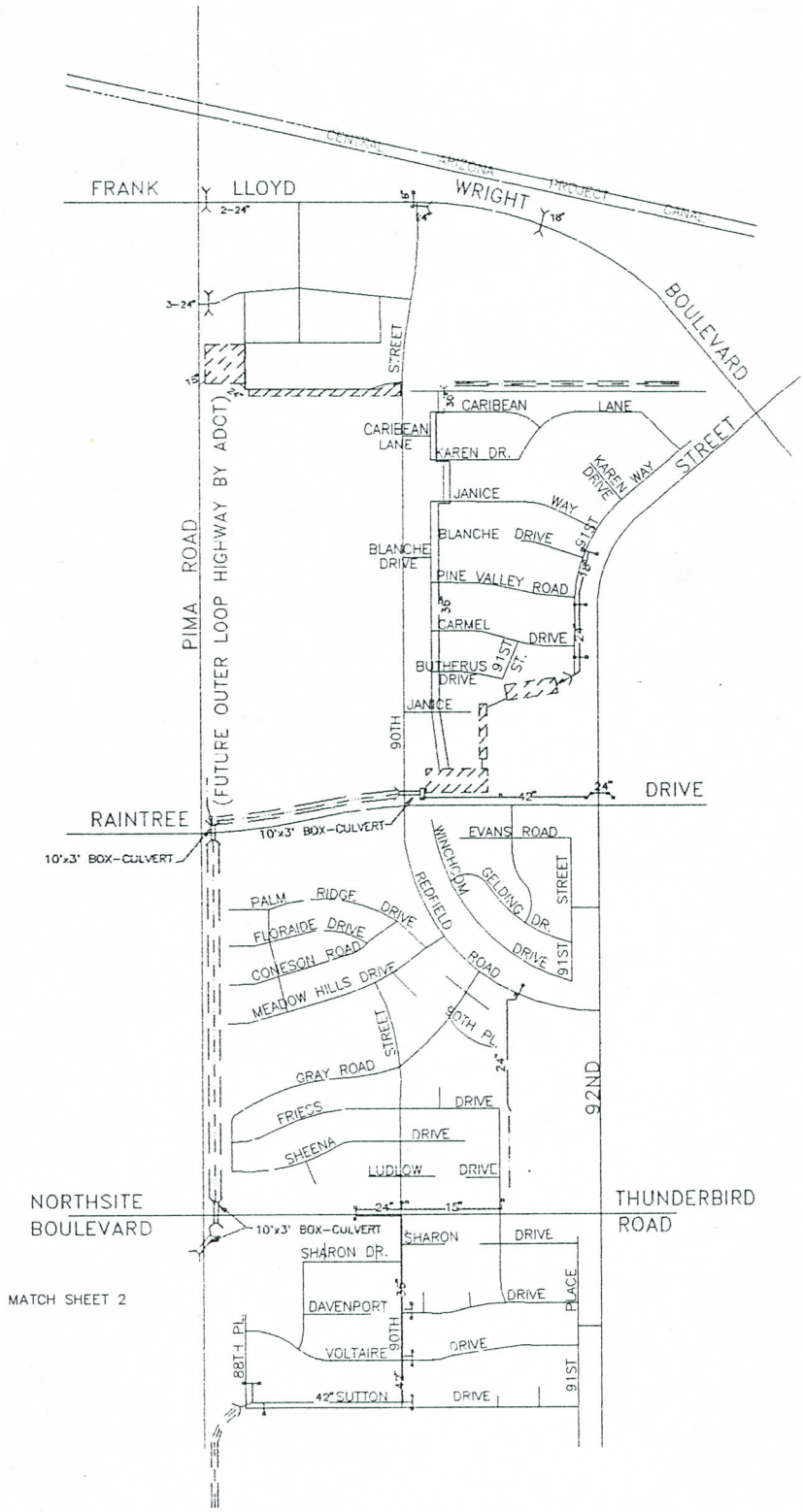


LEGEND

360	SUB-BASIN NUMBER
C360	CONCENTRATION POINT WITH DIRECTION OF FLOW
	DIVERTED FLOW

SMF ENGINEERING CORPORATION
1915 WEST ADOBE DRIVE, SUITE "D"
PHOENIX, AZ 85027 PHONE (602) 516-0605

DATE	REVISION		BY
ENGINEER	CITY OF SCOTTSDALE ARIZONA — MANAGEMENT SERVICES DEPARTMENT, CAPITAL PROJECT MANAGEMENT, 3939 CIVIC CENTER BLVD., SCOTTSDALE, ARIZONA 85251		
PROJECT TITLE: DRAINAGE AREA MAP			
SCALE: HORIZ. 1" = 400' / VERT.	DESIGNED BY: R.M. / DRAWN BY: M.L.H.	DATE: 03/94 / AS-BUILT	SQ. NO. / PROJECT NO. S-2706 & F-2708	SHT. 1 OF 2



LEGEND

- EXISTING WASH
- EXISTING IMPROVED CHANNEL
- EXISTING DETENTION BASIN
- EXISTING PIPE CULVERT
- EXISTING BOX-CULVERT
- EXISTING STORM DRAIN
- CATCH BASIN
- EXISTING BERM

SMF ENGINEERING CORPORATION
1915 WEST ADOBE DRIVE , SUITE "D"
PHOENIX, AZ 85027 PHONE (602) 516-0605

DATE	REVISION	BY
ENGINEER		

MANAGEMENT SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251

PROJECT TITLE: **EXISTING DRAINAGE FACILITIES**

SCALE	DESIGNED BY	DATE	DR. NO.	SHT. 1
HORIZ. 1"=400'	F.M.	03/94		
VERT.	DRAWN BY M.L.H.	AS-BUILT	PROJECT NO. C-2708 & F-2708	OF 2

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5859

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May 29, 1997

Annette Grove, Project Manager
City of Scottsdale
P.O. Box 1000
7447 East Indian School Road
Scottsdale, AZ 85252

SUBJECT: Drainage Design Report for Cholla Road and 84th Street

Dear Annette:

The District has reviewed the Drainage Design Report for Cholla Road and 84th Street Storm Drain and Detention Basin dated November 1996. We realize our comments are late but must preface that on the fact that we did not receive the report until March 1997. Due to this delay of receipt of our comments, they may not be included in any subsequent update of the report, but we submit them for your consideration.

Hydrology:

1- On page 5, under the title of Cactus Road Storm Drain for the proposed conditions, it is mentioned that "the difference between the 50-year and 100-year events will surface flow in Cactus Road and will be intercepted at 84th Street with catch basins." If the catch basins are part of the improvements, then the analysis should include it as part of the future condition analysis. The storm drain is the only improvement shown for the future condition analysis.

2- There is no HEC-1 model provided for the improvements to the area above Cactus Road, What is the design flow for Cactus Road storm drain based on?

3- The map for the proposed condition HEC-1 model is not included in the report. Sub-basin 380 is subdivided for the proposed condition's HEC-1 model but not shown as such on the map. A map for the proposed condition HEC-1 should be included in the report. The basis of the division of this sub-basin between the existing and the proposed condition should be reported.

4- No background information or calculations are given for the stage-discharge-storage curve values used in the HEC-1 model for the proposed 84th street and Cholla Detention Basin. These calculations should be included in the report. Without these calculations the design of the Basin could not be approved.

Hydraulics:

1. Provide an introductory paragraph describing the various agencies involvement and their contribution to the project. Also, briefly describe the scope of work for the project.
2. It is not clear if the Cactus Road Storm Drain is going to be part of this project. Please explain on page 5. If it is part of this project then the consultant would have to include storm drain calculations for Cactus Road.
3. It is not clear if the Cortez Street storm drain is going to be part of this project. If yes, then provide the necessary hydraulic calculations.
4. At Cholla Road storm drain, why do we have to capture the 100-year storm into the pipes? If the COS design criteria is to provide 2-year protection, then we should only contribute toward providing 2-year storm protection. It is not feasible to keep the street dry during the 100-yr storm.
5. Provide typical cross-sections of 84th Street, 85th Street and Cholla Road.
6. Is the Cholla Detention basin part of this project? If no, please provide note "Design by others".
7. For the catch basin capacity calculations, provide a table showing the different lengths of the curb-opening catch basins with the respective spread and available public right-of-way. This table will help in comparing what may be an acceptable catch basin size and spread. To minimize the cost, we would try to maximize the spread to the available right-of-way.
8. On the Hydraulic Gradient Worksheet, the equivalent diameter for the 6'X3', and 7'X3' box culvert is different than I calculated. Please check your calculations.
9. Each hydraulic gradient worksheet shows two water surface elevations in the basin. Which was selected for the starting WSE for the storm drain? Please explain.
10. On section 5, the elevations and pipe invert slopes do not match the hydraulic profile shown on the reduced scale sheet. Please check.
11. Perform iterations for the catch basin calculations to show different spread with different length and different combinations of the catch basins. The efficient method will be to use as much of the street capacity as possible to reduce the number of catch basins. (Same as comment #7)
12. The connector pipe shall be designed for the same Q's as the catch basins. Some of the stations, the connector pipe Q's are different (i.e. Sta. 37+70, Sta. 36+15). Please check.

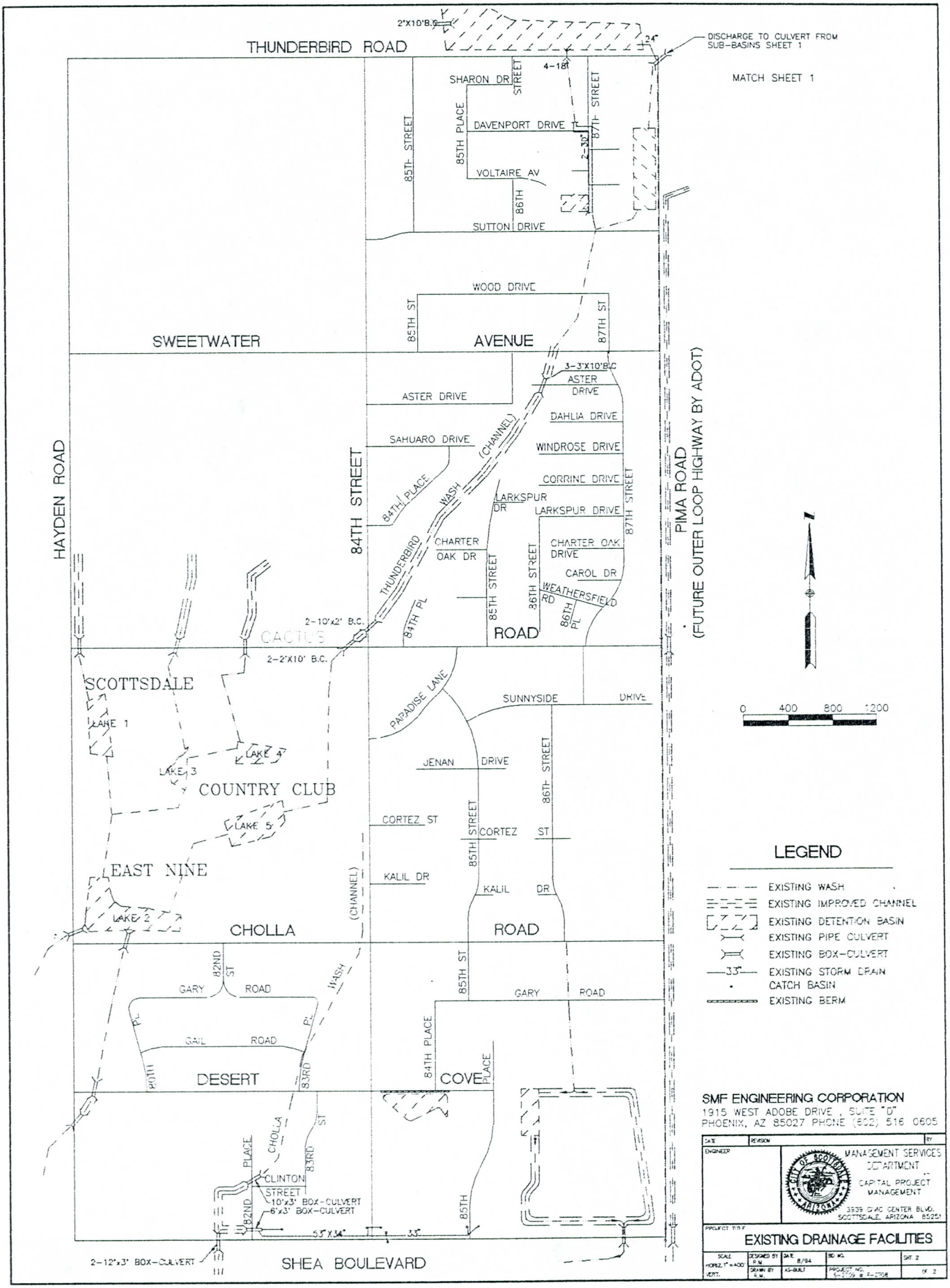
As we have stated in a previous letter, the District looks forward to increasing our presence in this project to the level specified in Section 10 of FCD IGA 94012, Scottsdale IGA 940060. To this end we look forward to an increased coordination effort and inclusion of the District in the decision making process as it relates to this project. If you have any questions please call me at 506-4768.

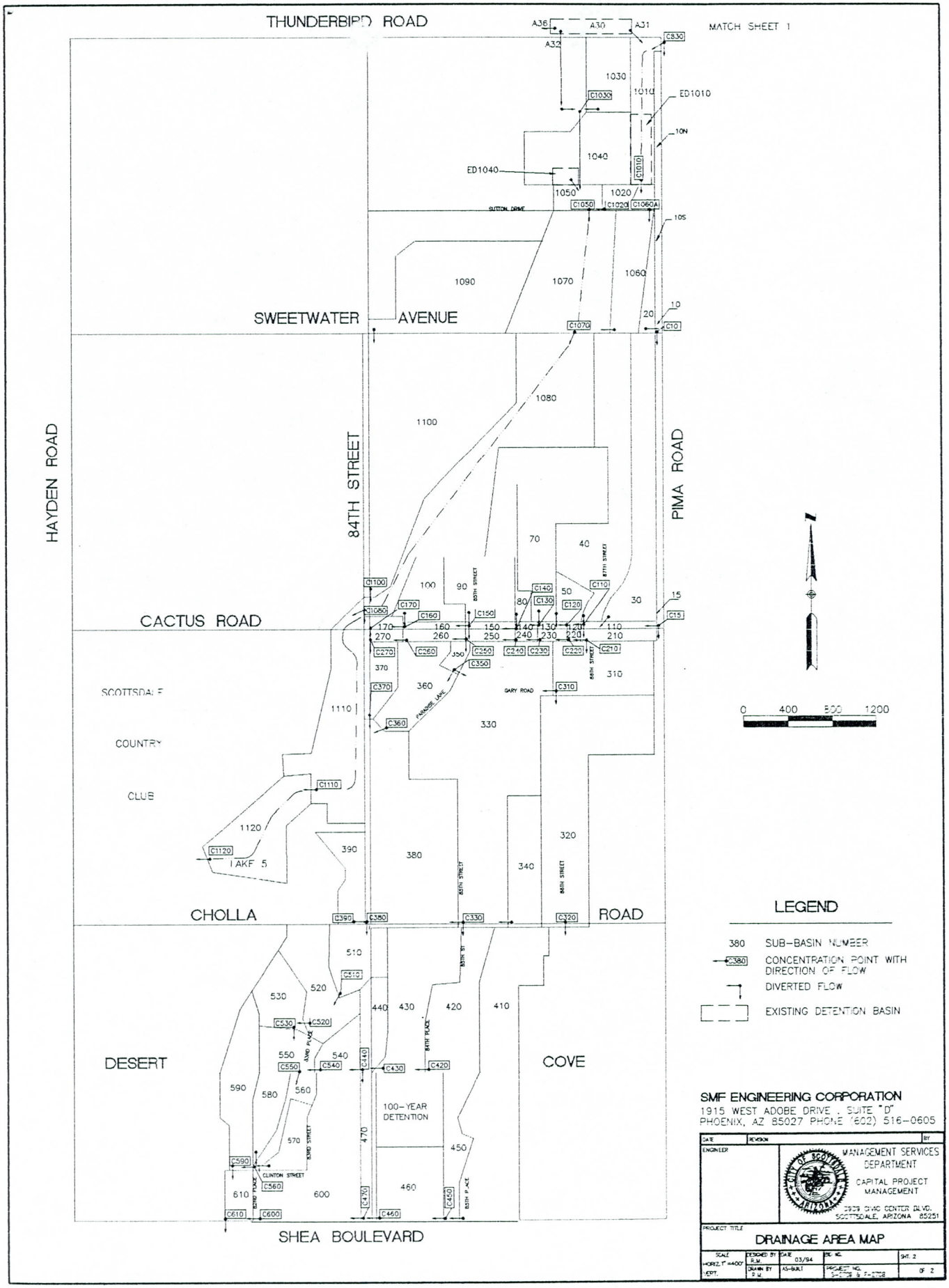
Sincerely,

H. Scott Clement, P.E.
Project Manager

Coord: GR 5/30/97

Info: AMM
AA
RCS


THUNDERBIRD ROAD
2'X10' B.C.
24"
DISCHARGE TO CULVERT FROM SUB-BASINS SHEET 1
MATCH SHEET 1
4-18"
SHARON DR
DAVENPORT DRIVE
VOLTAIRE AV
SUTTON DRIVE
85TH STREET
85TH PLACE
86TH
87TH STREET
2-30"
WOOD DRIVE
85TH ST
87TH ST
SWEETWATER
AVENUE
3-3'X10' B.C.
ASTER DRIVE
DAHLIA DRIVE
SAHUARO DRIVE
WINDROSE DRIVE
CORRINE DRIVE
LARKSPUR DR
LARKSPUR DRIVE
CHARTER OAK DR
CHARTER OAK DRIVE
CAROL DR
WEATHERSFIELD RD
86TH PL
84TH PLACE
84TH STREET
84TH PL
THUNDERBIRD WASH (CHANNEL)
HAYDEN ROAD
PIMA ROAD
(FUTURE OUTER LOOP HIGHWAY BY ADOT)
2-10'x2' B.C.
2-2'X10' B.C.
CACTUS
ROAD
SCOTTSDALE
LAKE 1
LAKE 3
LAKE 4
LAKE 5
LAKE 2
COUNTRY CLUB
EAST NINE
PARADISE LANE
SUNNYSIDE
DRIVE
JENAN
DRIVE
CORTEZ ST
CORTEZ
ST
KALIL DR
KALIL
DR
(CHANNEL)
CHOLLA
ROAD
82ND ST
GARY
ROAD
WASH
GAIL
ROAD
PL
PL
80TH
83RD
DESERT
COVE
PLACE
84TH PLACE
85TH ST
CHOLLA
PLACE
CLINTON
STREET
10'x3' BOX-CULVERT
6'x3' BOX-CULVERT
5.5'X34"
33"
2-12'x3' BOX-CULVERT
SHEA BOULEVARD
0 400 800 1200
LEGEND
EXISTING WASH
EXISTING IMPROVED CHANNEL
EXISTING DETENTION BASIN
EXISTING PIPE CULVERT
EXISTING BOX-CULVERT
EXISTING STORM DRAIN
CATCH BASIN
EXISTING BERM
SMF ENGINEERING CORPORATION
1915 WEST ADOBE DRIVE, SUITE "D"
PHOENIX, AZ 85027 PHONE (602) 516 0605
DATE
REVISION
BY
ENGINEER
CITY OF SCOTTSDALE ARIZONA
MANAGEMENT SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251
PROJECT TITLE
EXISTING DRAINAGE FACILITIES
SCALE HORIZ. 1" = 400' VERT.
DESIGNED BY R.M.
DRAWN BY R.M.
DATE 8/94
AS-BUILT
SHT. 2
OF 2


THUNDERBIRD ROAD
MATCH SHEET 1
SWEETWATER AVENUE
HAYDEN ROAD
84TH STREET
PIMA ROAD
CACTUS ROAD
SCOTTSDALE COUNTRY CLUB
LAKE 5
CHOLLA ROAD
DESERT COVE
SHEA BOULEVARD
SUTTON DRIVE
GARY ROAD
PARADISE LANE
CLINTON STREET
100-YEAR DETENTION
0 400 800 1200
LEGEND
380 SUB-BASIN NUMBER
C380 CONCENTRATION POINT WITH DIRECTION OF FLOW
DIVERTED FLOW
EXISTING DETENTION BASIN
SMF ENGINEERING CORPORATION
1915 WEST ADOBE DRIVE, SUITE "D"
PHOENIX, AZ 85027 PHONE (602) 516-0605
MANAGEMENT SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7575 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251
PROJECT TITLE
DRAINAGE AREA MAP
SCALE HORIZ. 1" =400'
DESIGNED BY R.M.
DATE 03/94
AS-BUILT
SHT. 2
OF 2