TECHNICAL ADDENDUM
FOR
WEST FORK JIMMY CAMP CREEK
DRAINAGE BASIN PLANNING STUDY

Prepared for:

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Prepared by:

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KIOWA Project No. 98.93
wfjc*.doc

June 1999
July 2000
November 2000
October 17, 2003

HEC-1 HYDROGRAPH PACKAGE
HYDROLOGIC CALCULATIONS

APPENDIX A

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1*****************************************
************************************
 *                                   *                                   *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                   *    U.S. ARMY
CORPS OF ENGINEERS     *
 *            SEPTEMBER 1990           *                                   *    HYDROLOGIC
ENGINEERING CENTER    *
 *             VERSION 4.0             *                                   *         609
SECOND STREET          *
 *                                   *                                   *       DAVIS,
CALIFORNIA 95616       *
 *  RUN DATE  10/19/1999  TIME  12:39:04 *                                   *
(916) 756-1104           *
 *                                   *                                   *
*
 ***************************************
************************************
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

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

  1           ID   WEST JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY
  2           ID   KIOWA ENGINEERING  -  PROJECT NO. 98.93
  3           ID   2, 5, 10 & 100 YEAR STORMS FILENAME: WFJCEX.DAT  EXISTING BASIN CONDITIONS
  4           ID   24HR STORM DURATION
              *DIAGRAM
  5           IT       5       0       0     250
  6           IO       5
  7           JR    PREC     .47     .56     .70       1

  8           KK   E1010
  9           BA     .05
 10           IN      15
 11           PB     4.4
 12           PC     0.0   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
 13           PC   .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
 14           PC   .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
 15           PC   .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
 16           PC   .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
 17           PC   .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
```

```
                18          PC   .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
                19          PC   .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
                20          PC   .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
                21          PC   .9963   .9975   .9988  1.0000
                22          LS      0    73.2
                23          UD    .392

                24          KK   E1020
                25          KM        RUNOFF FROM BAS 1020
                26          KO       0
                27          BA    .041
                28          LS       0    71.1
                29          UD    .467

                30          KK   E1030
                31          KM        RUNOFF FROM BAS 1030
                32          KO       0
                33          BA    .020
                34          LS       0    72.5
                35          UD    .383

                36          KK  DP1030
                37          KM        COMBINE FLOW FROM E1020 & ROUTED FLOW FROM E1030
                38          HC       2

                39          KK   E1040
                40          KM        RUNOFF FROM BAS 1040
                41          KO       0
                42          BA  .02171
                43          LS       0      75
                44          UD     .41
1                                                    HEC-1 INPUT
PAGE  2

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

                45          KK   E2010
                46          KM        RUNOFF FROM BAS 2010
                47          KO       0
                48          BA    .125
                49          LS       0      75
                50          UD    .350

                51          KK   R2020
                52          KM        ROUTE FLOW FROM E2010 TO DP2020
                53          KO       0
                54          RK     800     .03     .05            TRAP      20       10

                55          KK   E2020
                56          KM        RUNOFF FROM BASIN 2020
                57          KO       0
                58          BA    .062
                59          LS       0      68
                60          UD    .376

                61          KK  DP2020
                62          KM        COMBINE FLOW FROM E2010 & ROUTED FLOW FROM E2020
                63          HC       2

                64          KK   R2030
                65          KM        ROUTE FLOW FROM DP2020 TO DP2040
                66          RK     800    .0275     .05            TRAP      20        8

                67          KK   E2030
                68          KM        RUNOFF FROM BAS 2030
                69          KO       0
                70          BA    .021
                71          LS       0      69
                72          UD    .233
```

```
                73          KK   E2045
                74          KM        RUNOFF FROM BAS 2045
                75          KO       0
                76          BA     .061
                77          LS       0       85
                78          UD     .258

                79          KK   R2040
                80          KM        ROUTE FLOW FROM E2045 TO DP2040
                81          RK    1200    .0314      .04             TRAP       20        8

                82          KK   E2040
                83          KM        RUNOFF FROM BAS 2040
                84          KO       0
                85          BA     .026
                86          LS       0       69
                87          UD     .268
1                                                    HEC-1 INPUT
PAGE  3

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

                88          KK  DP2040
                89          KM        COMBINE FLOW FROM DP2020, E2030, E2045, E2040
                90          HC       4

                91          KK   R2050
                92          KM        ROUTE FLOW FROM DP2040 TO DP2060
                93          RK     600      .03      .03             TRAP       20        3

                94          KK   E2050
                95          KM        RUNOFF FROM BAS 2050
                96          KO       0
                97          BA     .020
                98          LS       0       69
                99          UD      .33

               100          KK   E2060
               101          KM        RUNOFF FROM BAS 2060
               102          KO       0
               103          BA     .024
               104          LS       0       69
               105          UD     .253

               106          KK  DP2060
               107          KM        COMBINE FLOW FROM DP2040, E2050, E2060
               108          HC       3

               109          KK   R2090
               110          KM        ROUTE FLOW FROM DP2060 TO DP2090
               111          RK     500     .023      .03             TRAP       30        3

               112          KK   E2070
               113          KM        RUNOFF FROM BAS 2070
               114          KO       0
               115          BA     .068
               116          LS       0       68
               117          UD     .463

               118          KK   R2080
               119          KM        ROUTE FLOW FROM E2070 TO DP2080
               120          RK    1220     .035      .04             TRAP       10        5

               121          KK   E2080
               122          KM        RUNOFF FROM BAS 2080
               123          KO       0
               124          BA     .057
               125          LS       0       69
               126          UD     .247
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                127          KK  DP2080
                128          KM        COMBINE FLOW FROM E2070, E2080
                129          HC       2
1                                                    HEC-1 INPUT
PAGE  4

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

                130          KK   E2090
                131          KM        RUNOFF FROM BAS 2090
                132          KO       0
                133          BA    .019
                134          LS       0       69
                135          UD    .414

                136          KK  DP2090
                137          KM        COMBINE FLOW FROM DP2060, DP2080, E2090
                138          HC       3

                139          KK   R2100
                140          KM        ROUTE FLOW FROM DP2090 TO DP2100
                141          RK    1800    .0169     .03            TRAP      60       4

                142          KK   E2110
                143          KM        RUNOFF FROM BAS 2110
                144          KO       0
                145          BA    .034
                146          LS       0       69
                147          UD    .329

                148          KK   R2101
                149          KM        ROUTE FLOW FROM E2110 TO DP2100
                150          RK     900    .025     .04            TRAP      40       5

                151          KK   E2100
                152          KM        RUNOFF FROM BAS 2100
                153          KO       0
                154          BA    .095
                155          LS       0       69
                156          UD    .482

                157          KK  DP2100
                158          KM        COMBINE FLOW FROM DP2090, E2110, E2100
                159          HC       3

                160          KK   E2120
                161          KM        RUNOFF FROM BAS 2120
                162          KO       0
                163          BA    .047
                164          LS       0       69
                165          UD    .288

                166          KK  DP2120
                167          KM        COMBINE FLOW FROM DP2100, E2120
                168          HC       2

                169          KK   R2120
                170          KM        ROUTE FLOW FROM DP2120 THROUGH LAKE
                171          RK    1000    .025     .04            TRAP      40       5
1                                                    HEC-1 INPUT
PAGE  5

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

                172          KK   R2130
                173          KM        ROUTE FLOW FROM DP2120 TO DP2130
                174          RK     550     .05     .04            TRAP       8       3

                175          KK   E2130
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176          KM        RUNOFF FROM BAS 2130
177          KO       0
178          BA     .010
179          LS       0      69
180          UD     .218

181          KK   DP2130
182          KM        COMBINE FLOW FROM DP2120, E2130
183          HC       2

184          KK    E2140
185          KM        RUNOFF FROM BAS 2140
186          KO       0
187          BA     .007
188          LS       0      69
189          UD      .16

190          KK    E2150
191          KM        RUNOFF FROM BAS 2150
192          KO       0
193          BA     .015
194          LS       0      75
195          UD     .259

196          KK    E2160
197          KM        RUNOFF FROM BAS 2160
198          KO       0
199          BA     .012
200          LS       0    72.6
201          UD     .162

202          KK   DP2160
203          HC       4

204          KK    R5010
205          KM        ROUTE FLOW FROM DP2160 TO DP5010
206          RK     2900    .015     .04            TRAP      20       4

207          KK    E3000
208          KM        RUNOFF FROM BAS 3000
209          KO       0
210          BA      .42
211          LS       0      77
212          UD     .414
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

213          KK    E3005
214          KM        RUNOFF FROM BASIN 3005
215          KO       0
216          BA      .24
217          LS       0      77
218          UD      .27

219          KK   DP3000
220          KM        COMBINE FLOW FROM E3000 AND E3005
221          HC       2

222          KK    R3015
223          KM        ROUTE FLOW FROM DP3000 TO DP3020
224          RK     3200    .031     .04            TRAP      15       3

225          KK    E3015
226          KM        RUNOFF FROM BASIN 3015
227          KO       0
228          BA      .11
229          LS       0      77
230          UD      .21
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231          KK   E3010
232          KM        RUNOFF FROM BAS 3010
233          KO        0
234          BA      .22
235          LS        0     75.1
236          UD      .28

237          KK   R3012
238          KM        ROUTE FLOW FROM E3010 TO DP 3020
239          RK     2600      .03      .04            TRAP       15        3

240          KK   E3012
241          KM        RUNOFF FROM BASIN E3012
242          KO        0
243          BA      .21
244          LS        0     75.1
245          UD      .47

246          KK   E3020
247          KM        RUNOFF FROM BAS 3020
248          KO        0
249          BA     .188
250          LS        0       77
251          UD      .36

252          KK   R3025
253          KM        ROUTE FLOW FROM BASIN E3020 TO DP 3020
254          RK     2600     .035      .04            TRAP       15        3
1                                          HEC-1 INPUT
PAGE  7

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

255          KK   E3025
256          KM        RUNOFF FROM BASIN E3025
257          KO        0
258          BA      .26
259          LS        0     72.2
260          UD      .23

261          KK  DP3020
262          KM        COMBINE FLOW FROM E3015, E3012, E3025, R3015, R3012 AND R3025
263          HC        6

264          KK   R3030
265          KM        ROUTE FLOW FROM DP3020 TO DP3030
266          RK     3000      .05      .04            TRAP       20       10

267          KK   E3030
268          KM        RUNOFF FROM BAS 3030
269          KO        0
270          BA      .26
271          LS        0     72.2
272          UD      .34

273          KK   E3035
274          KM        RUNOFF FROM BASIN E3035
275          KO        0
276          BA      .16
277          LS        0     72.2
278          UD      .16

279          KK  DP3030
280          KM        COMBINE FLOW FROM R3030, E3030 AND E3035
281          HC        3

282          KK   R3040
283          KM        ROUTE FLOW FROM DP 3030 TO DP 3040
284          RK     1450      .03      .03            TRAP       30        5
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                285          KK   E3040
                286          KM        RUNOFF FROM BAS 3040
                287          KO       0
                288          BA     .115
                289          LS       0     69.3
                290          UD     .294

                291          KK  DP3040
                292          KM        COMBINE FLOW FROM R3040, E3040
                293          HC       2

                294          KK   R3050
                295          KM        ROUTE FLOW FROM DP3040 TO DP3050
                296          RK    2850     .009      .03            TRAP       10        7
1                                                    HEC-1 INPUT
PAGE  8

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

                297          KK   E3050
                298          KM        RUNOFF FROM BAS 3050
                299          KO       0
                300          BA     .049
                301          LS       0     77.5
                302          UD     .371

                303          KK  DP3050
                304          KM        COMBINE FLOW FROM DP3040, E3050
                305          HC       2

                306          KK   E3060
                307          KM        RUNOFF FROM BAS 3060
                308          KO       0
                309          BA     .119
                310          LS       0     75.4
                311          UD     .257

                312          KK   R3070
                313          KM        ROUTE FLOW FROM E3060 TO DP3070
                314          RK    2000     .009      .04            TRAP       30        10

                315          KK   E3070
                316          KM        RUNOFF FROM BAS 3070
                317          KO       0
                318          BA     .077
                319          LS       0     77.1
                320          UD     .486

                321          KK  DP3070
                322          KM        COMBINE FLOW FROM R3070, E3070
                323          HC       2

                324          KK   R3080
                325          KM        ROUTE FLOW FROM DP3070 TO DP3080
                326          RK     350      .01      .04            TRAP       30        10

                327          KK   E3080
                328          KM        RUNOFF FROM BAS 3080
                329          KO       0
                330          BA     .050
                331          LS       0     75.4
                332          UD     .355

                333          KK  DP3080
                334          KM        COMBINE FLOW FROM R3080, E3080
                335          HC       2

                336          KK   R3090
                337          KM        ROUTE FLOW FROM DP3080 TO DP3090
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          338          RK    1750     .01     .03           TRAP      30       10
1                                                HEC-1 INPUT
PAGE  9

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

          339          KK   E3090
          340          KM        RUNOFF FROM BAS 3090
          341          KO       0
          342          BA     .082
          343          LS       0   76.85
          344          UD     .411

          345          KK  DP3090
          346          KM        COMBINE FLOW FROM DP3090, E3090
          347          HC       2

          348          KK  DP3091
          349          KM        COMBINE FLOW FROM DP3050, DP3090
          350          HC       2

          351          KK   R3100
          352          KM        ROUTE FLOW FROM DP3091 TO DP3100
          353          RK     350     .01     .03           TRAP      10       10

          354          KK   E3100
          355          KM        RUNOFF FROM BAS 3100
          356          KO       0
          357          BA     .095
          358          LS       0   75.75
          359          UD     .303

          360          KK  DP3100
          361          KM        COMBINE FLOW FROM DP3090, E3100
          362          KO       0
          363          HC       2

          364          KK   E3110
          365          KM        RUNOFF FROM BAS 3110
          366          KO       0
          367          BA     .018
          368          LS       0   75.15
          369          UD     .472

          370          KK  DP3110
          371          KM        COMBINE FLOW FROM E3110 AND DP3100
          372          HC       2

          373          KK   R5010
          374          KM        ROUTE FLOW FROM DP3110 TO DP5010
          375          RK    2900    .015     .04           TRAP      20       4

          376          KK   E5011
          377          KM        RUNOFF FROM BAS E5010
          378          KO       0
          379          BA     .156
          380          LS       0      74
          381          UD      .50
1                                                HEC-1 INPUT
PAGE 10

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

          382          KK  DP5010
          383          KM        COMBINE FLOW FROM E5010, R5011, R5010
          384          HC       3

          385          KK   E5020
          386          KM        RUNOFF FROM BASIN 5020
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387          KO       0
388          BA      .2
389          LS       0      74
390          UD      .4

391          KK   E4010
392          KM        RUNOFF FROM BAS 4010
393          KO       0
394          BA     .19
395          LS       0   72.75
396          UD    .497

397          KK   R4020
398          KM        ROUTE FLOW FROM E4010 TO DP4020
399          RK    2400    .005     .05            TRAP      10       30

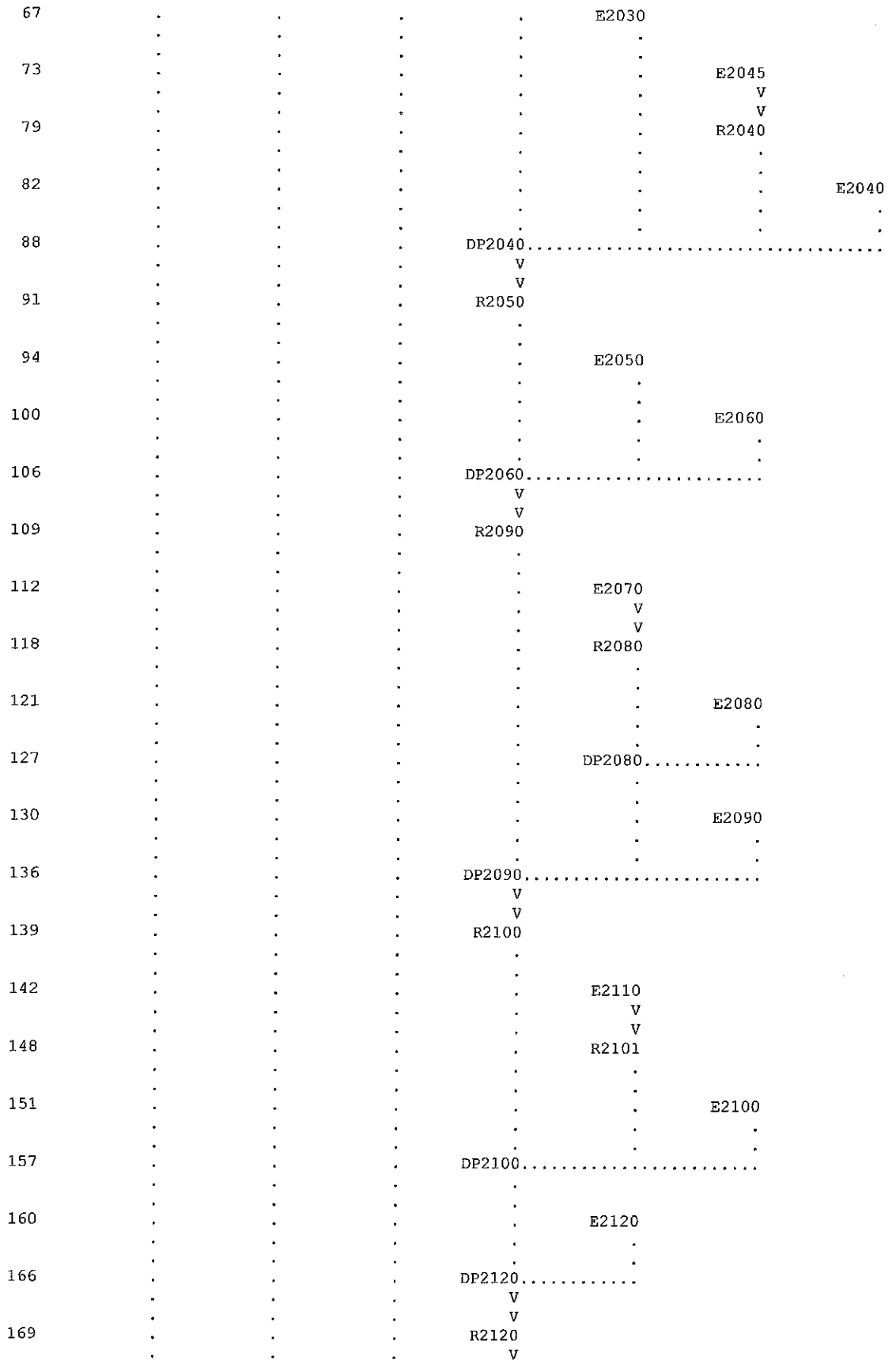
400          KK   E4020
401          KM        RUNOFF FROM BAS 4020
402          KO       0
403          BA    .135
404          LS       0   76.65
405          UD    .822

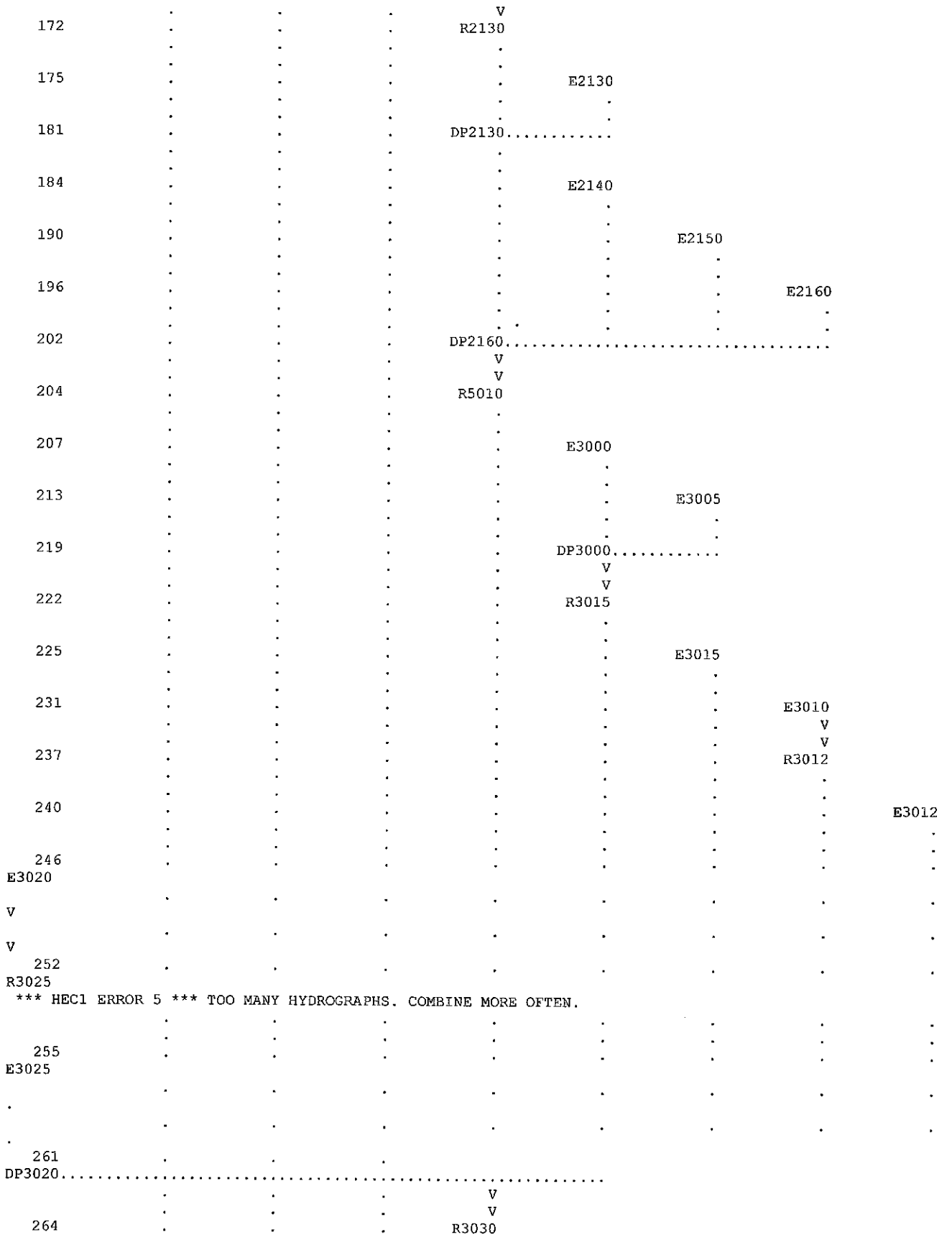
406          KK  DP4020
407          KM        COMBINE FLOW FROM R4020, E4020
408          HC       2

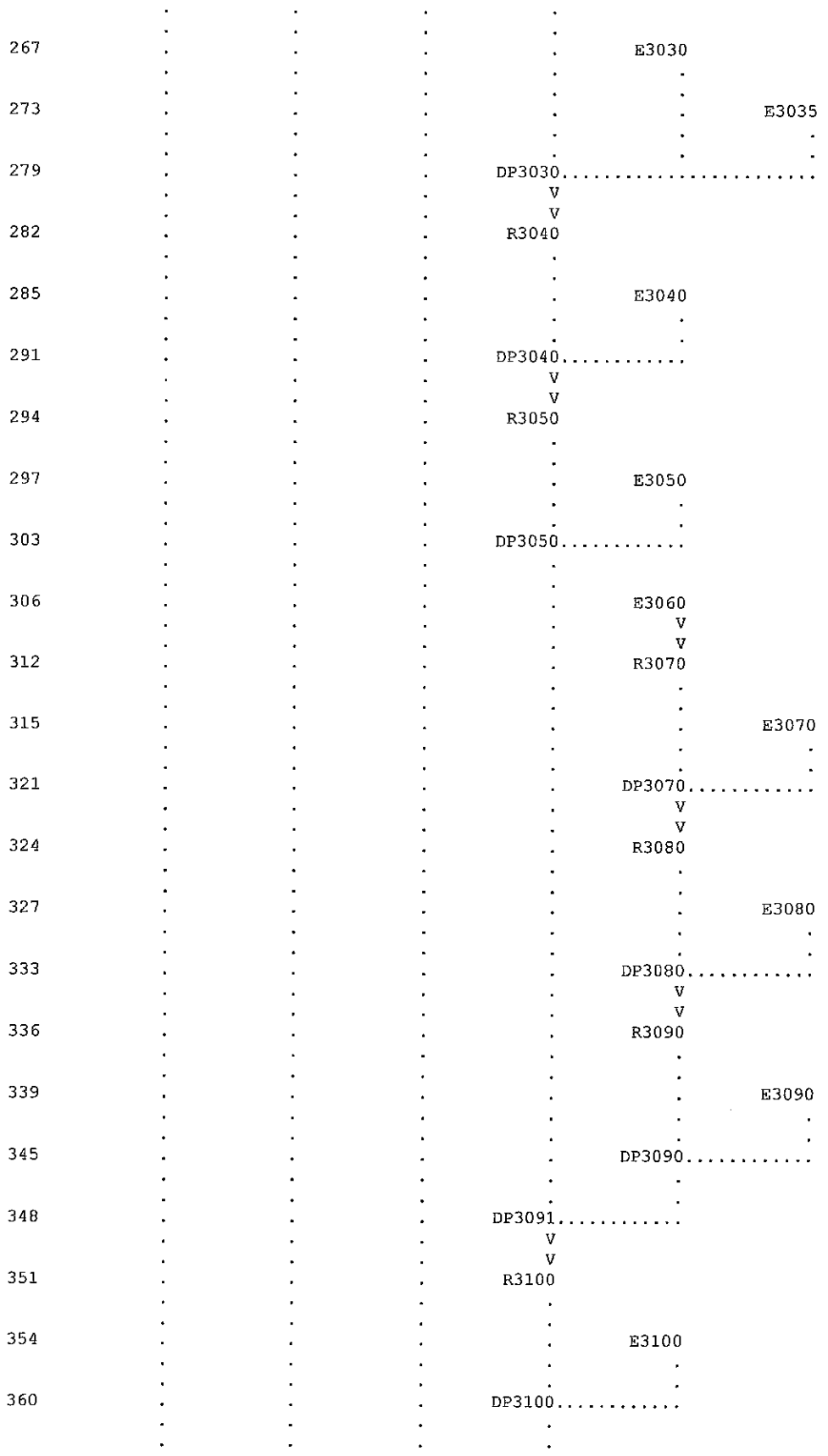
409          KK   E4030
410          KM        RUNOFF FROM BAS 4030
411          KO       0
412          BA    .018
413          LS       0   75.65
414          UD    .251
415          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

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

     8       E1010
                .
                .
    24          .       E1020
                .          .
                .          .
    30          .          .       E1030
                .          .          .
                .          .          .
    36          .      DP1030.....    .
                .          .          .
                .          .          .
    39          .          .       E1040
                .          .          .
                .          .          .
    45          .          .          .       E2010
                .          .          .          V
                .          .          .          V
    51          .          .          .       R2020
                .          .          .          .
                .          .          .          .
    55          .          .          .          .       E2020
                .          .          .          .          .
                .          .          .          .          .
    61          .          .          .      DP2020.....    .
                .          .          .          V          .
                .          .          .          V          .
    64          .          .          .       R2030         .
                .          .          .          .          .
                .          .          .          .          .
```


67
E2030
73
E2045
79
R2040
82
E2040
88
DP2040
91
R2050
94
E2050
100
E2060
106
DP2060
109
R2090
112
E2070
118
R2080
121
E2080
127
DP2080
130
E2090
136
DP2090
139
R2100
142
E2110
148
R2101
151
E2100
157
DP2100
160
E2120
166
DP2120
169
R2120


172
R2130
175
E2130
181
DP2130
184
E2140
190
E2150
196
E2160
202
DP2160
204
R5010
207
E3000
213
E3005
219
DP3000
222
R3015
225
E3015
231
E3010
237
R3012
240
E3012
246
E3020
252
R3025
*** HEC1 ERROR 5 *** TOO MANY HYDROGRAPHS. COMBINE MORE OFTEN.
255
E3025
261
DP3020
264
R3030


267
E3030
273
E3035
279
DP3030
282
R3040
285
E3040
291
DP3040
294
R3050
297
E3050
303
DP3050
306
E3060
312
R3070
315
E3070
321
DP3070
324
R3080
327
E3080
333
DP3080
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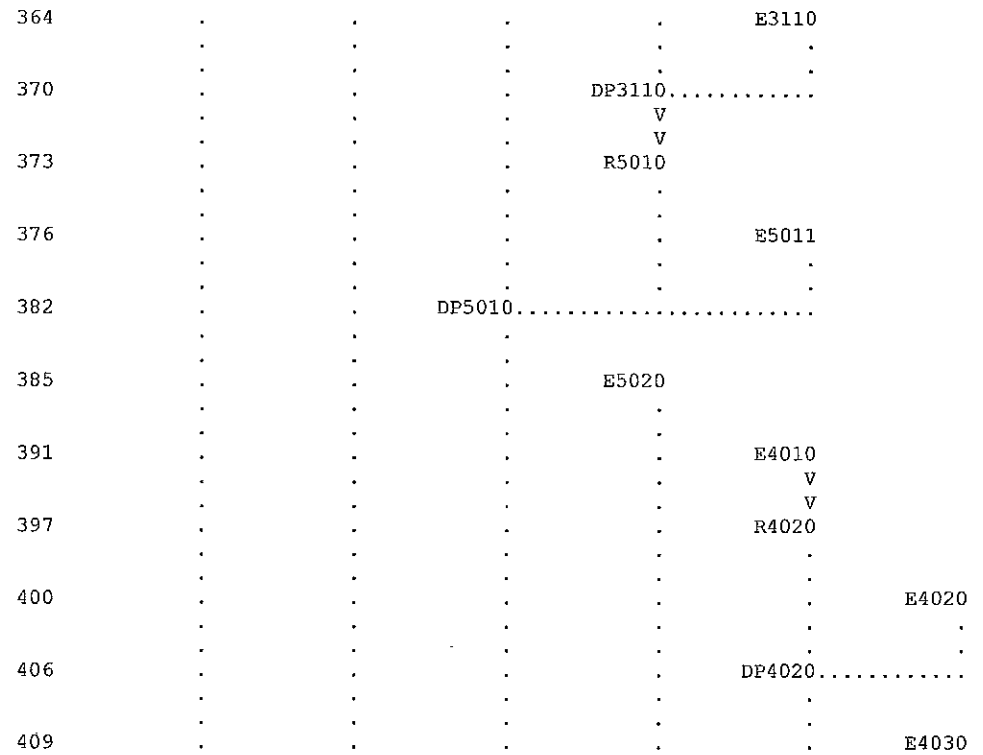
DP3091
351
R3100
354
E3100
360
DP3100



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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 .47	RATIO 2 .56	RATIO 3 .70	RATIO 4 1.00
HYDROGRAPH AT								
+	E1010	.05	1	FLOW	7.	12.	22.	49.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E1020	.04	1	FLOW	4.	7.	14.	32.
				TIME	6.42	6.42	6.33	6.33
HYDROGRAPH AT								
+	E1030	.02	1	FLOW	3.	5.	9.	19.
				TIME	6.33	6.33	6.25	6.25
2 COMBINED AT								
+	DP1030	.06 ,	1	FLOW	6.	12.	22.	50.
				TIME	6.42	6.33	6.33	6.33
HYDROGRAPH AT								
+	E1040	.02	1	FLOW	4.	6.	11.	22.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2010	.13	1	FLOW	24.	40.	68.	142.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2020	.13	1	FLOW	23.	38.	67.	142.
				TIME	6.33	6.33	6.25	6.25

HYDROGRAPH AT								
+	E2020	.06	1	FLOW	4.	9.	18.	47.
				TIME	6.33	6.33	6.25	6.25
2 COMBINED AT								
+	DP2020	.19	1	FLOW	28.	47.	86.	189.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R2030	.19	1	FLOW	27.	47.	84.	185.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2030	.02	1	FLOW	2.	5.	9.	22.
				TIME	6.17	6.17	6.17	6.08
HYDROGRAPH AT								
+	E2045	.06	1	FLOW	35.	48.	70.	124.
				TIME	6.17	6.17	6.08	6.08
ROUTED TO								
+	R2040	.06	1	FLOW	34.	48.	70.	121.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2040	.03	1	FLOW	3.	5.	11.	26.
				TIME	6.25	6.17	6.17	6.17
4 COMBINED AT								
+	DP2040	.30	1	FLOW	61.	97.	164.	335.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2050	.30	1	FLOW	60.	96.	163.	333.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2050	.02	1	FLOW	2.	4.	7.	17.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2060	.02	1	FLOW	3.	5.	10.	24.
				TIME	6.17	6.17	6.17	6.17
3 COMBINED AT								
+	DP2060	.34	1	FLOW	64.	105.	180.	372.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2090	.34	1	FLOW	63.	104.	179.	371.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2070	.07	1	FLOW	4.	8.	18.	44.
				TIME	6.42	6.42	6.42	6.33
ROUTED TO								
+	R2080	.07	1	FLOW	4.	8.	17.	44.
				TIME	6.50	6.50	6.42	6.42
HYDROGRAPH AT								
+	E2080	.06	1	FLOW	6.	12.	25.	58.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP2080	.13	1	FLOW	8.	17.	35.	88.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E2090	.02	1	FLOW	1.	3.	6.	14.

				TIME	6.42	6.33	6.33	6.33
3 COMBINED AT								
+	DP2090	.48	1	FLOW	72.	123.	219.	473.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2100	.48	1	FLOW	72.	122.	213.	471.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2110	.03	1	FLOW	3.	6.	12.	29.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2101	.03	1	FLOW	3.	6.	12.	29.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2100	.09	1	FLOW	6.	13.	26.	64.
				TIME	6.50	6.42	6.42	6.33
3 COMBINED AT								
+	DP2100	.61	1	FLOW	81.	140.	250.	558.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2120	.05	1	FLOW	5.	9.	18.	45.
				TIME	6.25	6.25	6.17	6.17
2 COMBINED AT								
+	DP2120	.66	1	FLOW	85.	148.	265.	600.
				TIME	6.33	6.33	6.33	6.25
ROUTED TO								
+	R2120	.66	1	FLOW	84.	145.	265.	591.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R2130	.66	1	FLOW	83.	143.	264.	586.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2130	.01	1	FLOW	1.	2.	5.	11.
				TIME	6.17	6.17	6.17	6.08
2 COMBINED AT								
+	DP2130	.67	1	FLOW	84.	145.	267.	594.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2140	.01	1	FLOW	1.	2.	4.	9.
				TIME	6.08	6.08	6.08	6.08
HYDROGRAPH AT								
+	E2150	.01	1	FLOW	4.	6.	10.	20.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2160	.01	1	FLOW	3.	5.	9.	18.
				TIME	6.08	6.08	6.08	6.08
4 COMBINED AT								
+	DP2160	.70	1	FLOW	87.	151.	277.	624.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R5010	.70	1	FLOW	86.	150.	274.	617.
				TIME	6.50	6.42	6.42	6.33
HYDROGRAPH AT								

+	E3000	.42	1	FLOW	88.	140.	233.	474.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E3005	.24	1	FLOW	68.	107.	176.	347.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP3000	.66	1	FLOW	147.	233.	388.	779.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R3015	.66	1	FLOW	145.	228.	383.	777.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3015	.11	1	FLOW	35.	55.	91.	181.
				TIME	6.08	6.08	6.08	6.08
HYDROGRAPH AT								
+	E3010	.22	1	FLOW	49.	81.	140.	288.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3012	.22	1	FLOW	48.	80.	136.	279.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3012	.21	1	FLOW	33.	54.	94.	199.
				TIME	6.42	6.42	6.33	6.33
HYDROGRAPH AT								
+	E3020	.19	1	FLOW	44.	69.	115.	231.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R3025	.19	1	FLOW	43.	68.	113.	228.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E3025	.26	1	FLOW	47.	82.	147.	324.
				TIME	6.17	6.17	6.17	6.08
6 COMBINED AT								
+	DP3020	1.65	1	FLOW	321.	528.	901.	1857.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R3030	1.65	1	FLOW	319.	516.	885.	1846.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3030	.26	1	FLOW	36.	65.	119.	262.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3035	.16	1	FLOW	36.	63.	111.	234.
				TIME	6.08	6.08	6.08	6.08
3 COMBINED AT								
+	DP3030	2.07	1	FLOW	367.	601.	1058.	2216.
				TIME	6.33	6.25	6.25	6.25
ROUTED TO								
+	R3040	2.07	1	FLOW	362.	598.	1044.	2213.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3040	.12	1	FLOW	12.	23.	45.	110.
				TIME	6.25	6.25	6.17	6.17

2 COMBINED AT								
+	DP3040	2.18	1	FLOW	373.	618.	1089.	2316.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R3050	2.18	1	FLOW	369.	609.	1075.	2290.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E3050	.05	1	FLOW	12.	18.	31.	61.
				TIME	6.25	6.25	6.25	6.25
2 COMBINED AT								
+	DP3050	2.23	1	FLOW	379.	627.	1104.	2351.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E3060	.12	1	FLOW	29.	48.	81.	163.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3070	.12	1	FLOW	28.	45.	79.	161.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3070	.08	1	FLOW	15.	23.	38.	78.
				TIME	6.42	6.42	6.33	6.33
2 COMBINED AT								
+	DP3070	.20	1	FLOW	42.	67.	114.	235.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R3080	.20	1	FLOW	41.	67.	112.	233.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3080	.05	1	FLOW	10.	16.	28.	58.
				TIME	6.25	6.25	6.25	6.25
2 COMBINED AT								
+	DP3080	.25	1	FLOW	50.	82.	139.	290.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R3090	.25	1	FLOW	50.	81.	139.	283.
				TIME	6.42	6.42	6.33	6.33
HYDROGRAPH AT								
+	E3090	.08	1	FLOW	17.	27.	45.	93.
				TIME	6.33	6.33	6.33	6.25
2 COMBINED AT								
+	DP3090	.33	1	FLOW	66.	106.	184.	373.
				TIME	6.42	6.42	6.33	6.33
2 COMBINED AT								
+	DP3091	2.56	1	FLOW	445.	732.	1288.	2722.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R3100	2.56	1	FLOW	443.	727.	1285.	2714.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E3100	.09	1	FLOW	21.	35.	60.	123.
				TIME	6.25	6.17	6.17	6.17
2 COMBINED AT								
+	DP3100	2.66	1	FLOW	458.	757.	1334.	2828.
				TIME	6.42	6.33	6.33	6.25

2 COMBINED AT								
+	DP3110	2.67	1	FLOW	461.	761.	1342.	2845.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R5010	2.67	1	FLOW	454.	758.	1311.	2800.
				TIME	6.50	6.42	6.33	6.33
HYDROGRAPH AT								
+	E5011	.16	1	FLOW	20.	35.	62.	133.
				TIME	6.42	6.42	6.42	6.33
3 COMBINED AT								
+	DP5010	3.53	1	FLOW	561.	943.	1640.	3550.
				TIME	6.50	6.42	6.33	6.33
HYDROGRAPH AT								
+	E5020	.20	1	FLOW	31.	52.	92.	200.
				TIME	6.33	6.33	6.33	6.25
2 COMBINED AT								
+	DP5011	3.73	1	FLOW	587.	992.	1732.	3745.
				TIME	6.50	6.42	6.33	6.33
HYDROGRAPH AT								
+	E4010	.19	1	FLOW	21.	38.	69.	153.
				TIME	6.42	6.42	6.42	6.33
ROUTED TO								
+	R4020	.19	1	FLOW	21.	37.	68.	151.
				TIME	6.83	6.75	6.67	6.58
HYDROGRAPH AT								
+	E4020	.14	1	FLOW	16.	26.	44.	90.
				TIME	6.83	6.75	6.75	6.67
2 COMBINED AT								
+	DP4020	.32	1	FLOW	38.	63.	112.	238.
				TIME	6.83	6.75	6.67	6.58
HYDROGRAPH AT								
+	E4030	.02	1	FLOW	5.	7.	12.	25.
				TIME	6.17	6.17	6.17	6.17
1								

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

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1*****************************************
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 *                                  *                                                  *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARMY
CORPS OF ENGINEERS      *
 *            SEPTEMBER 1990            *                                                  *    HYDROLOGIC
ENGINEERING CENTER    *
 *             VERSION 4.0              *                                                  *          609
SECOND STREET          *
 *                                      *                                                  *       DAVIS,
CALIFORNIA 95616       *
 *  RUN DATE  10/19/1999  TIME  12:41:18 *                                                  *           (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

1 HEC-1 INPUT
PAGE 1

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

            1           ID   WEST JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY
            2           ID   KIOWA ENGINEERING  -  PROJECT NO. 98.93
            3           ID   2, 5, 10 & 100 YEAR STORMS FILENAME: WFJCFUT.DAT DEV BASIN CONDITION
            4           ID   24HR STORM DURATION  NO DETENTION
                        *DIAGRAM
            5           IT       5       0       0     250
            6           IO       5
            7           JR    PREC     .47     .56     .70       1

            8           KK   E1010
            9           BA     .05
           10           IN      15
           11           PB     4.4
           12           PC     0.0   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
           13           PC   .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
           14           PC   .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
           15           PC   .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
           16           PC   .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
           17           PC   .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
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18          PC   .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
19          PC   .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
20          PC   .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
21          PC   .9963   .9975   .9988  1.0000
22          LS      0    73.2
23          UD    .392

24          KK   E1020
25          KM        RUNOFF FROM BAS 1020
26          KO       0
27          BA    .041
28          LS       0    88.8
29          UD    .467

30          KK   E1030
31          KM        RUNOFF FROM BAS 1030
32          KO       0
33          BA    .020
34          LS       0      80
35          UD    .383

36          KK  DP1030
37          KM        COMBINE FLOW FROM E1020 & ROUTED FLOW FROM E1030
38          HC       2

39          KK   E1040
40          KM        RUNOFF FROM BAS 1040
41          KO       0
42          BA  .02171
43          LS       0      75
44          UD     .41
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LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

45          KK   E2010
46          KM        RUNOFF FROM BAS 2010
47          KO       0
48          BA    .125
49          LS       0      75
50          UD    .350

51          KK   R2020
52          KM        ROUTE FLOW FROM E2010 TO DP2020
53          KO       0
54          RK    800     .03     .05            TRAP      20      10

55          KK   E2020
56          KM        RUNOFF FROM BASIN 2020
57          KO       0
58          BA    .062
59          LS       0      75
60          UD    .376

61          KK  DP2020
62          KM        COMBINE FLOW FROM E2010 & ROUTED FLOW FROM E2020
63          HC       2

64          KK   R2030
65          KM        ROUTE FLOW FROM DP2020 TO DP2040
66          RK    800   .0275     .05            TRAP      20       8

67          KK   E2030
68          KM        RUNOFF FROM BAS 2030
69          KO       0
70          BA    .021
71          LS       0      71
72          UD    .233
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                73          KK   E2045
                74          KM        RUNOFF FROM BAS 2045
                75          KO        0
                76          BA     .061
                77          LS        0       85
                78          UD     .258

                79          KK   R2040
                80          KM        ROUTE FLOW FROM E2045 TO DP2040
                81          RK     1200    .0314      .04             TRAP       20        8

                82          KK   E2040
                83          KM        RUNOFF FROM BAS 2040
                84          KO        0
                85          BA     .026
                86          LS        0       71
                87          UD     .268
1                                                    HEC-1 INPUT
PAGE  3

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

                88          KK  DP2040
                89          KM        COMBINE FLOW FROM DP2020, E2030, E2045, E2040
                90          HC        4

                91          KK   R2050
                92          KM        ROUTE FLOW FROM DP2040 TO DP2060
                93          RK      600      .03      .03             TRAP       20        3

                94          KK   E2050
                95          KM        RUNOFF FROM BAS 2050
                96          KO        0
                97          BA     .020
                98          LS        0       71
                99          UD      .33

               100          KK   E2060
               101          KM        RUNOFF FROM BAS 2060
               102          KO        0
               103          BA     .024
               104          LS        0     73.1
               105          UD     .253

               106          KK  DP2060
               107          KM        COMBINE FLOW FROM DP2040, E2050, E2060
               108          HC        3

               109          KK   R2090
               110          KM        ROUTE FLOW FROM DP2060 TO DP2090
               111          RK      500     .023      .03             TRAP       30        3

               112          KK   E2070
               113          KM        RUNOFF FROM BAS 2070
               114          KO        0
               115          BA     .068
               116          LS        0       75
               117          UD     .463

               118          KK   R2080
               119          KM        ROUTE FLOW FROM E2070 TO DP2080
               120          RK     1220     .035      .04             TRAP       10        5

               121          KK   E2080
               122          KM        RUNOFF FROM BAS 2080
               123          KO        0
               124          BA     .057
               125          LS        0       71
               126          UD     .247
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                127          KK  DP2080
                128          KM        COMBINE FLOW FROM E2070, E2080
                129          HC       2
1
PAGE  4                                                HEC-1 INPUT

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

                130          KK   E2090
                131          KM        RUNOFF FROM BAS 2090
                132          KO       0
                133          BA    .019
                134          LS       0       75
                135          UD    .414

                136          KK  DP2090
                137          KM        COMBINE FLOW FROM DP2060, DP2080, E2090
                138          HC       3

                139          KK   R2100
                140          KM        ROUTE FLOW FROM DP2090 TO DP2100
                141          RK    1800    .0169     .03            TRAP       60        4

                142          KK   E2110
                143          KM        RUNOFF FROM BAS 2110
                144          KO       0
                145          BA    .034
                146          LS       0       71
                147          UD    .329

                148          KK   R2101
                149          KM        ROUTE FLOW FROM E2110 TO DP2100
                150          RK     900    .025     .04            TRAP       40        5

                151          KK   E2100
                152          KM        RUNOFF FROM BAS 2100
                153          KO       0
                154          BA    .095
                155          LS       0    75.3
                156          UD    .482

                157          KK  DP2100
                158          KM        COMBINE FLOW FROM DP2090, E2110, E2100
                159          HC       3

                160          KK   E2120
                161          KM        RUNOFF FROM BAS 2120
                162          KO       0
                163          BA    .047
                164          LS       0       69
                165          UD    .288

                166          KK  DP2120
                167          KM        COMBINE FLOW FROM DP2100, E2120
                168          HC       2

                169          KK   R2120
                170          KM        ROUTE FLOW FROM DP2120 THROUGH LAKE
                171          RK    1000    .025     .04            TRAP       40        5
1
PAGE  5                                                HEC-1 INPUT

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

                172          KK   R2130
                173          KM        ROUTE FLOW FROM DP2120 TO DP2130
                174          RK     550     .05     .04            TRAP        8        3

                175          KK   E2130
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176          KM        RUNOFF FROM BAS 2130
177          KO        0
178          BA     .010
179          LS        0       69
180          UD     .218

181          KK   DP2130
182          KM        COMBINE FLOW FROM DP2120, E2130
183          HC        2

184          KK    E2140
185          KM        RUNOFF FROM BAS 2140
186          KO        0
187          BA     .007
188          LS        0       69
189          UD      .16

190          KK    E2150
191          KM        RUNOFF FROM BAS 2150
192          KO        0
193          BA     .015
194          LS        0     76.3
195          UD     .259

196          KK    E2160
197          KM        RUNOFF FROM BAS 2160
198          KO        0
199          BA     .012
200          LS        0       92
201          UD     .162

202          KK   DP2160
203          HC        4

204          KK    R5010
205          KM        ROUTE FLOW FROM DP2160 TO DP5010
206          RK     2900     .015      .04             TRAP       20        4

207          KK    E3000
208          KM        RUNOFF FROM BAS 3000
209          KO        0
210          BA      .42
211          LS        0       81
212          UD     .414
```


HEC-1 INPUT

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

213          KK    E3005
214          KM        RUNOFF FROM BASIN 3005
215          KO        0
216          BA      .24
217          LS        0       81
218          UD      .27

219          KK   DP3000
220          KM        COMBINE FLOW FROM E3000 AND E3005
221          HC        2

222          KK    R3015
223          KM        ROUTE FLOW FROM DP3000 TO DP3020
224          RK     3200     .031      .04             TRAP       15        3

225          KK    E3015
226          KM        RUNOFF FROM BASIN 3015
227          KO        0
228          BA      .11
229          LS        0       81
230          UD      .21
```

```
231          KK  DP3020
232          KM        COMBINE FLOW FROM BASIN 3015 AND R3015
233          HC       2

234          KK   E3010
235          KM        RUNOFF FROM BAS 3010
236          KO       0
237          BA     .22
238          LS       0       82
239          UD     .28

240          KK   R3012
241          KM        ROUTE FLOW FROM E3010 TO DP 3020
242          RK    2600      .03      .04            TRAP       15        3

243          KK   E3012
244          KM        RUNOFF FROM BASIN E3012
245          KO       0
246          BA     .21
247          LS       0       82
248          UD     .47

249          KK   E3020
250          KM        RUNOFF FROM BAS 3020
251          KO       0
252          BA    .188
253          LS       0       93
254          UD     .36
1                                          HEC-1 INPUT
PAGE  7

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

255          KK   R3025
256          KM        ROUTE FLOW FROM BASIN E3020 TO DP 3020
257          RK    2600     .035      .04            TRAP       15        3

258          KK   E3025
259          KM        RUNOFF FROM BASIN E3025
260          KO       0
261          BA     .26
262          LS       0       93
263          UD     .23

264          KK  DP3020
265          KM        COMBINE FLOW FROM DP3020, E3012, E3025, R3012 AND R3025
266          HC       5

267          KK   R3030
268          KM        ROUTE FLOW FROM DP3020 TO DP3030
269          RK    3000      .05      .04            TRAP       20       10

270          KK   E3030
271          KM        RUNOFF FROM BAS 3030
272          KO       0
273          BA     .26
274          LS       0       79
275          UD     .34

276          KK   E3035
277          KM        RUNOFF FROM BASIN E3035
278          KO       0
279          BA     .16
280          LS       0       79
281          UD     .16

282          KK  DP3030
283          KM        COMBINE FLOW FROM R3030, E3030 AND E3035
284          HC       3
```

```
                285          KK   R3040
                286          KM        ROUTE FLOW FROM DP3030 TO DP 3050
                287          RK    1450      .03      .03             TRAP       30        5

                288          KK   E3040
                289          KM        RUNOFF FROM BAS 3040
                290          KO        0
                291          BA     .115
                292          LS        0     72.3
                293          UD     .294

                294          KK  DP3040
                295          KM        COMBINE FLOW FROM R3040, E3040
                296          HC        2
1
PAGE  8                                                  HEC-1 INPUT

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


                297          KK   R3050
                298          KM        ROUTE FLOW FROM DP3040 TO DP3050
                299          RK    2850     .009      .03             TRAP       10        7

                300          KK   E3050
                301          KM        RUNOFF FROM BAS 3050
                302          KO        0
                303          BA     .074
                304          LS        0     87.3
                305          UD     .371

                306          KK  DP3050
                307          KM        COMBINE FLOW FROM DP3050, E3050
                308          HC        2

                309          KK   E3060
                310          KM        RUNOFF FROM BAS 3060
                311          KO        0
                312          BA     .119
                313          LS        0       79
                314          UD     .257

                315          KK   R3070
                316          KM        ROUTE FLOW FROM E3060 TO DP3070
                317          RK    2000     .009      .04             TRAP       30        10

                318          KK   E3070
                319          KM        RUNOFF FROM BAS 3070
                320          KO        0
                321          BA     .077
                322          LS        0     79.3
                323          UD     .486

                324          KK  DP3070
                325          KM        COMBINE FLOW FROM R3070, E3070
                326          HC        2

                327          KK   R3071
                328          KM        ROUTE FLOW FROM DP3070 TO DP3050
                329          RK    2250     .015      .04             TRAP       30        10

                330          KK  DP3050
                331          KM        COMBINE FLOW FROM R3071 AND DP3050
                332          HC        2

                333          KK   E3080
                334          KM        RUNOFF FROM BAS 3080
                335          KO        0
                336          BA     .053
                337          LS        0     79.2
```

```
          338          UD    .355
1                                                HEC-1 INPUT
PAGE  9

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

          339          KK   R3080
          340          KM        ROUTE FLOW FROM E3080 TO DP3090
          341          RK    1650      .01      .04             TRAP       30       10

          342          KK   E3090
          343          KM        RUNOFF FROM BAS 3090
          344          KO        0
          345          BA     .054
          346          LS        0       79
          347          UD     .411

          348          KK  DP3090
          349          KM        COMBINE FLOW FROM R3080, E3090
          350          HC        2

          351          KK  DP3091
          352          KM        COMBINE FLOW FROM DP3050, DP3090
          353          HC        2

          354          KK   R3100
          355          KM        ROUTE FLOW FROM DP3091 TO DP3100
          356          RK     350      .01      .03             TRAP       10       10

          357          KK   E3100
          358          KM        RUNOFF FROM BAS 3100
          359          KO        0
          360          BA     .095
          361          LS        0     82.9
          362          UD     .303

          363          KK  DP3100
          364          KM        COMBINE FLOW FROM R3100, E3100
          365          KO        0
          366          HC        2

          367          KK   E3110
          368          KM        RUNOFF FROM BAS 3110
          369          KO        0
          370          BA     .018
          371          LS        0       90
          372          UD     .472

          373          KK  DP3110
          374          KM        COMBINE FLOWS FROM E3110 AND DP3100
          375          HC        2

          376          KK   R5011
          377          KM        ROUTE FLOW FROM DP3110 TO DP5010
          378          RK    2900     .015      .04             TRAP       20       4
1                                                HEC-1 INPUT
PAGE 10

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

          379          KK   E5010
          380          KM        RUNOFF FROM BAS E5010
          381          KO        0
          382          BA     .156
          383          LS        0       88
          384          UD      .50

          385          KK  DP5010
          386          KM        COMBINE FLOW FROM E5010, R5011, AND R5010
```

```
387           HC       3

388           KK   E5020
389           KM        RUNOFF FROM BASIN 5020
390           KO       0
391           BA      .2
392           LS       0      88
393           UD      .4

394           KK   E4010
395           KM        RUNOFF FROM BAS 4010
396           KO       0
397           BA     .19
398           LS       0      86
399           UD    .497

400           KK   R4020
401           KM        ROUTE FLOW FROM E4010 TO DP4020
402           RK    2400     .005     .05            TRAP      10       30

403           KK   E4020
404           KM        RUNOFF FROM BAS 4020
405           KO       0
406           BA    .135
407           LS       0    81.8
408           UD    .822

409           KK  DP4020
410           KM        COMBINE FLOW FROM R4020, E4020
411           HC       2

412           KK   E4030
413           KM        RUNOFF FROM BAS 4030
414           KO       0
415           BA    .018
416           LS       0      90
417           UD    .251
418           ZZ
```

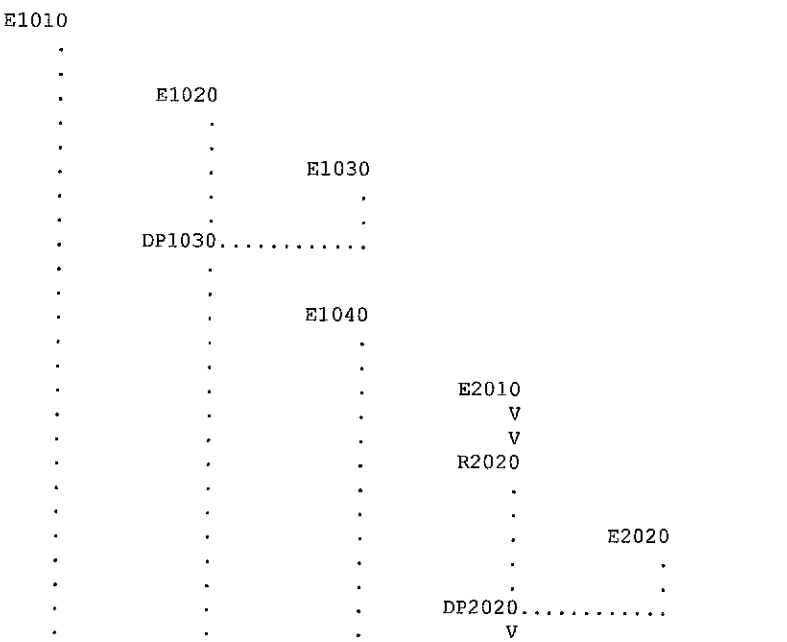
1

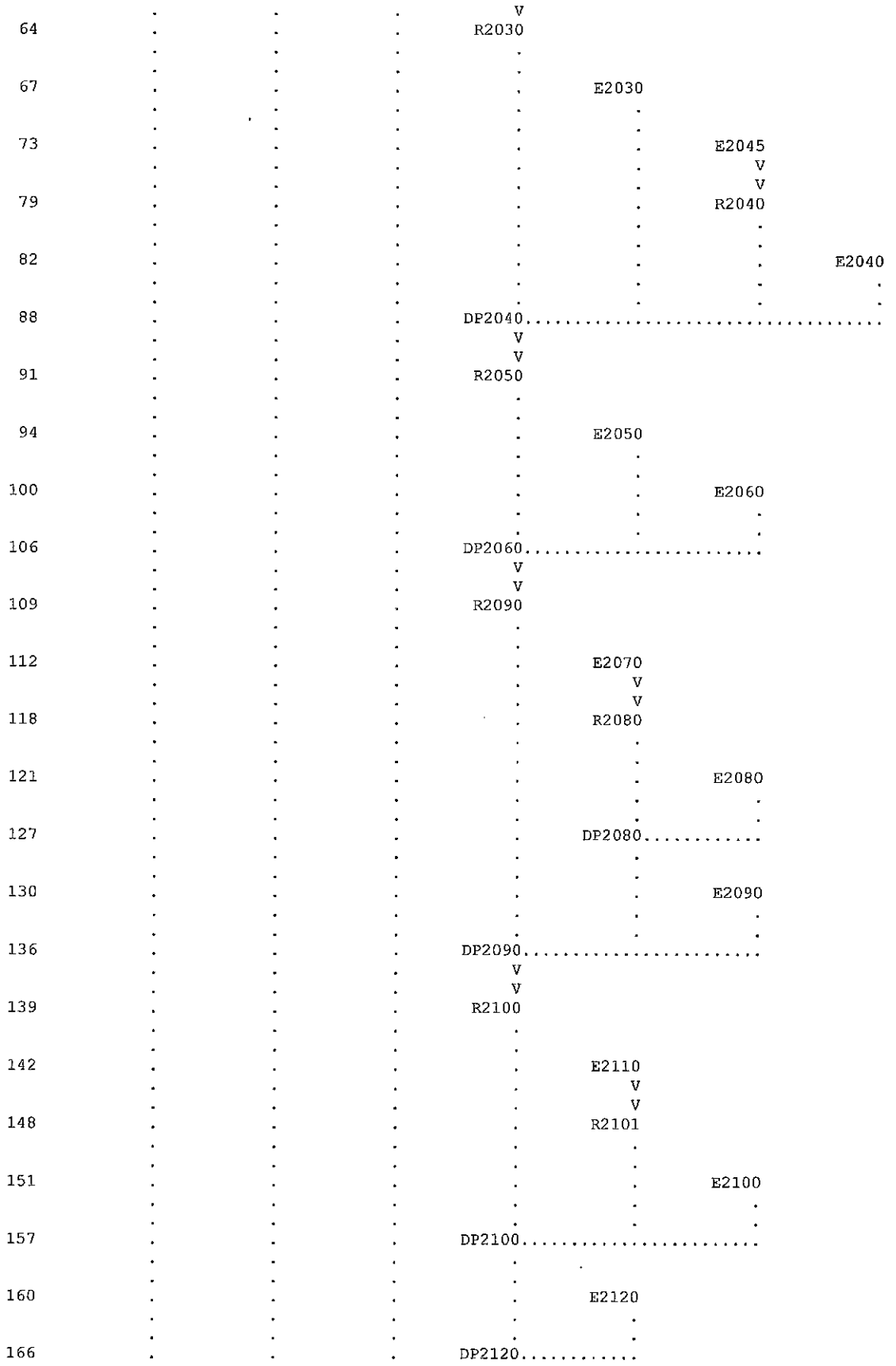
SCHEMATIC DIAGRAM OF STREAM NETWORK

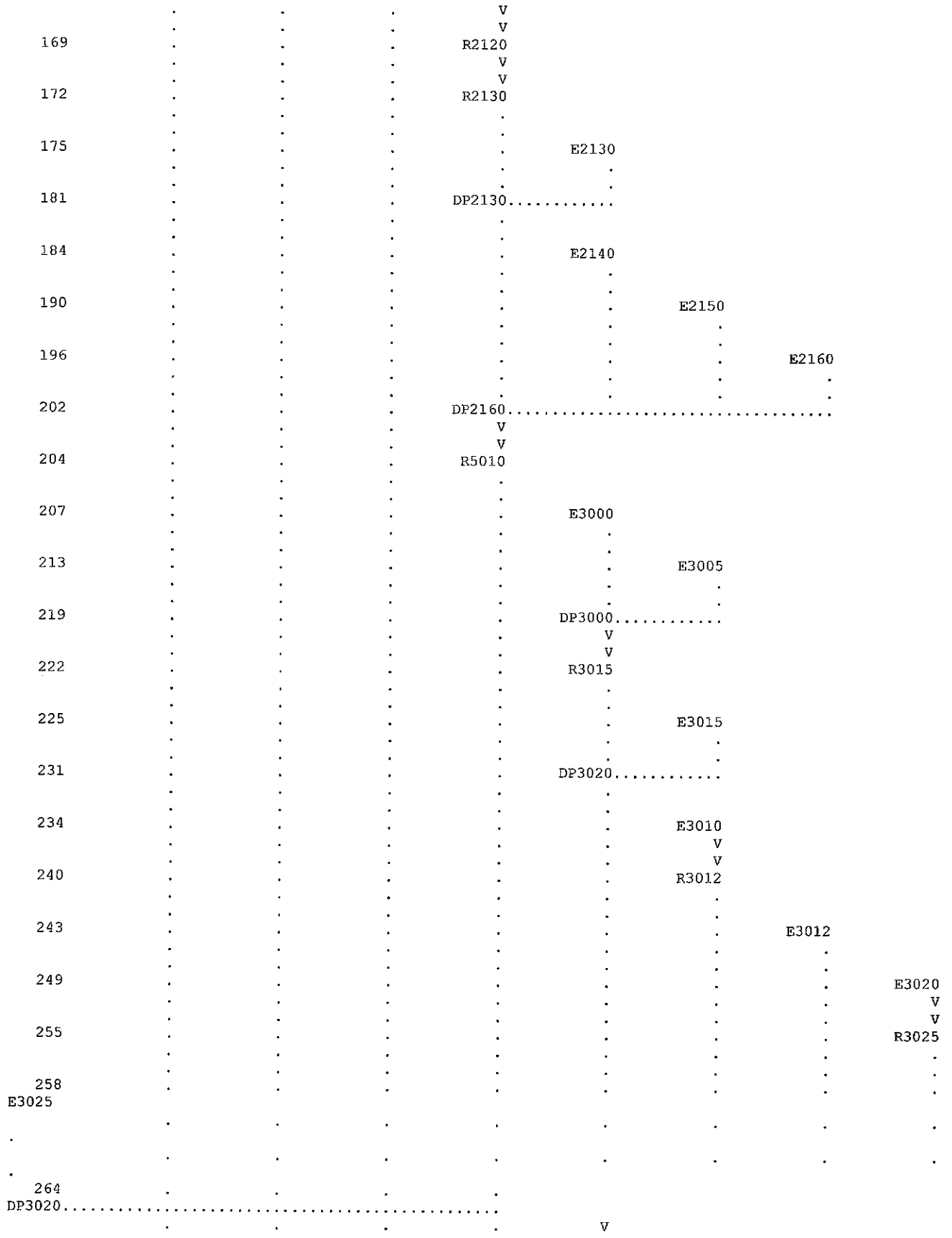
INPUT LINE NO.

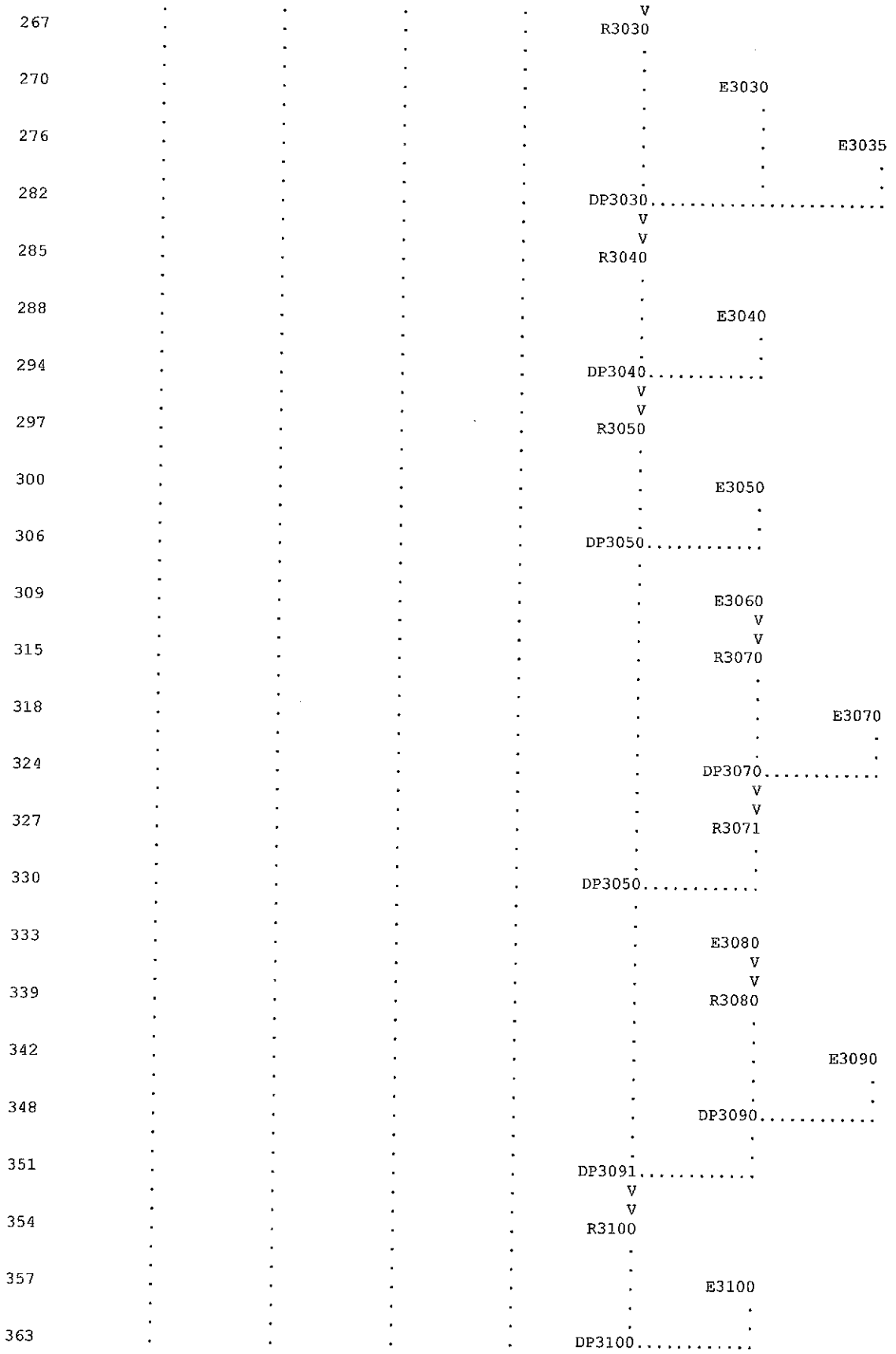
(V) ROUTING (---->) DIVERSION OR PUMP FLOW

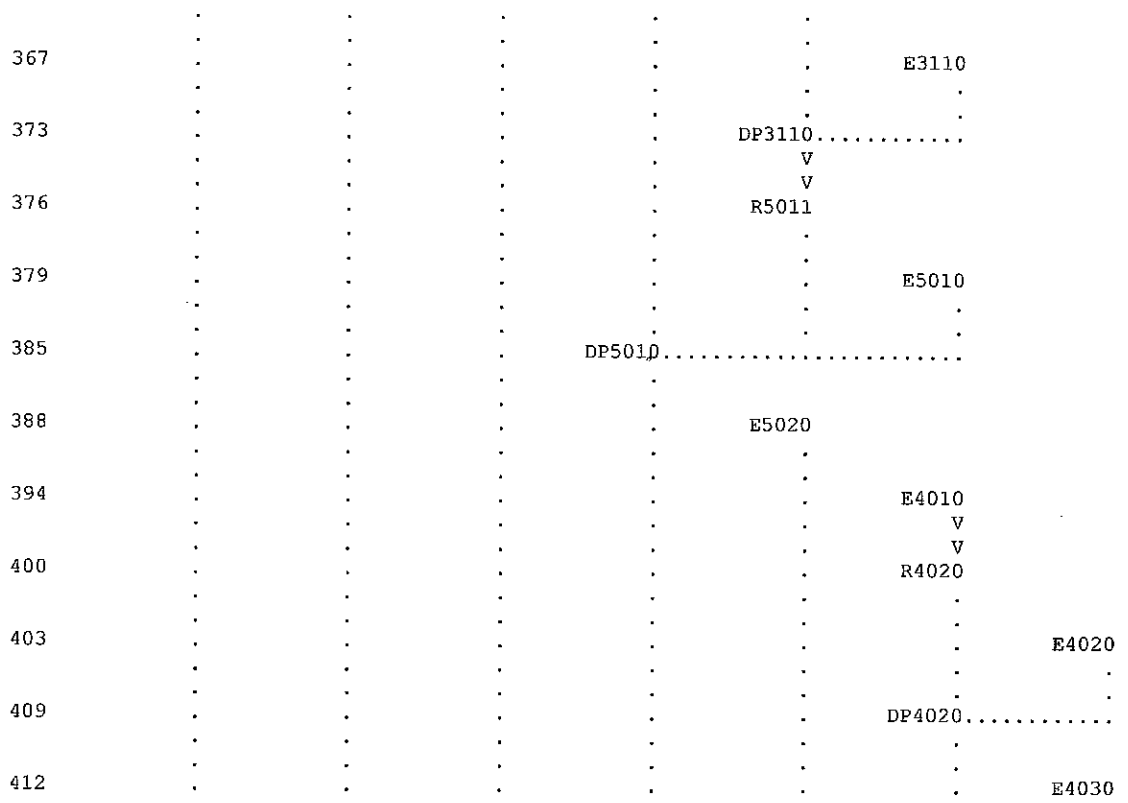
(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW




64
R2030
67
E2030
73
E2045
79
R2040
82
E2040
88
DP2040
91
R2050
94
E2050
100
E2060
106
DP2060
109
R2090
112
E2070
118
R2080
121
E2080
127
DP2080
130
E2090
136
DP2090
139
R2100
142
E2110
148
R2101
151
E2100
157
DP2100
160
E2120
166
DP2120


169
R2120
172
R2130
175
E2130
181
DP2130
184
E2140
190
E2150
196
E2160
202
DP2160
204
R5010
207
E3000
213
E3005
219
DP3000
222
R3015
225
E3015
231
DP3020
234
E3010
240
R3012
243
E3012
249
E3020
255
R3025
258
E3025
264
DP3020


267
R3030
270
E3030
276
E3035
282
DP3030
285
R3040
288
E3040
294
DP3040
297
R3050
300
E3050
306
DP3050
309
E3060
315
R3070
318
E3070
324
DP3070
327
R3071
330
DP3050
333
E3080
339
R3080
342
E3090
348
DP3090
351
DP3091
354
R3100
357
E3100
363
DP3100



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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 .47	RATIO 2 .56	RATIO 3 .70	RATIO 4 1.00
HYDROGRAPH AT								
+	E1010	.05	1	FLOW	7.	12.	22.	49.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E1020	.04	1	FLOW	22.	29.	42.	69.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E1030	.02	1	FLOW	6.	9.	14.	27.
				TIME	6.25	6.25	6.25	6.25
2 COMBINED AT								
+	DP1030	.06	1	FLOW	28.	38.	55.	96.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E1040	.02	1	FLOW	4.	6.	11.	22.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2010	.13	1	FLOW	24.	40.	68.	142.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2020	.13	1	FLOW	23.	38.	67.	142.

				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E2020	.06	1	FLOW	11.	19.	32.	68.
				TIME	6.33	6.25	6.25	6.25
2 COMBINED AT								
+	DP2020	.19	1	FLOW	35.	57.	100.	210.
				TIME	6.33	6.25	6.25	6.25
ROUTED TO								
+	R2030	.19	1	FLOW	34.	57.	97.	207.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2030	.02	1	FLOW	3.	6.	11.	24.
				TIME	6.17	6.17	6.17	6.08
HYDROGRAPH AT								
+	E2045	.06	1	FLOW	35.	48.	70.	124.
				TIME	6.17	6.17	6.08	6.08
ROUTED TO								
+	R2040	.06	1	FLOW	34.	48.	70.	121.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2040	.03	1	FLOW	4.	7.	13.	29.
				TIME	6.17	6.17	6.17	6.17
4 COMBINED AT								
+	DP2040	.30	1	FLOW	70.	109.	181.	362.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2050	.30	1	FLOW	69.	108.	180.	359.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2050	.02	1	FLOW	2.	4.	8.	19.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E2060	.02	1	FLOW	5.	8.	14.	30.
				TIME	6.17	6.17	6.17	6.17
3 COMBINED AT								
+	DP2060	.34	1	FLOW	75.	120.	201.	406.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2090	.34	1	FLOW	74.	119.	200.	403.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2070	.07	1	FLOW	11.	17.	31.	65.
				TIME	6.42	6.33	6.33	6.33
ROUTED TO								
+	R2080	.07	1	FLOW	10.	17.	30.	64.
				TIME	6.42	6.42	6.42	6.33
HYDROGRAPH AT								
+	E2080	.06	1	FLOW	8.	15.	29.	64.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP2080	.13	1	FLOW	16.	28.	51.	113.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								

+	E2090	.02	1	FLOW	3.	5.	9.	19.
				TIME	6.33	6.33	6.33	6.25
3 COMBINED AT								
+	DP2090	.48	1	FLOW	93.	152.	260.	535.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2100	.48	1	FLOW	92.	149.	253.	534.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E2110	.03	1	FLOW	4.	8.	14.	33.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2101	.03	1	FLOW	4.	7.	14.	33.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E2100	.09	1	FLOW	15.	24.	42.	89.
				TIME	6.42	6.42	6.33	6.33
3 COMBINED AT								
+	DP2100	.61	1	FLOW	111.	181.	308.	651.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2120	.05	1	FLOW	5.	9.	18.	45.
				TIME	6.25	6.25	6.17	6.17
2 COMBINED AT								
+	DP2120	.66	1	FLOW	115.	189.	324.	692.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R2120	.66	1	FLOW	113.	186.	323.	683.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R2130	.66	1	FLOW	112.	185.	322.	679.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2130	.01	1	FLOW	1.	2.	5.	11.
				TIME	6.17	6.17	6.17	6.08
2 COMBINED AT								
+	DP2130	.67	1	FLOW	113.	186.	325.	687.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2140	.01	1	FLOW	1.	2.	4.	9.
				TIME	6.08	6.08	6.08	6.08
HYDROGRAPH AT								
+	E2150	.01	1	FLOW	4.	6.	11.	21.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2160	.01	1	FLOW	13.	17.	22.	35.
				TIME	6.00	6.00	6.00	6.00
4 COMBINED AT								
+	DP2160	.70	1	FLOW	118.	196.	339.	723.
				TIME	6.42	6.33	6.33	6.25
ROUTED TO								
+	R5010	.70	1	FLOW	117.	195.	334.	713.
				TIME	6.50	6.42	6.33	6.33

HYDROGRAPH AT								
+	E3000	.42	1	FLOW	129.	190.	300.	568.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3005	.24	1	FLOW	98.	144.	222.	407.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP3000	.66	1	FLOW	215.	317.	493.	935.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R3015	.66	1	FLOW	210.	313.	493.	925.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3015	.11	1	FLOW	51.	75.	115.	212.
				TIME	6.08	6.08	6.08	6.08
2 COMBINED AT								
+	DP3020	.77	1	FLOW	245.	365.	570.	1077.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3010	.22	1	FLOW	96.	138.	211.	383.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3012	.22	1	FLOW	93.	134.	204.	378.
				TIME	6.25	6.25	6.17	6.17
HYDROGRAPH AT								
+	E3012	.21	1	FLOW	64.	94.	147.	272.
				TIME	6.33	6.33	6.33	6.33
HYDROGRAPH AT								
+	E3020	.19	1	FLOW	159.	204.	275.	428.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3025	.19	1	FLOW	158.	201.	270.	418.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3025	.26	1	FLOW	273.	347.	463.	712.
				TIME	6.08	6.08	6.08	6.08
5 COMBINED AT								
+	DP3020	1.65	1	FLOW	761.	1059.	1562.	2737.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3030	1.65	1	FLOW	754.	1043.	1525.	2680.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3030	.26	1	FLOW	76.	116.	186.	361.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3035	.16	1	FLOW	72.	106.	166.	306.
				TIME	6.08	6.08	6.08	6.08
3 COMBINED AT								
+	DP3030	2.07	1	FLOW	865.	1209.	1817.	3267.
				TIME	6.25	6.25	6.17	6.17
ROUTED TO								
+	R3040	2.07	1	FLOW	860.	1208.	1792.	3235.
				TIME	6.25	6.25	6.25	6.17

HYDROGRAPH AT								
+	E3040	.12	1	FLOW	18.	31.	58.	129.
				TIME	6.25	6.17	6.17	6.17
2 COMBINED AT								
+	DP3040	2.18	1	FLOW	878.	1239.	1848.	3364.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R3050	2.18	1	FLOW	860.	1219.	1846.	3309.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3050	.07	1	FLOW	41.	56.	80.	136.
				TIME	6.25	6.25	6.25	6.17
2 COMBINED AT								
+	DP3050	2.26	1	FLOW	898.	1275.	1926.	3444.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3060	.12	1	FLOW	42.	63.	100.	189.
				TIME	6.17	6.17	6.17	6.08
ROUTED TO								
+	R3070	.12	1	FLOW	40.	61.	98.	189.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3070	.08	1	FLOW	18.	27.	44.	87.
				TIME	6.42	6.42	6.33	6.33
2 COMBINED AT								
+	DP3070	.20	1	FLOW	57.	86.	140.	270.
				TIME	6.33	6.25	6.25	6.25
ROUTED TO								
+	R3071	.20	1	FLOW	57.	85.	137.	264.
				TIME	6.42	6.42	6.33	6.33
2 COMBINED AT								
+	DP3050	2.45	1	FLOW	946.	1336.	2049.	3705.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3080	.05	1	FLOW	15.	23.	38.	72.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R3080	.05	1	FLOW	15.	23.	37.	71.
				TIME	6.42	6.33	6.33	6.33
HYDROGRAPH AT								
+	E3090	.05	1	FLOW	14.	21.	34.	67.
				TIME	6.33	6.33	6.25	6.25
2 COMBINED AT								
+	DP3090	.11	1	FLOW	29.	44.	71.	138.
				TIME	6.33	6.33	6.33	6.25
2 COMBINED AT								
+	DP3091	2.56	1	FLOW	975.	1380.	2118.	3843.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R3100	2.56	1	FLOW	973.	1380.	2111.	3839.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3100	.09	1	FLOW	42.	61.	92.	166.

				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP3100	2.66	1	FLOW	1007.	1428.	2197.	3990.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3110	.02	1	FLOW	10.	14.	19.	31.
				TIME	6.33	6.33	6.33	6.25
2 COMBINED AT								
+	DP3110	2.67	1	FLOW	1018.	1442.	2216.	4022.
				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	R5011	2.67	1	FLOW	997.	1441.	2174.	3974.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E5010	.16	1	FLOW	74.	101.	146.	246.
				TIME	6.33	6.33	6.33	6.33
3 COMBINED AT								
+	DP5010	3.53	1	FLOW	1174.	1722.	2653.	4904.
				TIME	6.42	6.33	6.33	6.25
HYDROGRAPH AT								
+	E5020	.20	1	FLOW	112.	151.	216.	362.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E4010	.19	1	FLOW	78.	108.	160.	279.
				TIME	6.33	6.33	6.33	6.33
ROUTED TO								
+	R4020	.19	1	FLOW	76.	107.	158.	278.
				TIME	6.58	6.58	6.50	6.50
HYDROGRAPH AT								
+	E4020	.14	1	FLOW	27.	39.	61.	114.
				TIME	6.75	6.75	6.75	6.67
2 COMBINED AT								
+	DP4020	.32	1	FLOW	102.	145.	215.	383.
				TIME	6.67	6.58	6.58	6.50
HYDROGRAPH AT								
+	E4030	.02	1	FLOW	15.	20.	27.	44.
				TIME	6.08	6.08	6.08	6.08

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

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1****************************************
****************************************
 *                                      *                                      *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                      *    U.S. ARMY
CORPS OF ENGINEERS      *
 *               JUN   1998             *                                      *    HYDROLOGIC
ENGINEERING CENTER     *
 *            VERSION 4.1               *                                      *          609
SECOND STREET           *
 *                                      *                                      *       DAVIS,
CALIFORNIA 95616        *
 *  RUN DATE   07JUL00  TIME  15:52:10  *                                      *          (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

1
PAGE 1

HEC-1 INPUT

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

            1           ID   WEST JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY
            2           ID   KIOWA ENGINEERING  -  PROJECT NO. 98.93
            3           ID   2, 5, 10 & 100 YEAR STORMS FILENAME: WFJCDET.DAT DEV COND WITH DETENTION
            4           ID   24HR STORM DURATION
                        *DIAGRAM
            5           IT       5       0       0     250
            6           IO       5
            7           JR    PREC     .47     .56     .70       1

            8           KK   E1010
            9           BA     .05
           10           IN      15
           11           PB     4.4
           12           PC     0.0   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
           13           PC   .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
           14           PC   .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
           15           PC   .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
           16           PC   .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
           17           PC   .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
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 18          PC   .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
 19          PC   .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
 20          PC   .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
 21          PC   .9963   .9975   .9988  1.0000
 22          LS      0    73.2
 23          UD    .392

 24          KK   E1020
 25          KM        RUNOFF FROM BAS 1020
 26          KO       0
 27          BA    .041
 28          LS       0    88.8
 29          UD    .467

 30          KK   E1030
 31          KM        RUNOFF FROM BAS 1030
 32          KO       0
 33          BA    .020
 34          LS       0      80
 35          UD    .383

 36          KK  DP1030
 37          KM        COMBINE FLOW FROM E1020 & ROUTED FLOW FROM E1030
 38          HC       2

 39          KK  DB1031
 40          KM        ROUTE FLOW FROM DP 1030 THROUGH DETENTION BASIN 1031
 41          KO       0
 42          RS       1    ELEV     100
 43          SQ       0      15      30      45      60      90
 44          SV       0      .5       1     2.5       4       5
 45          SE     100     101     102     103     104     105
1                                        HEC-1 INPUT
PAGE  2

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

 46          KK   E1040
 47          KM        RUNOFF FROM BAS 1040
 48          KO       0
 49          BA  .02171
 50          LS       0      75
 51          UD     .41

 52          KK   E2010
 53          KM        RUNOFF FROM BAS 2010
 54          KO       0
 55          BA    .125
 56          LS       0      75
 57          UD    .350

 58          KK   R2020
 59          KM        ROUTE FLOW FROM E2010 TO DP2020
 60          KO       0
 61          RK     800     .03     .05            TRAP      20      10

 62          KK   E2020
 63          KM        RUNOFF FROM BASIN 2020
 64          KO       0
 65          BA    .062
 66          LS       0      75
 67          UD    .376

 68          KK  DP2020
 69          KM        COMBINE FLOW FROM E2010 & ROUTED FLOW FROM E2020
 70          HC       2

 71          KK   R2030
 72          KM        ROUTE FLOW FROM DP2020 TO DP2040
 73          RK     800   .0275     .05            TRAP      20       8
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                74          KK   E2030
                75          KM        RUNOFF FROM BAS 2030
                76          KO       0
                77          BA     .021
                78          LS       0       71
                79          UD     .233

                80          KK   E2045
                81          KM        RUNOFF FROM BAS 2045
                82          KO       0
                83          BA     .061
                84          LS       0       85
                85          UD     .258

                86          KK   R2040
                87          KM        ROUTE FLOW FROM E2045 TO DP2040
                88          RK    1200    .0314      .04             TRAP       20        8
1                                                    HEC-1 INPUT
PAGE  3

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

                89          KK   E2040
                90          KM        RUNOFF FROM BAS 2040
                91          KO       0
                92          BA     .026
                93          LS       0       71
                94          UD     .268

                95          KK  DP2040
                96          KM        COMBINE FLOW FROM DP2020, E2030, E2045, E2040
                97          HC       4

                98          KK   R2050
                99          KM        ROUTE FLOW FROM DP2040 TO DP2060
               100          RK     600      .03      .03             TRAP       20        3

               101          KK   E2050
               102          KM        RUNOFF FROM BAS 2050
               103          KO       0
               104          BA     .020
               105          LS       0       71
               106          UD      .33

               107          KK   E2060
               108          KM        RUNOFF FROM BAS 2060
               109          KO       0
               110          BA     .024
               111          LS       0     73.1
               112          UD     .253

               113          KK  DP2060
               114          KM        COMBINE FLOW FROM DP2040, E2050, E2060
               115          HC       3

               116          KK   R2090
               117          KM        ROUTE FLOW FROM DP2060 TO DP2090
               118          RK     500     .023      .03             TRAP       30        3

               119          KK   E2070
               120          KM        RUNOFF FROM BAS 2070
               121          KO       0
               122          BA     .068
               123          LS       0       75
               124          UD     .463

               125          KK   R2080
               126          KM        ROUTE FLOW FROM E2070 TO DP2080
               127          RK    1220     .035      .04             TRAP       10        5
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                128          KK   E2080
                129          KM        RUNOFF FROM BAS 2080
                130          KO       0
                131          BA    .057
                132          LS       0       71
                133          UD    .247
1                                                HEC-1 INPUT
PAGE  4

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


                134          KK  DP2080
                135          KM        COMBINE FLOW FROM E2070, E2080
                136          HC       2

                137          KK   E2090
                138          KM        RUNOFF FROM BAS 2090
                139          KO       0
                140          BA    .019
                141          LS       0       75
                142          UD    .414

                143          KK  DP2090
                144          KM        COMBINE FLOW FROM DP2060, DP2080, E2090
                145          HC       3

                146          KK  DB2091
                147          KM        ROUTE FLOW FROM DP 2090 THROUGH DET BASIN 2091
                148          KO       0
                149          RS       1    ELEV     100
                150          SQ       0     100     200     300     400     500
                151          SV       0      .5       1       2       3     4.5
                152          SE     100     101     102     103     104     105

                153          KK   R2100
                154          KM        ROUTE FLOW FROM DB2091 TO DP2100
                155          RK    1800    .0169     .03            TRAP      60       4

                156          KK   E2110
                157          KM        RUNOFF FROM BAS 2110
                158          KO       0
                159          BA    .034
                160          LS       0       71
                161          UD    .329

                162          KK   R2101
                163          KM        ROUTE FLOW FROM E2110 TO DP2100
                164          RK     900    .025     .04            TRAP      40       5

                165          KK   E2100
                166          KM        RUNOFF FROM BAS 2100
                167          KO       0
                168          BA    .095
                169          LS       0    75.3
                170          UD    .482

                171          KK  DP2100
                172          KM        COMBINE FLOW FROM DP2090, DB2111, E2100
                173          HC       3
1                                                HEC-1 INPUT
PAGE  5

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


                174          KK   E2120
                175          KM        RUNOFF FROM BAS 2120
                176          KO       0
                177          BA    .047
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178          LS       0      69
179          UD    .288

180          KK  DP2120
181          KM        COMBINE FLOW FROM DP2100, E2120
182          HC       2

183          KK   R2120
184          KM        ROUTE FLOW FROM DP2120 THROUGH LAKE
185          RK    1000     .025      .04             TRAP      40        5

186          KK   R2130
187          KM        ROUTE FLOW FROM DP2120 TO DP2130
188          RK     550      .05      .04             TRAP       8        3

189          KK   E2130
190          KM        RUNOFF FROM BAS 2130
191          KO       0
192          BA    .010
193          LS       0      69
194          UD    .218

195          KK  DP2130
196          KM        COMBINE FLOW FROM DP2120, E2130
197          HC       2

198          KK   E2140
199          KM        RUNOFF FROM BAS 2140
200          KO       0
201          BA    .007
202          LS       0      69
203          UD     .16

204          KK   E2150
205          KM        RUNOFF FROM BAS 2150
206          KO       0
207          BA    .015
208          LS       0    76.3
209          UD    .259

210          KK   E2160
211          KM        RUNOFF FROM BAS 2160
212          KO       0
213          BA    .012
214          LS       0      92
215          UD    .162
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HEC-1 INPUT

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

216          KK  DP2160
217          KM        COMBINE FLOW FROM E2140, E2150, E2160 AND DP 2160
218          HC       4

219          KK   E3000
220          KM        RUNOFF FROM BAS 3000
221          KO       0
222          BA     .42
223          LS       0      81
224          UD    .414

225          KK   E3005
226          KM        RUNOFF FROM BASIN 3005
227          KO       0
228          BA     .24
229          LS       0      81
230          UD     .27

231          KK  DP3000
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232          KM        COMBINE FLOW FROM E3000 AND E3005
233          HC       2

234          KK   R3015
235          KM        ROUTE FLOW FROM DP3000 TO DP3020
236          RK    3200     .031      .04            TRAP       15        3

237          KK   E3015
238          KM        RUNOFF FROM BASIN 3015
239          KO       0
240          BA     .11
241          LS       0       81
242          UD     .21

243          KK  DP3020
244          KM        COMBINE FLOW FROM BASIN 3015 AND R3015
245          HC       2

246          KK   E3010
247          KM        RUNOFF FROM BAS 3010
248          KO       0
249          BA     .22
250          LS       0       82
251          UD     .28

252          KK   R3012
253          KM        ROUTE FLOW FROM E3010 TO DP 3020
254          RK    2600      .03      .04            TRAP       15        3

255          KK   E3012
256          KM        RUNOFF FROM BASIN E3012
257          KO       0
258          BA     .21
259          LS       0       82
260          UD     .47
1                                        HEC-1 INPUT
PAGE   7

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

261          KK   E3020
262          KM        RUNOFF FROM BAS 3020
263          KO       0
264          BA    .188
265          LS       0       93
266          UD     .36

267          KK   R3025
268          KM        ROUTE FLOW FROM BASIN E3020 TO DP 3020
269          RK    2600     .035      .04            TRAP       15        3

270          KK   E3025
271          KM        RUNOFF FROM BASIN E3025
272          KO       0
273          BA     .26
274          LS       0       93
275          UD     .23

276          KK  DP3020
277          KM        COMBINE FLOW FROM DP3020, E3012, E3025, R3012 AND R3025
278          HC       5

279          KK  DB3021
280          KM        ROUTE FLOW FROM DP3020 TO DETENTION BASIN 3021
281          KO       0
282          RS       1    ELEV     100
283          SQ       0     150     400     600    1200    3000
284          SV       0      15      45      60      75      90
285          SE     100     102     104     106     108     110
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286          KK   R3030
287          KM        ROUTE FLOW FROM DB3021 TO DP3030
288          RK    3000      .05      .04            TRAP       20       10

289          KK   E3030
290          KM        RUNOFF FROM BAS 3030
291          KO        0
292          BA     .260
293          LS        0       79
294          UD      .34

295          KK   E3035
296          KM        RUNOFF FROM BASIN 3035
297          KO        0
298          BA     .16
299          LS        0       79
300          UD      .16

301          KK  DP3030
302          KM        COMBINE FLOW FROM DP3031, R3030 AND E3035
303          HC        3
1                                          HEC-1 INPUT
PAGE  8

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

304          KK  DB3031
305          KM        ROUTE FLOW FROM DP3030 TO DB3031
306          KO        0
307          RS        1     ELEV      100
308          SQ        0      100      400     1000     2400     3000
309          SV        0        2        4        6       10       12
310          SE      100      102      104      106      108      110

311          KK   R3040
312          KM        ROUTE FLOW FROM DB3031 TO DP3040
313          RK     1450      .03      .03            TRAP       30        5

314          KK   E3040
315          KM        RUNOFF FROM BAS 3040
316          KO        0
317          BA     .115
318          LS        0     72.3
319          UD     .294

320          KK  DP3040
321          KM        COMBINE FLOW FROM R3040, E3040
322          HC        2

323          KK   R3050
324          KM        ROUTE FLOW FROM DP3040 TO DP3050
325          RK     2850     .009      .03            TRAP       10        7

326          KK   E3050
327          KM        RUNOFF FROM BAS 3050
328          KO        0
329          BA     .074
330          LS        0     87.3
331          UD     .371

332          KK  DP3050
333          KM        COMBINE FLOW FROM DP3050, E3050
334          HC        2

335          KK   E3060
336          KM        RUNOFF FROM BAS 3060
337          KO        0
338          BA     .119
339          LS        0       79
340          UD     .257
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          341          KK  DB3061
          342          KM        ROUTE FLOW FROM E3060 THROUGH DET BASIN DB3061
          343          KO       0
          344          RS       1    ELEV     100
          345          SQ       0      30      60      90     120     160     200
          346          SV       0      .4      .8     1.2     1.6     2.0     2.5
          347          SE     100     101     102     103     104     105     106
1                                                 HEC-1 INPUT
PAGE  9

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


          348          KK   R3070
          349          KM        ROUTE FLOW FROM DB3061 TO DP3070
          350          RK    2000     .009      .04            TRAP      30      10

          351          KK   E3070
          352          KM        RUNOFF FROM BAS 3070
          353          KO       0
          354          BA    .077
          355          LS       0    79.3
          356          UD    .486

          357          KK  DP3070
          358          KM        COMBINE FLOW FROM R3070 AND E3070
          359          HC       2

          360          KK   R3071
          361          KM        ROUTE FLOW FROM DP3070 TO DP3050
          362          RK    2250     .015      .04            TRAP      30      10

          363          KK  DP3050
          364          KM        COMBINE FLOW FROM R3071 AND DP3050
          365          HC       2

          366          KK   E3080
          367          KM        RUNOFF FROM BAS 3080
          368          KO       0
          369          BA    .053
          370          LS       0    79.2
          371          UD    .355

          372          KK   R3080
          373          KM        ROUTE FLOW FROM E3080 TO DP 3090
          374          RK    1650      .01      .04            TRAP      30      10

          375          KK   E3090
          376          KM        RUNOFF FROM BAS 3090
          377          KO       0
          378          BA    .054
          379          LS       0      79
          380          UD    .411

          381          KK  DP3090
          382          KM        COMBINE FLOW FROM R3080 AND E3090
          383          HC       2

          384          KK  DB3091
          385          KM        ROUTE FLOW FROM E3090 TO DETENTION BASIN 3091
          386          KO       0
          387          RS       1    ELEV     100
          388          SQ       0       5      15      30     100     120
          389          SV       0     .25      .5     1.0     1.5     3.0
          390          SE     100     101     102     103     104     105
1                                                 HEC-1 INPUT
PAGE 10

          LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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391          KK  DP3092
392          KM        COMBINE FLOW FROM DP3050 AND DB3091
393          HC       2

394          KK   R3100
395          KM        ROUTE FLOW FROM DP3091 TO DP3100
396          RK     350      .01      .03             TRAP       10        10

397          KK   E3100
398          KM        RUNOFF FROM BAS 3100
399          KO       0
400          BA    .095
401          LS       0    82.9
402          UD    .303

403          KK  DB3101
404          KM        ROUTE FLOW FROM E3100 TO DB3101
405          KO       0
406          RS       1    ELEV     100
407          SQ       0      30      60      90      130      140
408          SV       0     0.5     1.0     1.5      3.0      4.0
409          SE     100     101     102     103      104      105

410          KK  DP3102
411          KM        COMBINE FLOW FROM E3100 AND DB3101
412          KO       0
413          HC       2

414          KK   E3110
415          KM        RUNOFF FROM BAS 3110
416          KO       0
417          BA    .018
418          LS       0       90
419          UD    .472

420          KK  DP3110
421          KM        COMBINE FLOW FROM E3100 AND DP3102
422          HC       2

423          KK   R3110
424          KM        ROUTE FLOW FROM DP3110 TO DP3111
425          RK     900     .004      .04             TRAP       70        4

426          KK  DP3111
427          KM        COMBINE FLOW FROM DP2160 AND R3110
428          HC       2

429          KK   R5010
430          KM        ROUTE FLOW FROM DP3111 TO DP5010
431          RK    2100     .004      .04              TRAP       90        4
1                                        HEC-1 INPUT
PAGE 11

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

432          KK   E5020
433          KM        RUNOFF FROM BASIN 5020
434          KO       0
435          BA      .2
436          LS       0       88
437          UD      .4

438          KK  DB5021
439          KM        ROUTE FLOW FROM E5020 THROUGH DET BASIN DB 5021
440          KO       0
441          RS       1    ELEV     100
442          SQ       0      20      40      80      120      250
443          SV       0       2       4       6       10       13
444          SE     100     102     104     106      108      110
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445          KK  DP5010
446          KM        COMBINE FLOW FROM DB5021 AND R5010
447          HC       2

448          KK   R5011
449          KM        ROUTE FLOW FROM DP5010 TO DP5011
450          RK    1300     .004      .04            TRAP       90        4

451          KK   E5010
452          KM        RUNOFF FROM BAS E5010
453          KO       0
454          BA    .156
455          LS       0       88
456          UD     .50

457          KK  DB5011
458          KM        ROUTE FLOW FROM E5010 THROUGH DET BASIN DB5011
459          KO       0
460          RS       1     ELEV      100
461          SQ       0       20       40       60      120      150
462          SV       0        2        4        6        8       12
463          SE     100      102      104      106      108      110

464          KK  DP5011
465          KM        COMBINE FLOW FROM R5011, DB5011
466          HC       2

467          KK   E4010
468          KM        RUNOFF FROM BAS 4010
469          KO       0
470          BA     .19
471          LS       0       86
472          UD    .497
1
PAGE 12                                        HEC-1 INPUT

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

473          KK  DB4011
474          KM        ROUTE FLOW FROM E4010 THROUGH DET BASIN DB4011
475          KO       0
476          RS       1     ELEV      100
477          SQ       0       40       80      120      180      220
478          SV       0        2        4        6       10       13
479          SE     100      102      104      106      108      110

480          KK   R4020
481          KM        ROUTE FLOW FROM DB4011 TO DP4020
482          RK    2400     .005      .05            TRAP       10       30

483          KK   E4020
484          KM        RUNOFF FROM BAS 4020
485          KO       0
486          BA    .135
487          LS       0     81.8
488          UD    .822

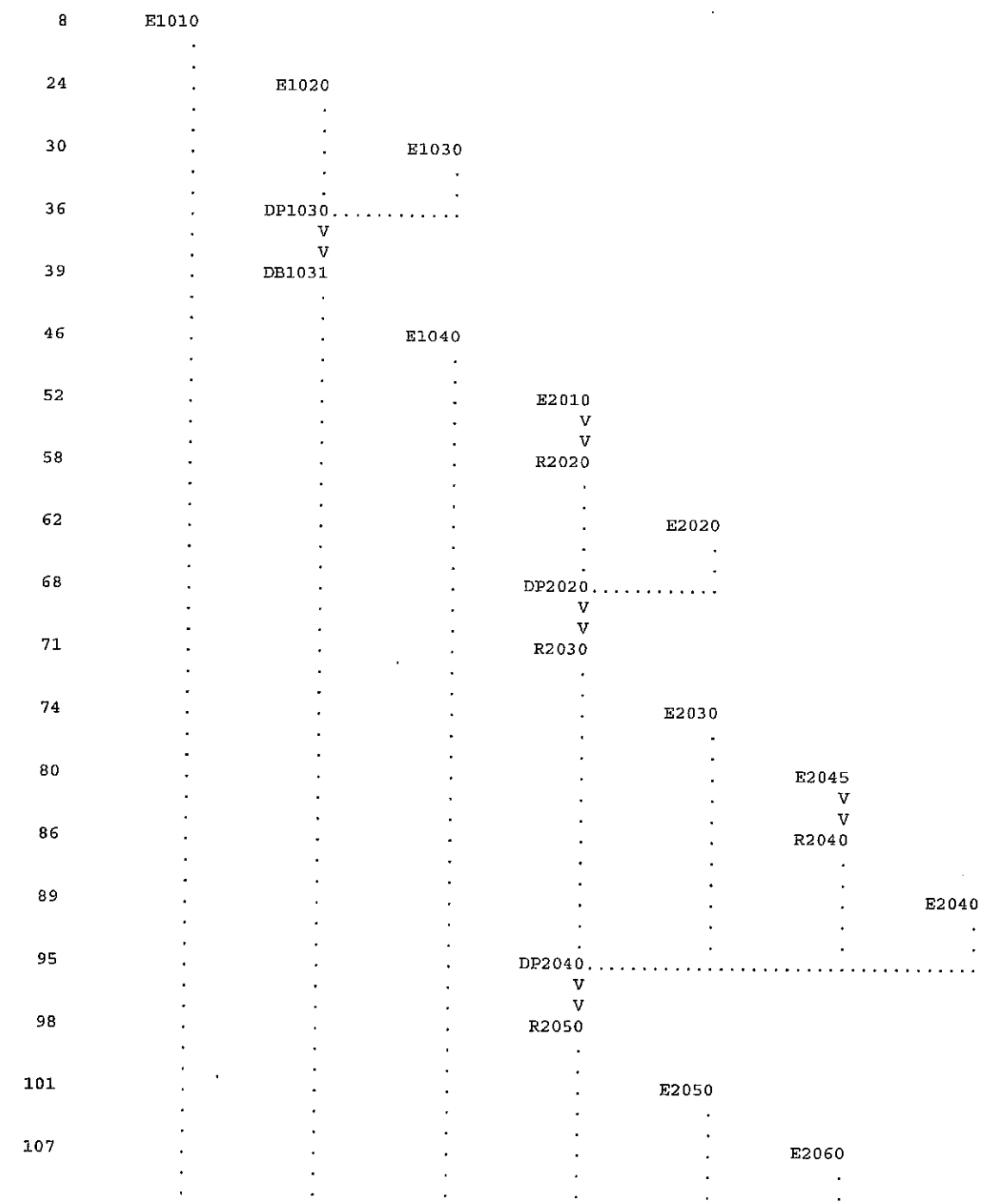
489          KK  DP4020
490          KM        COMBINE FLOW FROM R4020, E4020
491          HC       2

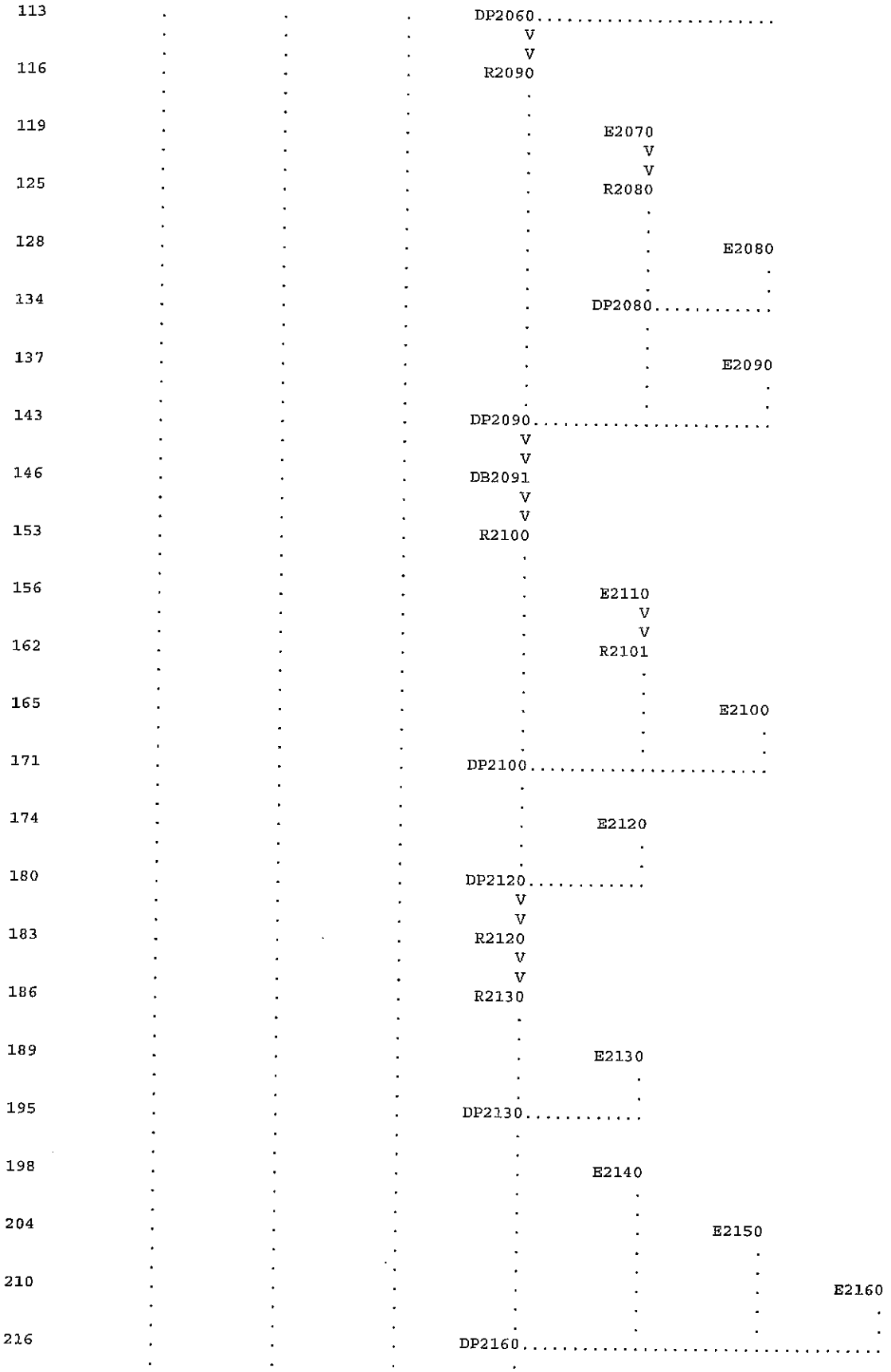
492          KK  DB4021
493          KM        ROUTE FLOW FROM 4020 THROUGH DET BASIN DB4021
494          KO       0
495          RS       1     ELEV      100
496          SQ       0       10       20       40       80      150      250
497          SV       0      1.0        2      3.0        4        6       10
498          SE     100      101      102      103      104      105      106
```

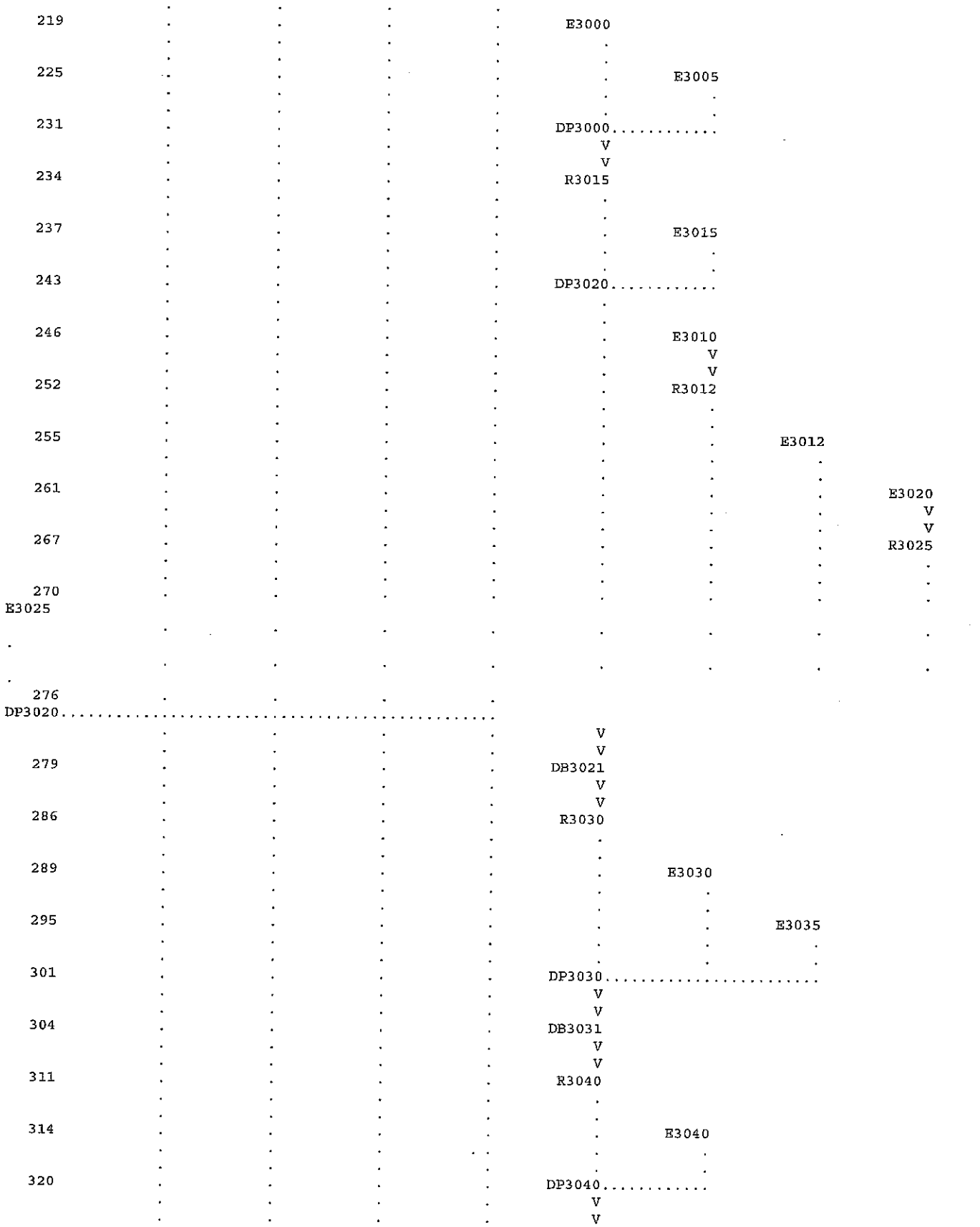
```
499            KK   E4030
500            KM        RUNOFF FROM BAS 4030
501            KO        0
502            BA     .018
503            LS        0       90
504            UD     .251
505            ZZ
```

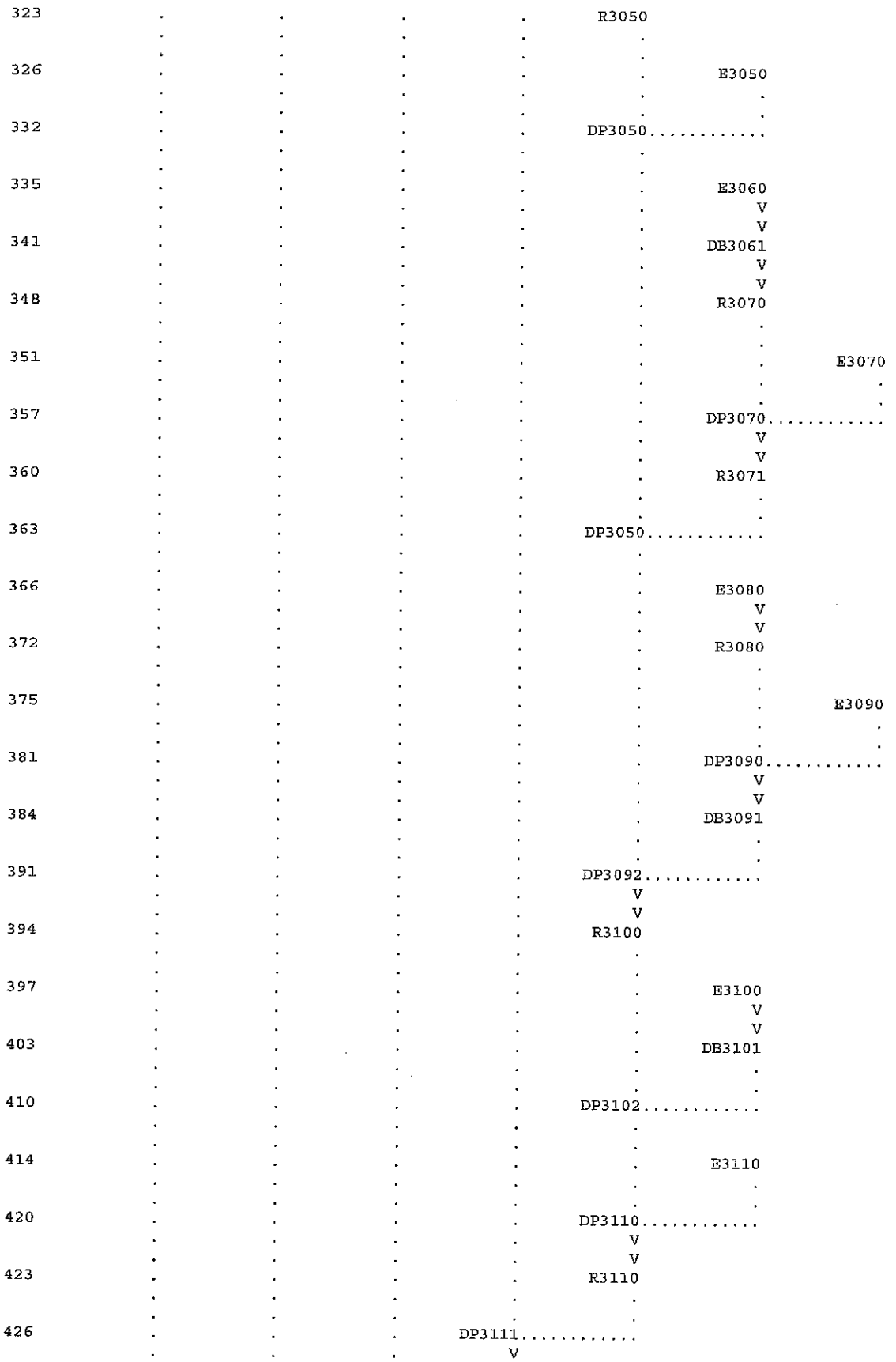
1

SCHEMATIC DIAGRAM OF STREAM NETWORK




113
DP2060
116
R2090
119
E2070
125
R2080
128
E2080
134
DP2080
137
E2090
143
DP2090
146
DB2091
153
R2100
156
E2110
162
R2101
165
E2100
171
DP2100
174
E2120
180
DP2120
183
R2120
186
R2130
189
E2130
195
DP2130
198
E2140
204
E2150
210
E2160
216
DP2160


219
E3000
225
E3005
231
DP3000
234
R3015
237
E3015
243
DP3020
246
E3010
252
R3012
255
E3012
261
E3020
267
R3025
270
E3025
276
DP3020
279
DB3021
286
R3030
289
E3030
295
E3035
301
DP3030
304
DB3031
311
R3040
314
E3040
320
DP3040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R3050
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E3050
332
DP3050
335
E3060
341
DB3061
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R3070
351
E3070
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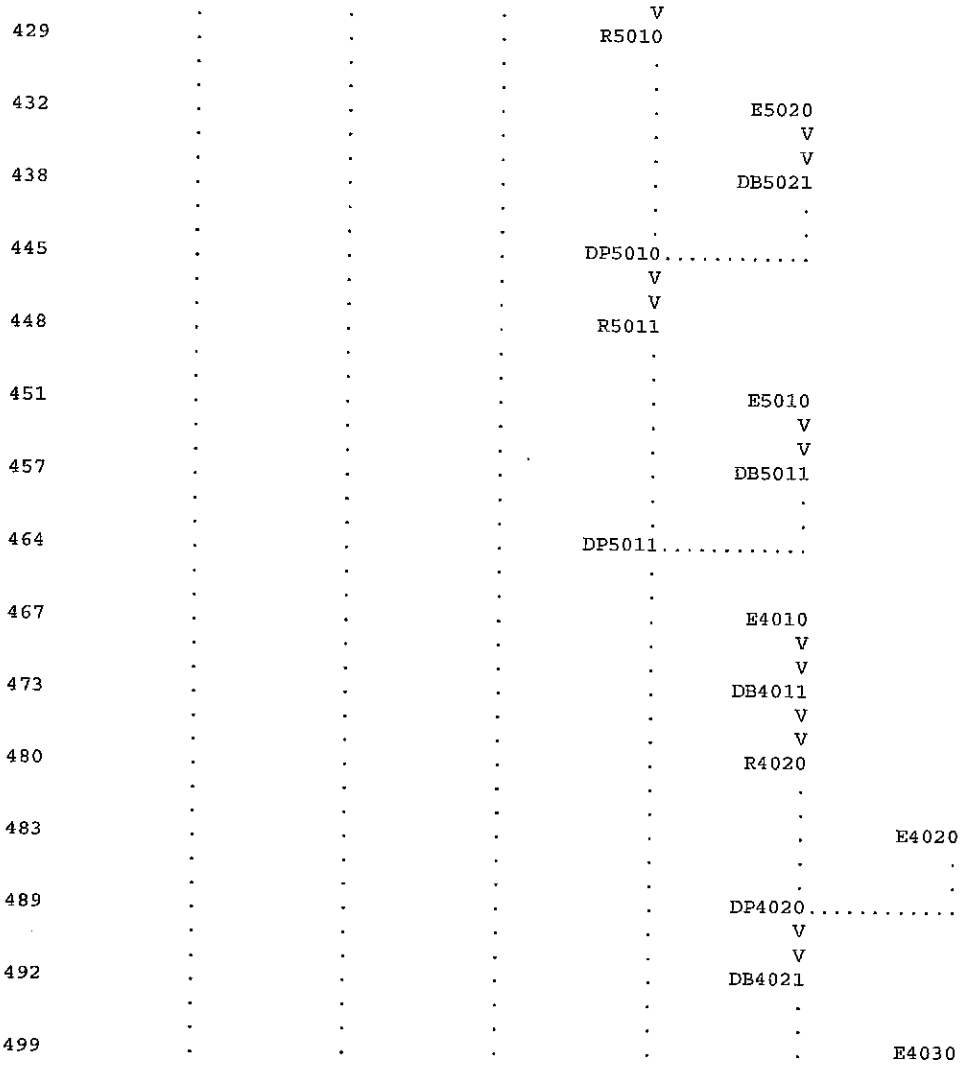
DP3070
360
R3071
363
DP3050
366
E3080
372
R3080
375
E3090
381
DP3090
384
DB3091
391
DP3092
394
R3100
397
E3100
403
DB3101
410
DP3102
414
E3110
420
DP3110
423
R3110
426
DP3111



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .47	RATIO 2 .56	RATIO 3 .70	RATIO 4 1.00
HYDROGRAPH AT								
+	E1010	.05	1	FLOW	7.	12.	22.	49.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E1020	.04	1	FLOW	22.	29.	42.	69.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E1030	.02	1	FLOW	6.	9.	14.	27.
				TIME	6.25	6.25	6.25	6.25
2 COMBINED AT								
+	DP1030	.06	1	FLOW	28.	38.	55.	96.

				TIME	6.33	6.33	6.25	6.25
ROUTED TO								
+	DB1031	.06	1	FLOW	19.	26.	33.	48.
				TIME	6.58	6.58	6.67	6.67
			** PEAK STAGES IN FEET **					
			1	STAGE	101.25	101.73	102.23	103.19
				TIME	6.58	6.58	6.67	6.67
HYDROGRAPH AT								
+	E1040	.02	1	FLOW	4.	6.	11.	22.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2010	.13	1	FLOW	24.	40.	68.	142.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R2020	.13	1	FLOW	23.	38.	67.	142.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E2020	.06	1	FLOW	11.	19.	32.	68.
				TIME	6.33	6.25	6.25	6.25
2 COMBINED AT								
+	DP2020	.19	1	FLOW	35.	57.	100.	210.
				TIME	6.33	6.25	6.25	6.25
ROUTED TO								
+	R2030	.19	1	FLOW	34.	57.	97.	207.
				TIME	6.33	6.33	6.33	6.25
HYDROGRAPH AT								
+	E2030	.02	1	FLOW	3.	6.	11.	24.
				TIME	6.17	6.17	6.17	6.08
HYDROGRAPH AT								
+	E2045	.06	1	FLOW	35.	48.	70.	124.
				TIME	6.17	6.17	6.08	6.08
ROUTED TO								
+	R2040	.06	1	FLOW	34.	48.	70.	121.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2040	.03	1	FLOW	4.	7.	13.	29.
				TIME	6.17	6.17	6.17	6.17
4 COMBINED AT								
+	DP2040	.30	1	FLOW	70.	109.	181.	362.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2050	.30	1	FLOW	69.	108.	180.	359.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2050	.02	1	FLOW	2.	4.	8.	19.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E2060	.02	1	FLOW	5.	8.	14.	30.
				TIME	6.17	6.17	6.17	6.17
3 COMBINED AT								
+	DP2060	.34	1	FLOW	75.	120.	201.	406.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								

+	R2090	.34	1	FLOW	74.	119.	200.	403.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2070	.07	1	FLOW	11.	17.	31.	65.
				TIME	6.42	6.33	6.33	6.33
ROUTED TO								
+	R2080	.07	1	FLOW	10.	17.	30.	64.
				TIME	6.42	6.42	6.42	6.33
HYDROGRAPH AT								
+	E2080	.06	1	FLOW	8.	15.	29.	64.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP2080	.13	1	FLOW	16.	28.	51.	113.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E2090	.02	1	FLOW	3.	5.	9.	19.
				TIME	6.33	6.33	6.33	6.25
3 COMBINED AT								
+	DP2090	.48	1	FLOW	93.	152.	260.	535.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	DB2091	.48	1	FLOW	90.	147.	241.	473.
				TIME	6.33	6.33	6.33	6.33
			** PEAK STAGES IN FEET **					
			1	STAGE	100.90	101.47	102.41	104.73
				TIME	6.33	6.33	6.33	6.33
ROUTED TO								
+	R2100	.48	1	FLOW	90.	144.	237.	468.
				TIME	6.42	6.42	6.42	6.42
HYDROGRAPH AT								
+	E2110	.03	1	FLOW	4.	8.	14.	33.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R2101	.03	1	FLOW	4.	7.	14.	33.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E2100	.09	1	FLOW	15.	24.	42.	89.
				TIME	6.42	6.42	6.33	6.33
3 COMBINED AT								
+	DP2100	.61	1	FLOW	108.	175.	292.	584.
				TIME	6.42	6.42	6.42	6.33
HYDROGRAPH AT								
+	E2120	.05	1	FLOW	5.	9.	18.	45.
				TIME	6.25	6.25	6.17	6.17
2 COMBINED AT								
+	DP2120	.66	1	FLOW	112.	181.	306.	618.
				TIME	6.42	6.42	6.33	6.33
ROUTED TO								
+	R2120	.66	1	FLOW	110.	181.	304.	612.
				TIME	6.42	6.42	6.42	6.33
ROUTED TO								
+	R2130	.66	1	FLOW	108.	181.	304.	609.
				TIME	6.42	6.42	6.42	6.42

HYDROGRAPH AT								
+	E2130	.01	1	FLOW	1.	2.	5.	11.
				TIME	6.17	6.17	6.17	6.08
2 COMBINED AT								
+	DP2130	.67	1	FLOW	109.	182.	306.	615.
				TIME	6.42	6.42	6.42	6.33
HYDROGRAPH AT								
+	E2140	.01	1	FLOW	1.	2.	4.	9.
				TIME	6.08	6.08	6.08	6.08
HYDROGRAPH AT								
+	E2150	.01	1	FLOW	4.	6.	11.	21.
				TIME	6.17	6.17	6.17	6.17
HYDROGRAPH AT								
+	E2160	.01	1	FLOW	13.	17.	22.	35.
				TIME	6.00	6.00	6.00	6.00
4 COMBINED AT								
+	DP2160	.70	1	FLOW	114.	188.	316.	640.
				TIME	6.42	6.42	6.42	6.33
HYDROGRAPH AT								
+	E3000	.42	1	FLOW	129.	190.	300.	568.
				TIME	6.33	6.33	6.25	6.25
HYDROGRAPH AT								
+	E3005	.24	1	FLOW	98.	144.	222.	407.
				TIME	6.17	6.17	6.17	6.17
2 COMBINED AT								
+	DP3000	.66	1	FLOW	215.	317.	493.	935.
				TIME	6.25	6.25	6.25	6.17
ROUTED TO								
+	R3015	.66	1	FLOW	210.	313.	493.	925.
				TIME	6.33	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3015	.11	1	FLOW	51.	75.	115.	212.
				TIME	6.08	6.08	6.08	6.08
2 COMBINED AT								
+	DP3020	.77	1	FLOW	245.	365.	570.	1077.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3010	.22	1	FLOW	96.	138.	211.	383.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3012	.22	1	FLOW	93.	134.	204.	378.
				TIME	6.25	6.25	6.17	6.17
HYDROGRAPH AT								
+	E3012	.21	1	FLOW	64.	94.	147.	272.
				TIME	6.33	6.33	6.33	6.33
HYDROGRAPH AT								
+	E3020	.19	1	FLOW	159.	204.	275.	428.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	R3025	.19	1	FLOW	158.	201.	270.	418.
				TIME	6.25	6.25	6.25	6.25
HYDROGRAPH AT								
+	E3025	.26	1	FLOW	273.	347.	463.	712.
				TIME	6.08	6.08	6.08	6.08

5 COMBINED AT								
+	DP3020	1.65	1	FLOW	761.	1059.	1562.	2737.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	DB3021	1.65	1	FLOW	255.	348.	554.	1808.
				TIME	6.75	6.75	6.67	6.42
			** PEAK STAGES IN FEET **					
			1	STAGE	102.84	103.58	105.54	108.68
				TIME	6.75	6.75	6.67	6.42
ROUTED TO								
+	R3030	1.65	1	FLOW	255.	347.	553.	1761.
				TIME	6.83	6.83	6.75	6.50
HYDROGRAPH AT								
+	E3030	.26	1	FLOW	76.	116.	186.	361.
				TIME	6.25	6.25	6.25	6.17
HYDROGRAPH AT								
+	E3035	.16	1	FLOW	72.	106.	166.	306.
				TIME	6.08	6.08	6.08	6.08
3 COMBINED AT								
+	DP3030	2.07	1	FLOW	290.	401.	637.	2007.
				TIME	6.67	6.58	6.58	6.50
ROUTED TO								
+	DB3031	2.07	1	FLOW	289.	399.	636.	2012.
				TIME	6.75	6.67	6.67	6.50
			** PEAK STAGES IN FEET **					
			1	STAGE	103.26	104.00	104.79	107.45
				TIME	6.75	6.67	6.67	6.50
ROUTED TO								
+	R3040	2.07	1	FLOW	289.	399.	635.	1987.
				TIME	6.75	6.67	6.67	6.50
HYDROGRAPH AT								
+	E3040	.12	1	FLOW	18.	31.	58.	129.
				TIME	6.25	6.17	6.17	6.17
2 COMBINED AT								
+	DP3040	2.18	1	FLOW	294.	410.	653.	2043.
				TIME	6.75	6.67	6.67	6.50
ROUTED TO								
+	R3050	2.18	1	FLOW	294.	409.	651.	1998.
				TIME	6.75	6.75	6.67	6.58
HYDROGRAPH AT								
+	E3050	.07	1	FLOW	41.	56.	80.	136.
				TIME	6.25	6.25	6.25	6.17
2 COMBINED AT								
+	DP3050	2.26	1	FLOW	308.	432.	682.	2061.
				TIME	6.75	6.58	6.67	6.58
HYDROGRAPH AT								
+	E3060	.12	1	FLOW	42.	63.	100.	189.
				TIME	6.17	6.17	6.17	6.08
ROUTED TO								
+	DB3061	.12	1	FLOW	33.	50.	82.	165.
				TIME	6.25	6.25	6.25	6.25
			** PEAK STAGES IN FEET **					
			1	STAGE	101.09	101.68	102.73	105.11

				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R3070	.12	1	FLOW	33.	50.	80.	164.
				TIME	6.42	6.42	6.33	6.33
HYDROGRAPH AT								
+	E3070	.08	1	FLOW	18.	27.	44.	87.
				TIME	6.42	6.42	6.33	6.33
2 COMBINED AT								
+	DP3070	.20	1	FLOW	51.	77.	124.	251.
				TIME	6.42	6.42	6.33	6.33
ROUTED TO								
+	R3071	.20	1	FLOW	49.	76.	123.	248.
				TIME	6.50	6.50	6.42	6.42
2 COMBINED AT								
+	DP3050	2.45	1	FLOW	354.	506.	800.	2267.
				TIME	6.58	6.50	6.50	6.50
HYDROGRAPH AT								
+	E3080	.05	1	FLOW	15.	23.	38.	72.
				TIME	6.25	6.25	6.25	6.25
ROUTED TO								
+	R3080	.05	1	FLOW	15.	23.	37.	71.
				TIME	6.42	6.33	6.33	6.33
HYDROGRAPH AT								
+	E3090	.05	1	FLOW	14.	21.	34.	67.
				TIME	6.33	6.33	6.25	6.25
2 COMBINED AT								
+	DP3090	.11	1	FLOW	29.	44.	71.	138.
				TIME	6.33	6.33	6.33	6.25
ROUTED TO								
+	DB3091	.11	1	FLOW	18.	28.	61.	107.
				TIME	6.67	6.67	6.50	6.50
			** PEAK STAGES IN FEET **					
			1	STAGE	102.23	102.87	103.44	104.35
				TIME	6.67	6.67	6.50	6.50
2 COMBINED AT								
+	DP3092	2.56	1	FLOW	372.	533.	861.	2374.
				TIME	6.58	6.58	6.50	6.50
ROUTED TO								
+	R3100	2.56	1	FLOW	372.	533.	860.	2368.
				TIME	6.58	6.58	6.50	6.58
HYDROGRAPH AT								
+	E3100	.09	1	FLOW	42.	61.	92.	166.
				TIME	6.17	6.17	6.17	6.17
ROUTED TO								
+	DB3101	.09	1	FLOW	33.	48.	73.	116.
				TIME	6.33	6.33	6.33	6.33
			** PEAK STAGES IN FEET **					
			1	STAGE	101.09	101.58	102.42	103.65
				TIME	6.33	6.33	6.33	6.33
2 COMBINED AT								
+	DP3102	2.66	1	FLOW	397.	573.	925.	2475.
				TIME	6.58	6.50	6.42	6.50
HYDROGRAPH AT								

HYDROGRAI	+	E3110	.02	1	FLOW	10.	14.	19.	31.
+					TIME	6.33	6.33	6.33	6.25
	2 COMBINED AT								
2 COMBIN	+	DP3110	2.67	1	FLOW	405.	585.	943.	2500.
+					TIME	6.58	6.50	6.42	6.50
	ROUTED TO								
ROUTED TO	+	R3110	2.67	1	FLOW	403.	581.	940.	2493.
+					TIME	6.58	6.58	6.50	6.58
	2 COMBINED AT								
	+	DP3111	3.38	1	FLOW	506.	759.	1246.	3043.
					TIME	6.58	6.50	6.42	6.50
	ROUTED TO								
HYDROGRAPI	+	R5010	3.38	1	FLOW	505.	756.	1243.	3035.
+					TIME	6.67	6.58	6.50	6.58
1	HYDROGRAPH AT								
	+	E5020	.20	1	FLOW	112.	151.	216.	362.
					TIME	6.25	6.25	6.25	6.25
	ROUTED TO								
*** NORMAI	+	DB5021	.20	1	FLOW	41.	65.	93.	197.
					TIME	6.75	6.67	6.67	6.58
				** PEAK STAGES IN FEET **					
				1	STAGE	104.04	105.26	106.67	109.19
					TIME	6.75	6.67	6.67	6.58
	2 COMBINED AT								
	+	DP5010	3.58	1	FLOW	545.	819.	1333.	3232.
					TIME	6.67	6.58	6.50	6.58
	ROUTED TO								
	+	R5011	3.58	1	FLOW	540.	810.	1323.	3200.
					TIME	6.75	6.67	6.58	6.58
	HYDROGRAPH AT								
	+	E5010	.16	1	FLOW	74.	101.	146.	246.
					TIME	6.33	6.33	6.33	6.33
	ROUTED TO								
	+	DB5011	.16	1	FLOW	30.	41.	59.	127.
					TIME	6.92	6.92	6.92	6.75
				** PEAK STAGES IN FEET **					
				1	STAGE	103.02	104.10	105.90	108.47
					TIME	6.92	6.92	6.92	6.75
	2 COMBINED AT								
	+	DP5011	3.73	1	FLOW	570.	848.	1375.	3324.
					TIME	6.75	6.67	6.58	6.58
	HYDROGRAPH AT								
	+	E4010	.19	1	FLOW	78.	108.	160.	279.
					TIME	6.33	6.33	6.33	6.33
	ROUTED TO								
	+	DB4011	.19	1	FLOW	46.	64.	94.	157.
					TIME	6.75	6.75	6.75	6.75
				** PEAK STAGES IN FEET **					
				1	STAGE	102.30	103.20	104.72	107.23
					TIME	6.75	6.75	6.75	6.75
	ROUTED TO								
	+	R4020	.19	1	FLOW	46.	64.	94.	157.
					TIME	7.00	7.00	7.00	6.92

HYDROGRAPH AT								
+	E4020	.14	1	FLOW	27.	39.	61.	114.
				TIME	6.75	6.75	6.75	6.67
2 COMBINED AT								
+	DP4020	.32	1	FLOW	70.	100.	150.	265.
				TIME	6.92	6.92	6.92	6.83
ROUTED TO								
+	DB4021	.32	1	FLOW	48.	77.	121.	211.
				TIME	7.58	7.33	7.25	7.25
			**	PEAK STAGES IN FEET **				
			1	STAGE	103.21	103.92	104.58	105.61
				TIME	7.58	7.33	7.25	7.25
HYDROGRAPH AT								
+	E4030	.02	1	FLOW	15.	20.	27.	44.
				TIME	6.08	6.08	6.08	6.08
1								

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

HYDRAULIC CALCULATIONS

APPENDIX B

WEST FORK JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY

SUMMARY OF CHANNEL IMPROVEMENTS
RIPRAP LINED

"n"= 0.04 SS 3 H TO 1 V.

DEPTH = 3 FT AVERAGE VELOCITY = 7 FPS MAX VEL 9 FPS

CHANNEL NUMBER	DRAINAGE NAME	CHANNEL LENGTH (FT)	100-YEAR FLOW (CFS)	REQD. AREA (S.F.)	CHANNEL DEPTH (FT)	EX. SLOPE (FT/FT)	FUTURE SLOPE (FT/FT)	CHANNEL BOTTOM WIDTH	CHANNEL TOP WIDTH	HYDR. RADIUS (FEET)	R.O.W. REQD. (FEET)	DROP IN SEGMENT (FT)	NUMBER OF CHECK STRUC.
5012	WFJC	1400	3320	474	5.0	0.003	0.003	100	130	4.43	160	0.0	0
5011	WFJC	1270	3190	456	5.0	0.006	0.004	90	120	4.38	150	2.5	2
5010	WFJC	2050	2640	377	4.0	0.006	0.004	90	114	3.59	144	4.1	3
3110	WFJC	870	2500	357	4.0	0.006	0.004	90	114	3.59	144	1.7	1
3040	WFJC	2350	360	51	3.0	0.025	0.010	20	38	2.28	68	35.3	11
3030-1	WFJC	1060	1850	264	4.0	0.030	0.010	65	89	3.47	119	21.2	5
3030-2	WFJC	900	1760	251	4.0	0.030	0.010	60	84	3.43	114	18.0	8
3000	WFJC	3230	570	81	3.0	0.020	0.010	25	43	2.37	73	32.3	10
3005	WFJC	3000	410	59	3.0	0.020	0.010	20	38	2.28	68	30.0	10
3012	WFJC	2000	380	54	3.0	0.010	0.005	20	38	2.28	68	10.0	4
3015	WFJC	1550	935	134	4.0	0.015	0.010	35	59	3.18	89	7.8	3
3021	WFJC	1750	420	60	3.0	0.020	0.010	20	38	2.28	68	17.5	6
3025	WFJC	1380	910	130	4.0	0.018	0.010	35	59	3.18	89	11.0	4
3060	WFJC	2000	190	27	2.0	0.015	0.010	20	32	1.62	62	10.0	3
3070	WFJC	800	190	27	4.0	0.015	0.010	10	34	2.54	64	4.0	1
2160	DRWY A	1030	620	89	3.0	0.026	0.013	30	48	2.44	78	13.4	11
4020 (1)	DFA	2500	265	53	3.0	0.005	0.005	20	38	2.28	68	0.0	4
4010 (1)	DFA	900	280	56	3.0	0.005	0.005	20	38	2.28	68	0.0	0

(1) Grasslined channel section

WEST FORK JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY

SUMMARY OF CHANNEL IMPROVEMENTS

RIPRAP LINED

UNIT COSTS

DEPTH	MAINT. RD ($/FT)	CHAN EX. ($/FT)	REVEG ($/FT^2)	RIPRAP ($/FT.)
1	$15	$10	$0.25	$72
2	$15	$15	$0.25	$99
3	$15	$18	$0.25	$126
4	$15	$19	$0.25	$144
5	$15	$19	$0.25	$171

NUMBER OF DROP STRUC.	CHANNEL NUMBER	MAINT. RD ($/FT.) $15.00	CHAN EX ($/YD^3) $7.50	REVEG ($/FT^2) $0.25	RIPRAP ($/FT.)	COST PER FT.	CHECK & DROP STRUCTURES	TOTAL CONST. COST, CHANNEL & DROPS	ENGR. & CONT	O&M
0	5012	$15	$19	$5	$171	$210	$0	$293,300	$43,995	$5,600
0	5011	$15	$19	$5	$171	$210	$84,000	$350,065	$52,510	$5,080
0	5010	$15	$19	$3	$144	$181	$120,600	$491,650	$73,748	$8,200
0	3110	$15	$19	$3	$144	$181	$40,200	$197,670	$29,651	$3,480
0	3040	$15	$18	$2	$126	$160	$191,400	$567,400	$85,110	$9,400
0	3030-1	$15	$19	$3	$144	$181	$163,500	$355,360	$53,304	$4,240
0	3030-2	$15	$19	$3	$144	$181	$249,600	$412,500	$61,875	$3,600
0	3000	$15	$18	$2	$126	$160	$189,000	$705,800	$105,870	$12,920
0	3005	$15	$18	$2	$126	$160	$174,000	$654,000	$98,100	$12,000
0	3012	$15	$18	$2	$126	$160	$69,600	$389,600	$58,440	$8,000
0	3015	$15	$19	$3	$144	$181	$71,100	$351,650	$52,748	$6,200
0	3021	$15	$18	$2	$126	$160	$104,400	$384,400	$57,660	$7,000
0	3025	$15	$19	$3	$144	$181	$94,800	$344,580	$51,687	$5,520
0	3060	$15	$15	$0	$99	$129	$46,800	$304,800	$45,720	$8,000
0	3070	$15	$19	$3	$144	$181	$16,200	$161,000	$24,150	$3,200
0	2160	$15	$18	$2	$126	$160	$224,400	$389,200	$58,380	$4,120
0	4020 (1)	$15	$18	$10	$0	$43	$69,600	$175,850	$26,378	$10,000
0	4010 (1)	$15	$18	$10	$0	$43	$0	$38,250	$5,738	$3,600
								$6,352,975	$952,946	$106,560

TOTAL COST OF IMPROVEMENTS $7,305,921

@ Proposed Collector, "The Crossings"
DP 5010

CURRENT DATE: 07-07-2000
CURRENT TIME: 12:17:35

FILE DATE: 07-07-2000
FILE NAME: 5010

****
FHWA CULVERT ANALYSIS
HY-8, VERSION 3.2
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.20	80.00	5 RCB	15.00	6.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (CFS) FILE: 5010 DATE: 07-07-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
102.66	350	350	0	0	0	0	0	0	1
102.96	700	700	0	0	0	0	0	0	1
103.25	1050	1050	0	0	0	0	0	0	1
103.74	1400	1400	0	0	0	0	0	0	1
104.32	1750	1750	0	0	0	0	0	0	1
104.88	2100	2100	0	0	0	0	0	0	1
105.41	2450	2450	0	0	0	0	0	0	1
105.93	2800	2800	0	0	0	0	0	0	1
106.45	3150	3150	0	0	0	0	0	0	1
106.71	3320	3320	0	0	0	0	0	0	1
110.00	5186	5186	0	0	0	0	0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 5010 DATE: 07-07-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
102.66	0.00	350	0	0.00
102.96	0.00	700	0	0.00
103.25	0.00	1050	0	0.00
103.74	0.00	1400	0	0.00
104.32	0.00	1750	0	0.00
104.88	0.00	2100	0	0.00
105.41	0.00	2450	0	0.00
105.93	0.00	2800	0	0.00
106.45	0.00	3150	0	0.00
106.71	0.00	3320	0	0.00

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 07-07-2000
CURRENT TIME: 12:17:35

FILE DATE: 07-07-2000
FILE NAME: 5010

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 5 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.20	0.00	-0.80	0-NF	0.00	100.00	0.00	0.00
350	102.66	100.41	1.50	2.66	6-FF	0.00	0.00	0.00	3.85
700	102.96	101.03	2.38	2.96	6-FF	0.00	0.00	0.00	5.10
1050	103.25	101.52	3.10	3.25	6-FF	0.00	0.00	0.00	6.02
1400	103.74	101.95	3.74	3.55	6-FF	0.00	0.00	0.00	11.72
1750	104.32	102.34	4.32	3.87	6-FF	0.00	0.00	0.00	12.47
2100	104.88	102.69	4.88	4.20	6-FF	0.00	0.00	0.00	13.05
2450	105.41	103.02	5.41	4.56	6-FF	0.00	0.00	0.00	13.60
2800	105.93	103.33	5.93	4.93	6-FF	0.00	0.00	0.00	14.07
3150	106.45	103.62	6.45	5.34	6-FF	0.00	0.00	0.00	14.52
3320	106.71	103.75	6.71	5.54	6-FF	0.00	0.00	0.00	14.71

El. inlet face invert 100.00 ft El. outlet invert 99.20 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

*** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	180.00
OUTLET ELEVATION (FT)	99.20
NUMBER OF BARRELS	5.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	80.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	15.00 FT
BARREL RISE	6.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

****

CURRENT DATE: 07-07-2000
CURRENT TIME: 12:17:35

FILE DATE: 07-07-2000
FILE NAME: 5010

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	80.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.004
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.20
CULVERT NO.1 OUTLET INVERT ELEVATION	99.20 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.20	0.000	0.00	0.00
350.00	100.41	0.552	3.45	0.30
700.00	101.03	0.583	4.48	0.46
1050.00	101.52	0.600	5.19	0.58
1400.00	101.95	0.612	5.76	0.69
1750.00	102.34	0.621	6.24	0.78
2100.00	102.69	0.627	6.65	0.87
2450.00	103.02	0.633	7.02	0.95
2800.00	103.33	0.637	7.35	1.03
3150.00	103.62	0.641	7.65	1.10
3320.00	103.75	0.643	7.79	1.14

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	80.00
CREST LENGTH (FT)	200.00
OVERTOPPING CREST ELEVATION (FT)	110.00

****

Use e SUEFFELS RD & MESA PUMP PADDOCK, DRIVE

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:56:48

FILE DATE: 03-21-2000
FILE NAME: 2160-1

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	2 RCB	8.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 2160-1 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.94	70	70	0	0	0	0	0	0	1
102.25	140	140	0	0	0	0	0	0	1
102.67	210	210	0	0	0	0	0	0	1
103.25	280	280	0	0	0	0	0	0	1
103.78	350	350	0	0	0	0	0	0	1
104.27	420	420	0	0	0	0	0	0	1
104.76	490	490	0	0	0	0	0	0	1
105.26	560	560	0	0	0	0	0	0	1
105.70	620	620	0	0	0	0	0	0	1
106.33	700	700	0	0	0	0	0	0	1
108.00	882	882	0	0	0	0	0	OVERTOPPING	

****

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 2160-1 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.94	0.00	70	0	0.00
102.25	0.00	140	0	0.00
102.67	0.00	210	0	0.00
103.25	0.00	280	0	0.00
103.78	0.00	350	0	0.00
104.27	0.00	420	0	0.00
104.76	0.00	490	0	0.00
105.26	0.00	560	0	0.00
105.70	0.00	620	0	0.00
106.33	0.00	700	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 13:56:48 FILE NAME: 2160-1

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 2 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
70	101.94	99.65	1.28	1.94	6-FF	0.00	0.00	0.00	5.19
140	102.25	99.99	2.03	2.25	6-FF	0.00	0.00	0.00	6.54
210	102.67	100.25	2.67	2.55	6-FF	0.00	0.00	0.00	10.59
280	103.25	100.48	3.25	2.87	6-FF	0.00	0.00	0.00	11.52
350	103.78	100.69	3.78	3.22	6-FF	0.00	0.00	0.00	12.18
420	104.27	100.88	4.27	3.59	6-FF	0.00	0.00	0.00	12.77
490	104.76	101.06	4.76	3.99	6-FF	0.00	0.00	0.00	13.30
560	105.26	101.22	5.26	4.43	6-FF	0.00	0.00	0.00	13.75
620	105.70	101.36	5.70	4.83	6-FF	0.00	0.00	0.00	14.11
700	106.33	101.53	6.33	5.40	6-FF	0.00	0.00	0.00	14.56

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	2.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	8.00 FT
BARREL RISE	5.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

RRENT DATE: 03-21-2000
RENT TIME: 13:56:48

FILE DATE: 03-21-2000
FILE NAME: 2160-1

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	40.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.005
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
70.00	99.65	0.556	2.55	0.20
140.00	99.99	0.586	3.30	0.31
210.00	100.25	0.603	3.83	0.39
280.00	100.48	0.614	4.25	0.46
350.00	100.69	0.623	4.59	0.53
420.00	100.88	0.629	4.90	0.59
490.00	101.06	0.635	5.16	0.64
560.00	101.22	0.639	5.40	0.69
620.00	101.36	0.642	5.59	0.74
700.00	101.53	0.646	5.82	0.79

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

UNDER ARTERIAL: DP 3000 & CULVERT @ 3025

CURRENT DATE: 03-21-2000
CURRENT TIME: 12:44:45

FILE DATE: 03-21-2000
FILE NAME: 3000

****
FHWA CULVERT ANALYSIS
HY-8, VERSION 3.2
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	98.80	120.01	2 RCB	12.00	6.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3000 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
102.22	100	100	0	0	0	0	0	0	1
102.50	200	200	0	0	0	0	0	0	1
102.76	300	300	0	0	0	0	0	0	1
103.13	400	400	0	0	0	0	0	0	1
103.65	500	500	0	0	0	0	0	0	1
104.12	600	600	0	0	0	0	0	0	1
104.58	700	700	0	0	0	0	0	0	1
105.01	800	800	0	0	0	0	0	0	1
105.43	900	900	0	0	0	0	0	0	1
105.71	965	965	0	0	0	0	0	0	1
108.00	1458	1458	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3000 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
102.22	0.00	100	0	0.00
102.50	0.00	200	0	0.00
102.76	0.00	300	0	0.00
103.13	0.00	400	0	0.00
103.65	0.00	500	0	0.00
104.12	0.00	600	0	0.00
104.58	0.00	700	0	0.00
105.01	0.00	800	0	0.00
105.43	0.00	900	0	0.00
105.71	0.00	965	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 12:44:45

FILE DATE: 03-21-2000
FILE NAME: 3000

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 2 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	98.80	0.00	-1.20	0-NF	0.00	100.00	0.00	0.00
100	102.22	99.86	1.24	2.22	6-FF	0.00	0.00	0.00	3.94
200	102.50	100.38	1.97	2.50	6-FF	0.00	0.00	0.00	5.28
300	102.76	100.79	2.58	2.76	6-FF	0.00	0.00	0.00	6.28
400	103.13	101.14	3.13	3.02	6-FF	0.00	0.00	0.00	11.74
500	103.65	101.45	3.65	3.29	6-FF	0.00	0.00	0.00	12.51
600	104.12	101.73	4.12	3.58	6-FF	0.00	0.00	0.00	13.16
700	104.58	101.99	4.58	3.88	6-FF	0.00	0.00	0.00	13.67
800	105.01	102.23	5.01	4.20	6-FF	0.00	0.00	0.00	14.17
900	105.43	102.45	5.43	4.53	6-FF	0.00	0.00	0.00	14.59
965	105.71	102.59	5.71	4.76	6-FF	0.00	0.00	0.00	14.87

El. inlet face invert 100.00 ft El. outlet invert 98.80 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	220.00
OUTLET ELEVATION (FT)	98.80
NUMBER OF BARRELS	2.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	120.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	12.00 FT
BARREL RISE	6.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 12:44:45 FILE NAME: 3000

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	25.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.005
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	98.80
CULVERT NO.1 OUTLET INVERT ELEVATION	98.80 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	98.80	0.000	0.00	0.00
100.00	99.86	0.576	3.36	0.33
200.00	100.38	0.597	4.26	0.49
300.00	100.79	0.609	4.87	0.62
400.00	101.14	0.615	5.34	0.73
500.00	101.45	0.620	5.73	0.83
600.00	101.73	0.624	6.06	0.91
700.00	101.99	0.627	6.35	0.99
800.00	102.23	0.629	6.61	1.07
900.00	102.45	0.631	6.85	1.14
965.00	102.59	0.632	6.99	1.18

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

SB 3000 @ PROPOSED COLLECTOR

CULVERT # 3000-1

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:21:29

FILE DATE: 03-21-2000
FILE NAME: 3000-2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	1 RCB	18.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3000-2 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.88	65	65	0	0	0	0	0	0	1
102.14	130	130	0	0	0	0	0	0	1
102.39	195	195	0	0	0	0	0	0	1
102.85	260	260	0	0	0	0	0	0	1
103.32	325	325	0	0	0	0	0	0	1
103.75	390	390	0	0	0	0	0	0	1
104.17	455	455	0	0	0	0	0	0	1
104.57	520	520	0	0	0	0	0	0	1
104.88	570	570	0	0	0	0	0	0	1
105.39	650	650	0	0	0	0	0	0	1
108.00	992	992	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3000-2 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.88	0.00	65	0	0.00
102.14	0.00	130	0	0.00
102.39	0.00	195	0	0.00
102.85	0.00	260	0	0.00
103.32	0.00	325	0	0.00
103.75	0.00	390	0	0.00
104.17	0.00	455	0	0.00
104.57	0.00	520	0	0.00
104.88	0.00	570	0	0.00
105.39	0.00	650	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 14:21:29 FILE NAME: 3000-2

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 1 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
65	101.88	99.93	1.13	1.88	6-FF	0.00	0.00	0.00	3.88
130	102.14	100.39	1.79	2.14	6-FF	0.00	0.00	0.00	5.21
195	102.39	100.75	2.34	2.39	6-FF	0.00	0.00	0.00	6.20
260	102.85	101.05	2.85	2.64	6-FF	0.00	0.00	0.00	11.29
325	103.32	101.32	3.32	2.90	6-FF	0.00	0.00	0.00	11.95
390	103.75	101.57	3.75	3.18	6-FF	0.00	0.00	0.00	12.57
455	104.17	101.79	4.17	3.48	6-FF	0.00	0.00	0.00	13.11
520	104.57	102.00	4.57	3.80	6-FF	0.00	0.00	0.00	13.56
570	104.88	102.15	4.88	4.05	6-FF	0.00	0.00	0.00	13.90
650	105.39	102.38	5.39	4.49	6-FF	0.00	0.00	0.00	14.38

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

*** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	1.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	18.00 FT
BARREL RISE	5.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:23:44

FILE DATE: 03-21-2000
FILE NAME: 3000-2

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	20.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.005
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
65.00	99.93	0.560	3.07	0.29
130.00	100.39	0.580	3.88	0.43
195.00	100.75	0.590	4.42	0.54
260.00	101.05	0.596	4.85	0.64
325.00	101.32	0.601	5.19	0.72
390.00	101.57	0.604	5.49	0.80
455.00	101.79	0.607	5.75	0.87
520.00	102.00	0.609	5.98	0.94
570.00	102.15	0.610	6.15	0.98
650.00	102.38	0.612	6.39	1.05

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:31:25

FILE DATE: 03-21-2000
FILE NAME: 3005-1

****

FHWA CULVERT ANALYSIS
HY-8, VERSION 3.2

****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	1 RCB	9.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3005-1 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.28	21	21	0	0	0	0	0	0	1
101.47	42	42	0	0	0	0	0	0	1
101.82	63	63	0	0	0	0	0	0	1
102.19	84	84	0	0	0	0	0	0	1
102.52	105	105	0	0	0	0	0	0	1
102.83	126	126	0	0	0	0	0	0	1
103.14	147	147	0	0	0	0	0	0	1
103.43	168	168	0	0	0	0	0	0	1
103.73	189	189	0	0	0	0	0	0	1
103.95	205	205	0	0	0	0	0	0	1
108.00	444	444	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3005-1 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.28	0.00	21	0	0.00
101.47	0.00	42	0	0.00
101.82	0.00	63	0	0.00
102.19	0.00	84	0	0.00
102.52	0.00	105	0	0.00
102.83	0.00	126	0	0.00
103.14	0.00	147	0	0.00
103.43	0.00	168	0	0.00
103.73	0.00	189	0	0.00
103.95	0.00	205	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:31:25

FILE DATE: 03-21-2000
FILE NAME: 3005-1

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 1 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
21	101.28	99.58	0.88	1.28	6-FF	0.00	0.00	0.00	4.04
42	101.47	99.86	1.39	1.47	6-FF	0.00	0.00	0.00	5.31
63	101.82	100.07	1.82	1.65	6-FF	0.00	0.00	0.00	8.83
84	102.19	100.26	2.19	1.82	6-FF	0.00	0.00	0.00	9.58
105	102.52	100.42	2.52	2.00	6-FF	0.00	0.00	0.00	10.42
126	102.83	100.57	2.83	2.19	6-FF	0.00	0.00	0.00	10.83
147	103.14	100.70	3.14	2.39	6-FF	0.00	0.00	0.00	11.39
168	103.43	100.83	3.43	2.61	6-FF	0.00	0.00	0.00	11.74
189	103.73	100.94	3.73	2.83	6-FF	0.00	0.00	0.00	12.13
205	103.95	101.03	3.95	3.01	6-FF	0.00	0.00	0.00	12.44

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	1.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	9.00 FT
BARREL RISE	4.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 14:31:25 FILE NAME: 3005-1

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	10.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.010
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
21.00	99.58	0.719	3.10	0.36
42.00	99.86	0.742	3.90	0.53
63.00	100.07	0.753	4.43	0.67
84.00	100.26	0.760	4.84	0.79
105.00	100.42	0.765	5.18	0.89
126.00	100.57	0.769	5.46	0.98
147.00	100.70	0.772	5.71	1.06
168.00	100.83	0.774	5.94	1.14
189.00	100.94	0.776	6.14	1.21
205.00	101.03	0.778	6.28	1.27

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

DP 3020 @ Proposed N/S Collector;
3060-2, 3005-1 & 3010 AC30

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:05:34

FILE DATE: 03-21-2000
FILE NAME: 3020-1

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	1 RCB	12.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3020-1 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.89	45	45	0	0	0	0	0	0	1
102.15	90	90	0	0	0	0	0	0	1
102.50	135	135	0	0	0	0	0	0	1
102.98	180	180	0	0	0	0	0	0	1
103.44	225	225	0	0	0	0	0	0	1
103.88	270	270	0	0	0	0	0	0	1
104.31	315	315	0	0	0	0	0	0	1
104.73	360	360	0	0	0	0	0	0	1
105.15	405	405	0	0	0	0	0	0	1
105.29	420	420	0	0	0	0	0	0	1
108.00	676	676	0	0	0	0	0	OVERTOPPING	

Hw/D=1

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3020-1 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.89	0.00	45	0	0.00
102.15	0.00	90	0	0.00
102.50	0.00	135	0	0.00
102.98	0.00	180	0	0.00
103.44	0.00	225	0	0.00
103.88	0.00	270	0	0.00
104.31	0.00	315	0	0.00
104.73	0.00	360	0	0.00
105.15	0.00	405	0	0.00
105.29	0.00	420	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 14:05:34 FILE NAME: 3020-1

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 1 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
45	101.89	99.72	1.20	1.89	6-FF	0.00	0.00	0.00	4.93
90	102.15	100.07	1.91	2.15	6-FF	0.00	0.00	0.00	6.21
135	102.50	100.35	2.50	2.40	6-FF	0.00	0.00	0.00	10.42
180	102.98	100.58	2.98	2.65	6-FF	0.00	0.00	0.00	11.25
225	103.44	100.79	3.44	2.92	6-FF	0.00	0.00	0.00	11.92
270	103.88	100.98	3.88	3.19	6-FF	0.00	0.00	0.00	12.53
315	104.31	101.15	4.31	3.49	6-FF	0.00	0.00	0.00	13.05
360	104.73	101.31	4.73	3.80	6-FF	0.00	0.00	0.00	13.51
405	105.15	101.46	5.15	4.13	6-FF	0.00	0.00	0.00	13.93
420	105.29	101.51	5.29	4.25	6-FF	0.00	0.00	0.00	14.07

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	1.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	12.00 FT
BARREL RISE	5.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL
INLET DEPRESSION	NONE

****

RRENT DATE: 03-21-2000
RENT TIME: 14:05:34

FILE DATE: 03-21-2000
FILE NAME: 3020-1

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	15.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.010
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
45.00	99.72	0.757	3.64	0.45
90.00	100.07	0.784	4.61	0.67
135.00	100.35	0.797	5.25	0.84
180.00	100.58	0.805	5.75	0.99
225.00	100.79	0.811	6.16	1.12
270.00	100.98	0.815	6.51	1.24
315.00	101.15	0.819	6.82	1.34
360.00	101.31	0.822	7.09	1.44
405.00	101.46	0.824	7.34	1.54
420.00	101.51	0.825	7.42	1.57

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

ROADWAY 3020-2
WEST COLLECTOR
FOR DET BASIN OUTLET, 3030

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:59:27

FILE DATE: 03-21-2000
FILE NAME: 3020-2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	2 RCB	15.00	8.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3020-2 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
103.59	210	210	0	0	0	0	0	0	1
103.98	420	420	0	0	0	0	0	0	1
104.34	630	630	0	0	0	0	0	0	1
104.70	840	840	0	0	0	0	0	0	1
105.23	1050	1050	0	0	0	0	0	0	1
105.89	1260	1260	0	0	0	0	0	0	1
106.52	1470	1470	0	0	0	0	0	0	1
107.15	1680	1680	0	0	0	0	0	0	1
107.77	1890	1890	0	0	0	0	0	0	1
108.10	2000	2000	0	0	0	0	0	0	1
112.00	3203	3203	0	0	0	0	0	OVERTOPPING	

3020-2 / DB3031

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3020-2 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
103.59	0.00	210	0	0.00
103.98	0.00	420	0	0.00
104.34	0.00	630	0	0.00
104.70	0.00	840	0	0.00
105.23	0.00	1050	0	0.00
105.89	0.00	1260	0	0.00
106.52	0.00	1470	0	0.00
107.15	0.00	1680	0	0.00
107.77	0.00	1890	0	0.00
108.10	0.00	2000	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:59:27

FILE DATE: 03-21-2000
FILE NAME: 3020-2

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 2 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
210	103.59	99.87	1.83	3.59	6-FF	0.00	0.00	0.00	6.07
420	103.98	100.31	2.89	3.98	6-FF	0.00	0.00	0.00	7.65
630	104.34	100.67	3.78	4.34	6-FF	0.00	0.00	0.00	8.76
840	104.70	100.98	4.54	4.70	6-FF	0.00	0.00	0.00	9.64
1050	105.23	101.26	5.23	5.08	6-FF	0.00	0.00	0.00	14.20
1260	105.89	101.51	5.89	5.47	6-FF	0.00	0.00	0.00	14.87
1470	106.52	101.75	6.52	5.88	6-FF	0.00	0.00	0.00	15.47
1680	107.15	101.98	7.15	6.31	6-FF	0.00	0.00	0.00	16.01
1890	107.77	102.19	7.77	6.76	6-FF	0.00	0.00	0.00	16.50
2000	108.10	102.29	8.10	7.01	6-FF	0.00	0.00	0.00	16.75

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	2.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	15.00 FT
BARREL RISE	8.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:59:27

FILE DATE: 03-21-2000
FILE NAME: 3020-2

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	75.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.005
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
210.00	99.87	0.588	3.11	0.27
420.00	100.31	0.623	4.05	0.41
630.00	100.67	0.643	4.72	0.52
840.00	100.98	0.657	5.24	0.62
1050.00	101.26	0.667	5.69	0.70
1260.00	101.51	0.675	6.07	0.78
1470.00	101.75	0.682	6.42	0.86
1680.00	101.98	0.687	6.73	0.93
1890.00	102.19	0.692	7.01	1.00
2000.00	102.29	0.694	7.15	1.03

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	112.00
OVERTOPPING CREST ELEVATION (FT)	112.00

****

DETENTION BASIN 3061
OUTLET PIPE

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:01:36

FILE DATE: 03-21-2000
FILE NAME: 3060-1

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	98.80	120.01	1 RCP	5.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3060-1 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.89	18	18	0	0	0	0	0	0	1
102.25	35	35	0	0	0	0	0	0	1
102.86	53	53	0	0	0	0	0	0	1
103.43	70	70	0	0	0	0	0	0	1
103.93	88	88	0	0	0	0	0	0	1
104.41	105	105	0	0	0	0	0	0	1
104.88	123	123	0	0	0	0	0	0	1
105.38	140	140	0	0	0	0	0	0	1
105.91	158	158	0	0	0	0	0	0	1
106.15	165	165	0	0	0	0	0	0	1
110.00	255	255	0	0	0	0	0	OVERTOPPING	

Hw/D=1.2 for Det Basin outlet

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3060-1 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.89	0.00	18	0	0.00
102.25	0.00	35	0	0.00
102.86	0.00	53	0	0.00
103.43	0.00	70	0	0.00
103.93	0.00	88	0	0.00
104.41	0.00	105	0	0.00
104.88	0.00	123	0	0.00
105.38	0.00	140	0	0.00
105.91	0.00	158	0	0.00
106.15	0.00	165	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:01:36

FILE DATE: 03-21-2000
FILE NAME: 3060-1

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 1 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	98.80	0.00	-1.20	0-NF	0.00	100.00	0.00	0.00
18	101.89	99.32	1.56	1.89	6-FF	0.00	0.00	0.00	5.20
35	102.25	99.57	2.25	2.21	6-FF	0.00	0.00	0.00	9.21
53	102.86	99.77	2.86	2.52	6-FF	0.00	0.00	0.00	10.36
70	103.43	99.94	3.43	2.84	6-FF	0.00	0.00	0.00	10.99
88	103.93	100.09	3.93	3.20	6-FF	0.00	0.00	0.00	11.67
105	104.41	100.22	4.41	3.59	6-FF	0.00	0.00	0.00	12.12
123	104.88	100.35	4.88	4.01	6-FF	0.00	0.00	0.00	12.62
140	105.38	100.46	5.38	4.47	6-FF	0.00	0.00	0.00	13.06
158	105.91	100.57	5.91	4.97	6-FF	0.00	0.00	0.00	13.44
165	106.15	100.61	6.15	5.19	6-FF	0.00	0.00	0.00	13.62

El. inlet face invert 100.00 ft El. outlet invert 98.80 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	220.00
OUTLET ELEVATION (FT)	98.80
NUMBER OF BARRELS	1.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	120.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 14:01:36 FILE NAME: 3060-1

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	10.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.010
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	98.80
CULVERT NO.1 OUTLET INVERT ELEVATION	98.80 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	98.80	0.000	0.00	0.00
17.50	99.32	0.713	2.91	0.32
35.00	99.57	0.737	3.68	0.48
52.50	99.77	0.749	4.19	0.61
70.00	99.94	0.756	4.58	0.71
87.50	100.09	0.761	4.90	0.80
105.00	100.22	0.765	5.18	0.89
122.50	100.35	0.768	5.42	0.96
140.00	100.46	0.771	5.63	1.03
157.50	100.57	0.773	5.83	1.10
165.00	100.61	0.774	5.91	1.13

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	30.00
CREST LENGTH (FT)	110.00
OVERTOPPING CREST ELEVATION (FT)	110.00

****

@ PROPOSED COLLECTOR CHANNEL
3060

CURRENT DATE: 03-21-2000
CURRENT TIME: 14:03:30

FILE DATE: 03-21-2000
FILE NAME: 3060-2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	1 RCB	8.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3060-2 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
101.30	20	20	0	0	0	0	0	0	1
101.50	40	40	0	0	0	0	0	0	1
101.90	60	60	0	0	0	0	0	0	1
102.28	80	80	0	0	0	0	0	0	1
102.63	100	100	0	0	0	0	0	0	1
102.96	120	120	0	0	0	0	0	0	1
103.28	140	140	0	0	0	0	0	0	1
103.60	160	160	0	0	0	0	0	0	1
103.91	180	180	0	0	0	0	0	0	1
104.15	195	195	0	0	0	0	0	0	1
108.00	395	395	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3060-2 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
101.30	0.00	20	0	0.00
101.50	0.00	40	0	0.00
101.90	0.00	60	0	0.00
102.28	0.00	80	0	0.00
102.63	0.00	100	0	0.00
102.96	0.00	120	0	0.00
103.28	0.00	140	0	0.00
103.60	0.00	160	0	0.00
103.91	0.00	180	0	0.00
104.15	0.00	195	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

RRENT DATE: 03-21-2000
RENT TIME: 14:03:30

FILE DATE: 03-21-2000
FILE NAME: 3060-2

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 1 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
20	101.30	99.56	0.92	1.30	6-FF	0.00	0.00	0.00	4.31
40	101.50	99.83	1.45	1.50	6-FF	0.00	0.00	0.00	5.43
60	101.90	100.05	1.90	1.68	6-FF	0.00	0.00	0.00	9.07
80	102.28	100.23	2.28	1.88	6-FF	0.00	0.00	0.00	9.73
100	102.63	100.39	2.63	2.07	6-FF	0.00	0.00	0.00	10.49
120	102.96	100.53	2.96	2.28	6-FF	0.00	0.00	0.00	10.98
140	103.28	100.66	3.28	2.50	6-FF	0.00	0.00	0.00	11.52
160	103.60	100.78	3.60	2.74	6-FF	0.00	0.00	0.00	11.88
180	103.91	100.89	3.91	2.98	6-FF	0.00	0.00	0.00	12.28
195	104.15	100.98	4.15	3.18	6-FF	0.00	0.00	0.00	12.55

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	1.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	8.00 FT
BARREL RISE	4.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	1:1 BEVEL
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 14:03:30 FILE NAME: 3060-2

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	10.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.010
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
20.00	99.56	0.718	3.05	0.35
40.00	99.83	0.741	3.84	0.52
60.00	100.05	0.752	4.36	0.65
80.00	100.23	0.759	4.77	0.76
100.00	100.39	0.764	5.10	0.86
120.00	100.53	0.768	5.38	0.95
140.00	100.66	0.771	5.63	1.03
160.00	100.78	0.773	5.86	1.11
180.00	100.89	0.775	6.06	1.18
195.00	100.98	0.777	6.20	1.23

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	108.00

****

PROPOSED CULVERTS IN THE CROSSINGS

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:53:01

FILE DATE: 03-21-2000
FILE NAME: 3110-1

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 3.2 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	100.00	99.00	100.01	5 RCB	15.00	6.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: 3110-1 DATE: 03-21-2000

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.00	0	0	0	0	0	0	0	0	1
102.45	340	340	0	0	0	0	0	0	1
102.74	680	680	0	0	0	0	0	0	1
103.02	1020	1020	0	0	0	0	0	0	1
103.32	1360	1360	0	0	0	0	0	0	1
103.86	1700	1700	0	0	0	0	0	0	1
104.36	2040	2040	0	0	0	0	0	0	1
104.84	2380	2380	0	0	0	0	0	0	1
105.31	2720	2720	0	0	0	0	0	0	1
105.77	3060	3060	0	0	0	0	0	0	1
106.13	3320	3320	0	0	0	0	0	0	1
115.00	7658	7658	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 3110-1 DATE: 03-21-2000

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
100.00	0.00	0	0	0.00
102.45	0.00	340	0	0.00
102.74	0.00	680	0	0.00
103.02	0.00	1020	0	0.00
103.32	0.00	1360	0	0.00
103.86	0.00	1700	0	0.00
104.36	0.00	2040	0	0.00
104.84	0.00	2380	0	0.00
105.31	0.00	2720	0	0.00
105.77	0.00	3060	0	0.00
106.13	0.00	3320	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 03-21-2000 FILE DATE: 03-21-2000
CURRENT TIME: 13:53:01 FILE NAME: 3110-1

****
********** CULVERT # 1 **********
****

PERFORMANCE CURVE FOR 5 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	FLOW TYPE	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	100.00	99.00	0.00	-1.00	0-NF	0.00	100.00	0.00	0.00
340	102.45	100.04	1.31	2.45	6-FF	0.00	0.00	0.00	4.36
680	102.74	100.57	2.08	2.74	6-FF	0.00	0.00	0.00	5.77
1020	103.02	101.00	2.73	3.02	6-FF	0.00	0.00	0.00	6.80
1360	103.32	101.37	3.32	3.31	6-FF	0.00	0.00	0.00	11.90
1700	103.86	101.70	3.86	3.61	6-FF	0.00	0.00	0.00	12.65
2040	104.36	102.01	4.36	3.92	6-FF	0.00	0.00	0.00	13.30
2380	104.84	102.29	4.84	4.25	6-FF	0.00	0.00	0.00	13.82
2720	105.31	102.56	5.31	4.61	6-FF	0.00	0.00	0.00	14.32
3060	105.77	102.82	5.77	4.98	6-FF	0.00	0.00	0.00	14.76
3320	106.13	103.00	6.13	5.28	6-FF	0.00	0.00	0.00	15.08

El. inlet face invert 100.00 ft El. outlet invert 99.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	100.00
INLET ELEVATION (FT)	100.00
OUTLET STATION (FT)	200.00
OUTLET ELEVATION (FT)	99.00
NUMBER OF BARRELS	5.00
SLOPE (V-FT/H-FT)	0.0100
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	15.00 FT
BARREL RISE	6.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 03-21-2000
CURRENT TIME: 13:53:01

FILE DATE: 03-21-2000
FILE NAME: 3110-1

****
********** TAILWATER **********
****

******* REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	90.00
SIDE SLOPE H/V (X:1)	3.0
CHANNEL SLOPE V/H (FT/FT)	0.005
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	99.00 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00
340.00	100.04	0.606	3.51	0.32
680.00	100.57	0.642	4.57	0.49
1020.00	101.00	0.663	5.32	0.62
1360.00	101.37	0.677	5.91	0.74
1700.00	101.70	0.687	6.41	0.84
2040.00	102.01	0.696	6.85	0.94
2380.00	102.29	0.703	7.24	1.03
2720.00	102.56	0.708	7.59	1.11
3060.00	102.82	0.713	7.91	1.19
3320.00	103.00	0.717	8.14	1.25

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	45.00
CREST LENGTH (FT)	100.00
OVERTOPPING CREST ELEVATION (FT)	115.00

****

EVALUATION OF ALTERNATIVES

APPENDIX C

Evaluation of Conceptual Alternatives

Parameter / Impact / Reach	Flood Control: Reduced Hazard	Flood Control: No change	Environmental: Disturbance	Environmental: Limited or No Impact	Environmental: Mitigation required	Operations and Maintenance: Reduced effort	Operations and Maintenance: Increased effort
Alternative Concept: Floodplain Preservation (do nothing)							
WFJCC & DRWY A SEGMENTS 5010, 3110 2160		Residential and commercial property impacted by the 100-year floodplain are not benefitted by this alternative		Limited area of wetland or riparian area exist in these segments			Unlined banks increase annual annual maintenance responsibility as flows increase in duration and frequency
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY		Residential and commercial property not impacted by the 100-year event at this time.		This concept works well for the segments that have significant wetland and riparioan resources	Limited mitigation with this concept		Unlined banks increase annual annual maintenance responsibility as flows increase in duration and frequency
WFJCC NO. OF FONTAINE BLVD		Residential and commercial property not impacted by the 100-year event at this time.		Limited area of wetland or riparian area exist in these segments			Unlined banks increase annual annual maintenance responsibility as flows increase in duration and frequency
Alternative Concept: Channelization							
WFJCC & DRWY A SEGMENTS 5010, 3110 2160	Channelization of 100-year flow in these segments would benefit developed properties along Marksheffel Road, south of the basin			Limited habitat now exists along drain-ageway.			More maintenance of linings would result with this alternative
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY		Little change in floodplain widths would result from channeliizing in these segments Residential and commercial property not impacted by the 100-year event at this time.	Construction of channel linings will disturb existing wetland and riparian re-source		Mitigation would be required wherever the channelization altered or eliminated wetland habitat		More maintenance of linings would result with this alternative
WFJCC NO OF FONTAINE BLVD		Residential and commercial property not impacted by the 100-year event at this time.		Limited impacts due to absence of wetland areas in these segments.	Mitigation would be required wherever the channelization altered or eliminated wetland habitat		More maintenance of linings would result with this alternative

Parameter / Impact / Reach	Open Space/Aesthetics: Enhancement or Degradation	Open Space/Aesthetics: No change	Implementation: Low Feasibility	Implementation: Moderate Feasibility	Implementation: High Feasibility	Comments	Relative Advantages/Disadvantages of Alternative Concept	
Alternative Concept: Floodplain Preservation (do nothing)								
WFJCC & DRWY A SEGMENTS 5010, 3110 2160		Poorly defined drainageway in these segments the enhance-ment opportunities in these segments	X			Floodplain presservation in these segments does not address the signifi-cant areas within the exisitng flood-plain especially south of the basin	Ad: Low initial cost of improvements	DAd: Large area within 100-year floodplair not addresssed by this concept.
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Floodplain preservation has the opportunity if implemented to preserve the natural floodplain that can enhance the open space			X		When combined with preservation of the floodplain as open space, this concept has positive benefits to the existing wetland and riparian resources in these segments.	Ad: Reduces the need for mitigation along these segments with regard to permitting of the proposed tormwater facilities	
WFJCC NO. OF FONTAINE BLVD	Opportunities for vegetative and visual enhancement of drainageway is limited by the naturally narrow drainageways			X			Ad: Low initial cost	
Alternative Concept: Channelization								
WFJCC & DRWY A SEGMENTS 5010, 3110 2160	Planting along new channel could enhance the drainageway as open space. No vegetation now exists.				X	Development of land adjacent to these se-ments will require that a channel be constructed	Ad: Greatly reduces extent of 100-year floodplain within these segments and offsite from the basin	DAd: Land acquisition will be required through area downstream of Marksheffel Road
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Naturalness of existing drainage-way could be viewed as a de-gradation			X			Ad: Reduces width of drainageway com-pared to the 100-year floodplain widths	DAd: Moderate to high initial costs and would cause disturbance to wetland and riparian areas that would not have to be mitigated for.
WFJCC NO OF FONTAINE BLVD	Naturalness of existing drainage-way could be viewed as a de-gradation			X			Ad: Reduces width of drainageway compe 100-year floodplain widths	DAd: Moderate to high initial costs

Evaluation of Conceptual Alternatives

Parameter	Flood Control			Environmental		Operations and Maintenance	
Impact	Reduced Hazard	No change	Disturbance	Limited or No Impact	Mitigation required	Reduced effort	Increased effort
Reach							
Alternative Concept: Onsite Detention							
WFJCC & DRWY A SEGMENTS 5010, 3110 2160	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property impacted by the 100-year floodplain are not benefitted by this alternative w/o channelization		Limited area of wetland or riparian area exist in these segments			Increase maintenance compared to regional detention
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.	Disturbance wetland & riparian areas could result from the construction of embankments for the on-stream detention basins		Mitigation would be required within detention basin bottom for onstream sites		Increase maintenance compared to regional detention
WFJCC NO, OF FONTAINE BLVD	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.		Limited area of wetland or riparian area exist in these segments	Mitigation would be required within detention basin bottom for onstream sites		Increase maintenance compared to regional detention
Alternative Concept: Regional Detention							
WFJCC & DRWY A SEGMENTS 5010, 3110 2160	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property impacted by the 100-year floodplain are not benefitted by this alternative w/o channelization	Disturbance of wetland & riparian areas could result from the construction of embankments for the on-stream detention basins			Lower maintenance compared to onsite detention concept	
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.	Disturbance of wetland and riparian areas could result from the construction of embankments for the on-stream detention basins		Mitigation would be required wherever the construction altered or eliminated wetland habitat	Lower maintenance compared to onsite detention concept	
WFJCC NO OF FONTAINE BLVD	detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.		Limited impacts due to absence of wetland areas in these segments.		Lower maintenance compared to onsite detention concept	

Parameter	Open Space/Aesthetics		Implementation			Comments	Relative Advantages/Disadvantages of Alternative Concept	
Impact	Enhancement or Degradation	No change	Low Feasibility	Moderate Feasibility	High Feasibility			
Reach								
Alternative Concept: Onsite Detention								
WFJCC & DRWY A SEGMENTS 5010, 3110 2160		Limited enhancement of existing wetlands would result from this concept	X			Onsite detention areas could be used to create new wetland areas if site conditions are there to create a wetland/riparian resource	Ad: May work best in a phased development scenario compared to regional concept Lower initial costs	DAd: Hydrologic impact of onsite detention is potentially not as effective as regional detention concept Private maintenance agreements would be required
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY		Limited enhancement of existing wetlands would result from this concept		X		Onsite detention areas could be used to as mitigation sites for wetland or riparian resources disturbed by channelization of drainageway	Ad: May work best in a phased development scenario compared to regional concept Lower initial costs	DAd: Hydrologic impact of onsite detention is potentially not as effective as regional detention concept Private maintenance agreements would be required
WFJCC NO, OF FONTAINE BLVD		Limited enhancement of existing wetlands would result from this concept	X			Numerous small drainageways in this portion of the basin would create the need for numerous onsite detention basins	Ad: May work best in a phased development scenario compared to regional concept Lower initial costs	DAd: This concept conflicts with the Colorado Centre master drainage plan approved by the City of Colorado Springs
Alternative Concept: Regional Detention								
WFJCC & DRWY A SEGMENTS 5010, 3110 2160	Offstream basins could be used to expand the wetland resources to areas off of the main drainageway			X		Dedication of land could be achieved through development process	Ad: Fewer sites, less maintenance compared to onsite detention concept. Conforms with Cross Creek MDDP	DAd: Phasing of detention basin construction could hinder implementation and administration of system by local governments
WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Offstream basins could be used to expand the wetland resources to areas off of the main drainageway			X		Dedication of land could be achieved through development process	Ad: Fewer sites, less maintenance compared to onsite detention concept	DAd: Phasing of detention basin construction could hinder implementation and administration of system by local governments
WFJCC NO OF FONTAINE BLVD					X	Natural detention area now exists north of Fontaine Boulevard	Ad: Fewer sites, less maintenance compared to onsite detention concept. Conforms with Colorado Centre MDDP	DAd: Phasing of detention basin construction could hinder implementation and administration of system by local governments

Evaluation of Conceptual Alternatives

Parameter / Impact / Reach	Flood Control: Reduced Hazard	Flood Control: No change	Environmental: Disturbance	Environmental: Limited or No Impact	Environmental: Mitigation required	Operations and Maintenance: Reduced effort	Operations and Maintenance: Increased effort
Alternative Concept: Onsite Detention							
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WFJCC & DRWY A SEGMENTS NO, OF MESA RIDGE PRKWY	Implementation of onsite detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.	Disturbance wetland & riparian areas could result from the construction of emabankments for the onstream detention basins		Mitigation would be required within detention basin bottom for onstream sites		Increase maintenance compared to regional detention
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WFJCC NO OF FONTAINE BLVD	detention would have no effect upon reducing existing 100-year floodplain widths	Residential and commercial property not impacted by the 100-year event at this time.		Limited impacts due to absence of wetland areas in these segments.		Lower maintenance compared to onsite detention concept	

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