RIDO

Hydrology File Copy

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From: BZ

To: AMM
DJR

Date: 4/29/96

Subject: RID Overchute

Attached is the revised report for RID Overchute Alternative analysis. Please let me know if it is necessary to make any changes. Thank you very much!

Superceded
See 470.604
App C. for
May 1997 version

DATED
4.29.96

SEE
A470.604,
App. C
FOR
May 1997 Version

Hydrologic Analysis

for

the RID Overchute Project

Prepared by

Flood Control District of Maricopa County

Engineering Division

Hydrology Branch

April 29, 1996

Table of Contents

1. Introduction

The purpose of this report is to document the hydrologic analysis for RID (Roosvelt Irrigation District) Canal Overchute Project. Three alternatives are presented. The HEC-1 models for these alternatives are developed by modifying a previous HEC-1 model (FCDMC, 1995). The results for the hydrologic analysis can be found in Table 1 and Figures 1-3.

2. Background of Previous Hydrologic Analysis

The previous HEC-1 model was developed by FCDMC(1995) by modifying the HEC-1 model for the White Tanks/Agua Fria Area Drainage Master Study (ADMS) (WLB, 1992) because (1) the contributing area for this study area is within the White Tanks/Agua Fria ADMS project area; and (2) new drainage improvements had been constructed or proposed since the completion of the White Tanks/Agua Fria ADMS. The previous model's improvements included (FCDMC, 1995):

- existing drainage channel along Dysart Road from Camelback to RID (MCDOT, 1993);
- existing drainage channel/detention along RID from Dysart Road east for 2500 feet (MCDOT, 1993);
- existing detention basin with 30 inch outlet at the end of the above channel;
- proposed Indian School Bypass (I.S.B.) Channel from Indian School Road to the proposed overchute at Litchfield Road alignment;
- proposed channel from the existing detention basin to the proposed overchute;
- proposed channel from Litchfield Road to the proposed overchute;
- existing wall along the I.S.B. from Litchfield Road to the Litchfield Road Bypass.

In the previous HEC-1 model (FCDMC, 1995), subbasin 255 was divided into three new subbasins 255A, 6 and 7, and subbasin 271 was divided into subbasins 2711 and 2712 along the proposed I.S.B. channel. The subdivision for subbasin 255 was based on MCDOT (1993). In addition, CP-270 was moved from Litchfield Road Bypass to Litchfield Road (FCDMC, 1995). It was assumed that 50% of subasin 7 goes to CP256, and the rest goes to CP255 (MCDOT, 1993).

All detention basins were lumped together and modeled as one detention basin system for developing the stage-storage relationship for the reservoir routing. The stage-discharge relationship was developed by applying the Manning's equation to the outlet channel. Design drawings and the topographic maps were used to estimate routing parameters for the channels and detention basins. The computed peak discharge at the RID Overchute for the 100-yr, 24-hr storm is 1516 cfs. The computed peak stage for the detention basin system is about 1012.59 ft.

3. Hydrologic Analysis for Three Alternatives

Three alternatives are presented in this section. They are required to satisfy the criterion that the peak discharge at the RID Overchute and the peak stage at the detention basin system are, respectively, not larger than the peak discharge (1516 cfs) and peak stage (1012.59 ft) in the previous HEC-1 model. The HEC-1 model for Alternative One is developed by modifying the previous HEC-1 model (FCDMC, 1995). Alternative One can be seen on Figure 1. Alternative One has the following new characteristics:

- the flow along Indian School Bypass is routed south of the Plaza Circle Drive into the detention basin system;
- another detention basin is added to the existing detention basin system (the existing basin system could be enlarged rather than adding a separate basin);
- channels R255, R2711, and R271 have been modified;
- channels R2712 and R271_1 have been added.

Alternative Two (Figure 2) is obtained by modifying Alternative One. Alternative

Two has the following new characteristics:

- the concrete channel (R2711) along Indian School Bypass is removed from Alternative One;
- flow from CP2711 is routed as sheet-flow (R2711) into the detention basin system;
- the detention basin system is enlarged;
- the width of the basin outlet channel (R271) has been increased.

Alternative Three (Figure 3) is obtained by modifying Alternative Two. Alternative Three has the following new characteristics:

- flow from CP2711 is routed into the detention basin system through a concrete channel.

The HEC-1 models for these three alternatives are developed such that they satisfy the required criterion that the peak discharge at the RID Overchute and the peak stage detention basin system are, respectively, not larger than the peak discharge (1516 cfs) and peak stage (1012.59 ft) in the previous HEC-1 model.

As in the previous HEC-1 model, all detention basins are lumped together as one detention basin system for the reservoir routing. Therefore, all detention basins are used to develop one volume-stage relationship. Also as in the previous HEC-1 model, the outflow-stage relationship is controlled by the outlet channel, which is computed by using Manning's equation for the outlet channel. Manning's equation is also used to compute the channel capacity.

4. Results

The HEC-1 input files for Alternative One, Alternative Two, and Alternative Three are, respectively, RIDALT1.DAT, RIDALT2.DAT, RIDALT3.DAT, which are included in the diskette attached with the report. The results are obtained by running HEC-1 version 4.0 program (1990). Table 1 lists the computed peak discharges for some selected locations for these alternatives. The HEC-1 input files and some of the detailed HEC-1 results are listed in Appendices 4.1-4.3. The estimation of the design data for the channel system and the detention basin system for these three alternatives can be found on Figure 1, Figure 2, and Figure 3.

Since the estimation is based on hydrologic analysis, further hydraulic analysis including sizing of all features is needed to show any backwater effects which are very important to final design. Since the District's intention for the RID Overchute Project is to reduce the floodplain over the study area, the consultants must perform hydraulic analysis to insure that the floodplain is limited to the detention basins and channel features.

5. Summary and Recommendation

Three alternatives for RID Overchute Project have been presented. The results from hydrologic analysis may be used for a comparison among these alternatives from the hydrologic viewpoint. However, it is necessary to conduct hydraulic analysis to compare these alternatives from the hydraulic viewpoint. It is expected that the hydraulic analysis will also show the floodplain reduction. The final design data will be based on the hydraulic analysis for the most suitable alternative to be selected.

6. References

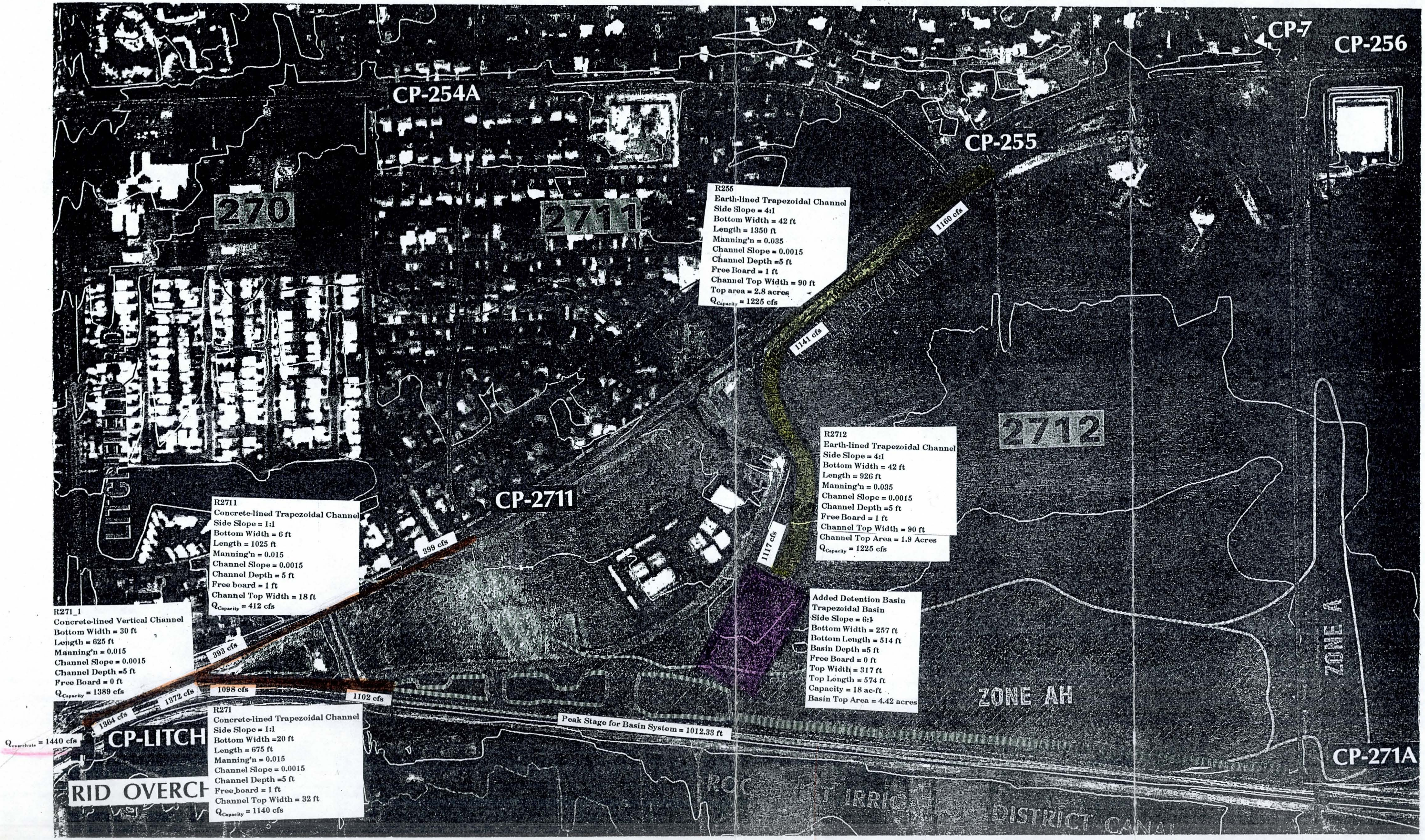
Flood Control District of Maricopa County, 1995, "Roosevelt Irrigation District Canal, Proposed Overchute at Litchfield Road."

Maricopa County Department of Transportation, 1993, "Dysart Road, Final Drainage Calculations," Work Order No. 68644.

WLB, 1992, "White Tanks/Agua Fria Area Drainage Master Study." Prepared for Flood Control District of Maricopa County.

Table 1. Peak Discharges at Selected Locations for a 100-yr and 24-hr Storm (see the HEC-1 Output Files in the Appendices for the Detailed Results).

	Alternative One	Alternative Two	Alternative Three
Sub-basin 257	217 cfs	217 cfs	217 cfs
Diversion from 257 to 256	119 cfs	119 cfs	119 cfs
Sub-basin 6	188 cfs	188 cfs	188 cfs
Sub-basin 7	429 cfs	429 cfs	429 cfs
Outflow from 7	214 cfs	214 cfs	214 cfs
Diversion from 7 to 255A	214 cfs	214 cfs	214 cfs
Sub-basin 256	326 cfs	326 cfs	326 cfs
CP-256 (6+outflow from 7 + 256 + R257)	493 cfs	493 cfs	493 cfs
CP-271A	481 cfs	481 cfs	481 cfs
CP-255 (255A + D7out)	1160 cfs	1160 cfs	1160 cfs
CP-271	1724 cfs (R271A +R2712+2712)	2106 cfs (R271A+ R2711 +R2712 + 2712)	2091 cfs (R271A+ R2711 +R2712 + 2712)
SR-271	1102 cfs	1376 cfs	1396 cfs
Sub-basin 270	560 cfs	560 cfs	560 cfs
CP-2711	399 cfs	399 cfs	399 cfs
R271_1	1364 cfs	1367 cfs	1378 cfs
Overchute	1440 cfs	1417 cfs	1441 cfs



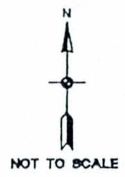


Figure 1. **Alternative One for Channel and Basin Sizing** (Note: the values shown on the Figure are only based on hydrologic analysis; hydraulic analysis is needed for final design)

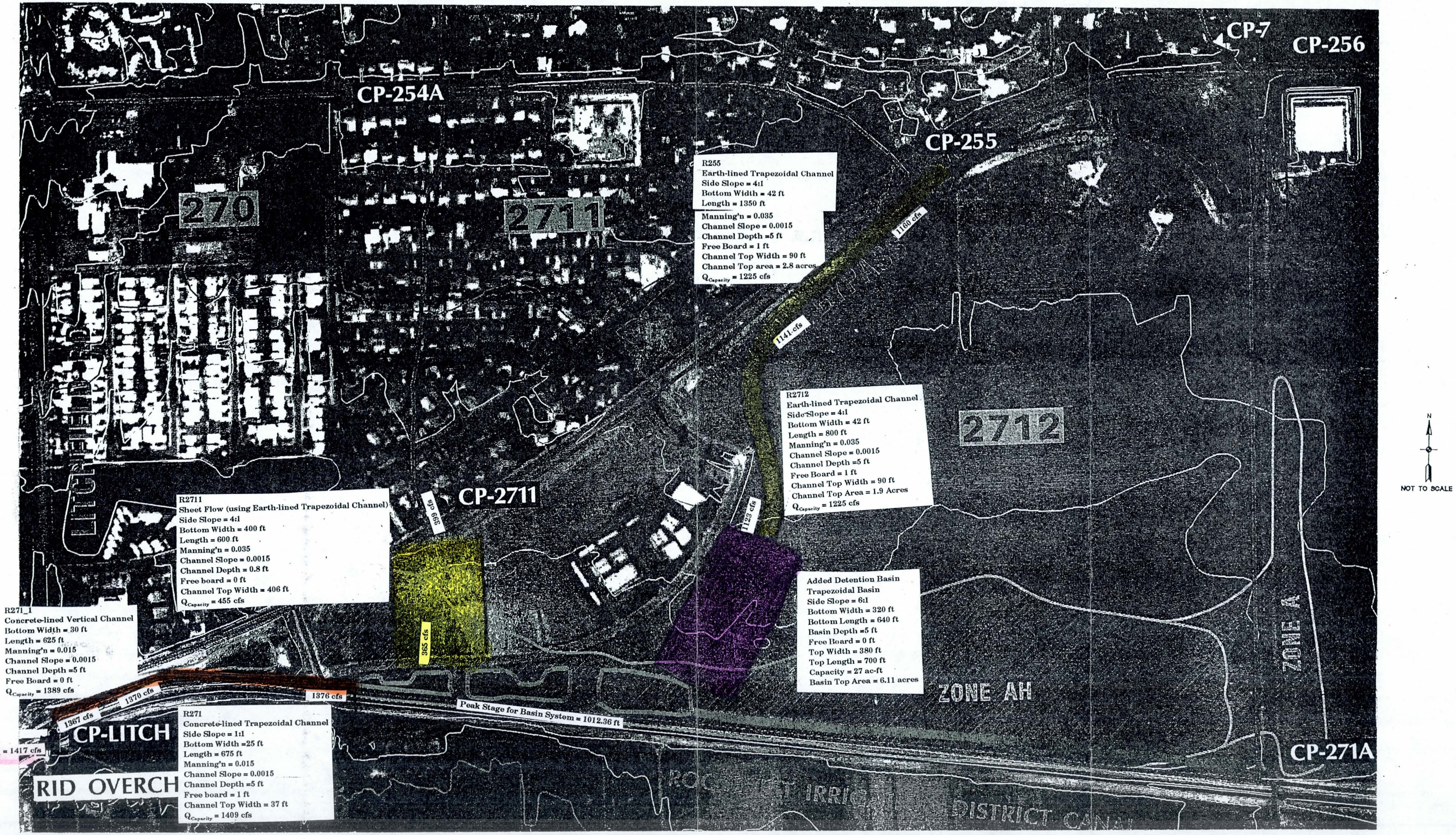


Figure 2. **Alternative Two for Channel and Basin Sizing** (Note: the values shown on the Figure are only based on hydrologic analysis; hydraulic analysis is needed for final design)

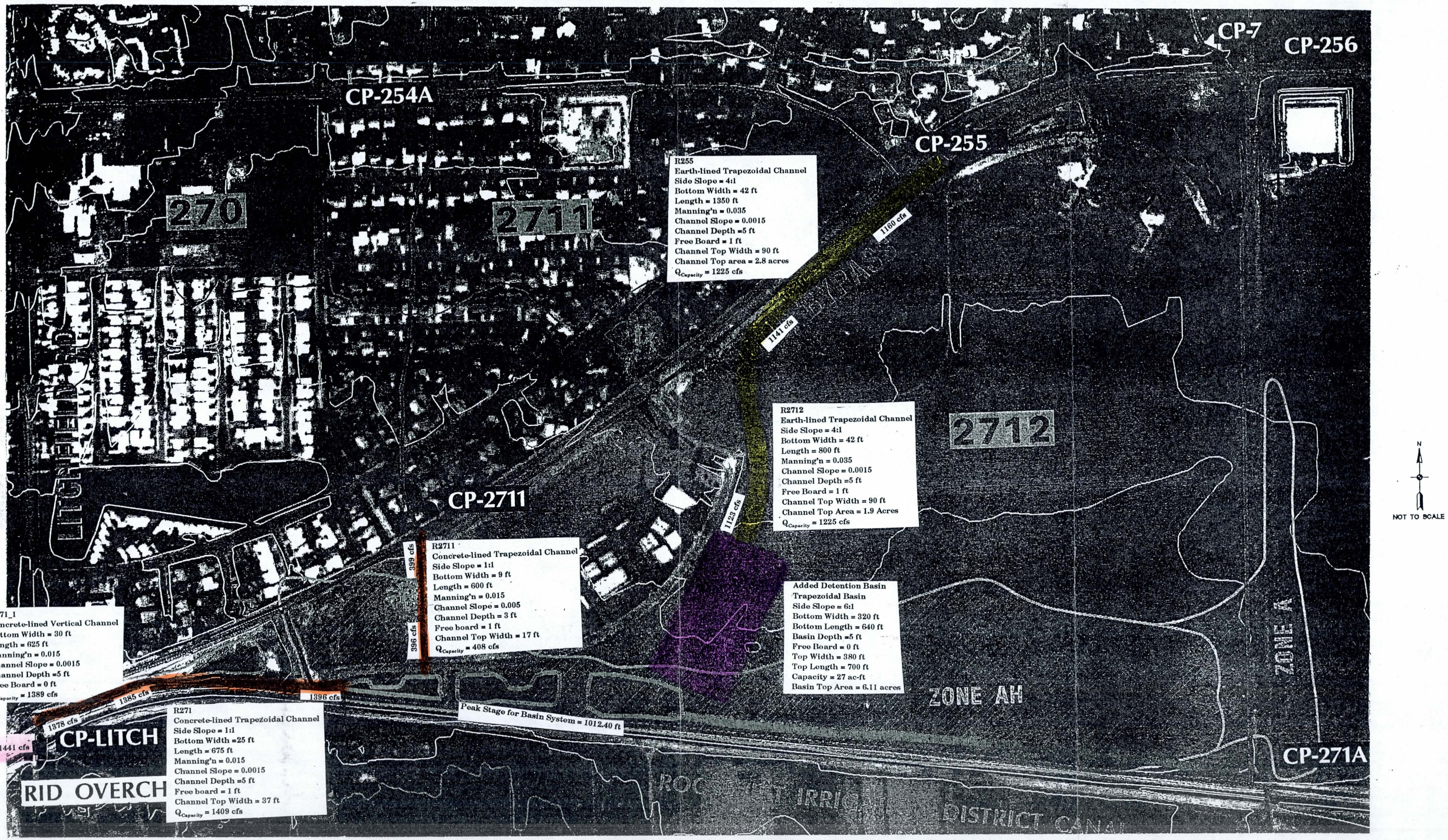


Figure 3. **Alternative Three for Channel and Basin Sizing** (Note: the values shown on the Figure are only based on hydrologic analysis; hydraulic analysis is needed for final design)

7. Appendices

7.1 HEC-1 Input File and Selected Results for Alternative One

```
ID
ID      FILENAME: RIDALT1.DAT
ID      Flood Control District of Maricopa County
ID      April, 1996
ID
ID      GENERAL:
ID      *****************************************************************
ID      This HEC-1 model is obtained by modifying the previous HEC-1
ID      model rid4ch.dat (FCDMC, 1995) which is based on the HEC-1
ID      model of White Tanks/Agua Fria ADMS (WLB, 1992).  It is for a
ID      100-year and 24-hour event.    The modifications include
ID      the locations and characteristics for channels
ID      and detention basin system.  The modifications were requested by
ID      Mr. Don Rerick in Project Management Branch of Planning and Project
ID      Management Division.  The modifications are made such that
ID      (1) the peak discharge at the overchute is equal to or less than
ID      that in the previous hydrologic analysis, and (2) the water
ID      surface elevation for the detention basin system is equal to or
ID      less than that in the previous hydrologic analysis.
ID      *****************************************************************
ID
ID      THE MODIFICATIONS COMPARED TO PREVIOUS ANALYSIS ARE:
ID      *****************************************************************
ID      (1) flow along Indian School Bypass is routed south of the
ID      Plaza Circle Drive into the detention basin system. Channel R2712
ID      corresponds to this routing.
ID      (2) another detention basin is added to the existing detention
ID      basin system.
ID      (3) a new storage-elevation relationship for the detention basin
ID      system is developed by incorporating the new detention basin.
ID      (4) channels R255, R2711, and R271 have been modified.
ID      (5) channels R2712 and R271_1 have been added.
ID      *****************************************************************
ID
ID      NOTES:
ID      *****************************************************************
ID      (1) The channel capacity is computed by using Manning's equation
ID      (a computer program called FlowMaster is used)
ID      (2) The outflow-elevation relationship for the detention basin
ID      system is computed by applying Manning's equation to the outlet
ID      channel (R271).
ID      (3) Ridalt1.dat is Alternative One. There are two more alternatives
ID      which are Alternative Two (ridalt2.dat) and Alternative Three
ID      (ridalt3.dat).
ID      *****************************************************************
ID
*DIAGRAM
IT      5 01JAN94    0001      300
IO      5
IN     15
JD   4.03      .001
PC   .000      .002      .005      .008      .011      .014      .017      .020      .023      .026
PC   .029      .032      .035      .038      .041      .044      .048      .052      .056      .060
PC   .064      .068      .072      .076      .080      .085      .090      .095      .100      .105
PC   .110      .115      .120      .126      .133      .140      .147      .155      .163      .172
PC   .181      .191      .203      .218      .236      .257      .283      .387      .663      .707
PC   .735      .758      .776      .791      .804      .815      .825      .834      .842      .849
PC   .856      .863      .869      .875      .881      .887      .893      .898      .903      .908
PC   .913      .918      .922      .926      .930      .934      .938      .942      .946      .950
PC   .953      .956      .959      .962      .965      .968      .971      .974      .977      .980
PC   .983      .986      .989      .992      .995      .998      1.00     1.000     1.000     1.000
JD   3.99        10
JD   3.83        50
JD   3.76       100
JD   3.70       200
KK    257
KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 257
BA    .34
LG    .50       .00      5.82       .24       .00
UI    12.       12.       12.       12.       27.       40.       46.       55.       59.       65.
UI    69.       74.       80.       88.       93.      106.      127.      144.      156.      136.
UI   122.      111.      102.       96.       89.       81.       74.       69.       62.       57.
UI    53.       45.       34.       27.       21.       21.       20.       20.       17.       12.
UI    12.       12.       12.        5.        4.        4.        4.        4.        4.        4.
UI     4.        4.        4.        4.        4.        4.        4.        0.        0.        0.
UI     0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
KK   D257
KM        DIVERT FROM CP257 TO CP256
DT DI256
DI      0        56      1308
DQ      0         0       922
```

```
KK  2711
KM  NEW SUBBASIN, PART OF THE PREVIOUS 271 NORTH OF INDIAN SCHOOL BYPASS
BA  0.11
LG   0.2     0.25      4.3     0.39       20
UI    93      288      306      118       33       11        0        0        0        0
UI     0        0        0        0        0        0        0        0        0        0
KK  254A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 254A
BA   .22
LG   .12      .19     5.82      .21    20.00
UI   79.     248.     444.     456.     271.     115.      56.      15.      14.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KKR254A1
KM       ROUTE FLOW FROM CP254A TO CP270A
KM       FROM CP254A TO THE PROPOSED INDIAN SCHOOL BYPASS
RS     2                -1
RC  0.05     0.05     0.05     2100  0.0025
RX  1000     1001     1002     1180     1310     1398     1399     1400
RY  1050     1017     1017     1016     1016     1017     1017     1050
KKCP2711
* 2/21/96, change "HC    3" to "HC    2". Flow from CP255A will not be
* combined here.
HC     2
* The following was modified on 2/21/1996 at FCD.
KK R2711  REVISED CHANNEL
KM       ROUTE FLOW FROM CP2711 TO MERGING POINT
RS     1     FLOW       -1
* RC 0.014   0.014    0.014     1650  0.0008
RC 0.015   0.015   0.015    1025  0.0015
* B=6
RX     0        5       15       20       26       31       41       46
RY    10       10       10        5        5       10       10       10
* B=10
* RX     0        5       15       20       30       35       45       50
* RY    10       10       10        5        5       10       10       10
* *************************************************************
KK  D257
KM       RETURN DIVERT AT CP257
DR DI256
KK  R257
KM       ROUTE DIVERT FROM CP257 TO CP256
RS    12                -1        0
RC  .035     .035     .075     2680    .0018
RX  1000     1001     1002     1010     1540     1858     1859     1860
RY1025.5     1025     1025     1024     1024     1025     1025   1025.5
KK   256
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 256
BA   .43
LG   .50      .00     5.84      .30      .00
UI   20.      20.      20.      47.      71.      86.      98.     108.     119.     132.
UI  147.     165.     205.     244.     244.     206.     182.     165.     150.     133.
UI  120.     107.      96.      83.      64.      47.      35.      34.      32.      27.
UI   20.      20.      19.       6.       6.       6.       6.       6.       6.       6.
UI    6.       6.       6.       6.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB6
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=      1.1  Lca=       .6    S=    19.0  Kn= .030  LAG=  20.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .10
LG   .17      .20     6.00      .16    20.00
UI   21.      75.     114.     189.     162.     109.      65.      30.      17.       5.
UI    5.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB7
KM BASIN SUB7
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=      1.0  Lca=       .5    S=    21.0  Kn= .030  LAG=  19.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .24
LG   .19      .19     6.80      .20     3.00
UI   55.     192.     294.     483.     362.     238.     117.      60.      28.      13.
UI   13.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK    D7
KM DIVERT D7 TO CP255
DT D7OUT
DI     0      250
DQ     0      125
KK CP256
KM       ADD HYDROGRAPHS AT CP256
HC     4
* KK  D256
* KM  ALL FLOWS GO SOUTH TO CP271A
* DTDI271A
* DI      0       98     1231     8218
* DQ      0       98     1231     4308
* KK  D256
```

```
* KM      RETURN DIVERT AT CP256
* DRDI271A
KK  R256
* KO      1
KM      ROUTE FLOW FROM CP256 TO CP271A  ** REVISED CHANNEL
KM      ASSUMED CHANNEL UNLINED, D= 5FT, V=3.5 FT/SEC
KM      3100 FEET, SLOPE 0.0014, 30FT BOTTOM WIDTH, 2:1 SIDE SLOPES
RS      3    FLOW      -1
RC 0.035   0.035   0.035    3100  0.0014
RX      0       5      10      20      50      60      65      70
RY     11      11      10       5       5      10      11      11
KK 271A
KM      RUNOFF HYDROGRAPH FROM SUB-BASIN 271A
BA    .16
LG    .50     .00    4.93     .39     .00
UI     6.      6.      6.      6.     16.     21.     24.     28.     30.     33.
UI    35.     38.     42.     45.     50.     59.     70.     78.     68.     60.
UI    55.     50.     47.     43.     39.     36.     33.     30.     28.     24.
UI    19.     16.     10.     10.     10.     10.      9.      6.      6.      6.
UI     6.      2.      2.      2.      2.      2.      2.      2.      2.      2.
UI     2.      2.      2.      2.      0.      0.      0.      0.      0.      0.
UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
KKCP271A
KM      ADD HYDROGRAPHS AT CP271A
HC      2
KKSR271A
* KO      1
KM      STORAGE ROUTE FLOW AT CP271A
RS      1    STOR
SV      0     .06    0.97    1.51
SE017.99     1018  1018.3  1018.4
SQ              7     247     460     604
SE017.99     1018  1018.3  1018.4  1018.5
KK R271A
* KO      1
KM      ROUTE FLOW FROM CP271A TO DETENTION BASIN AT CP271 **REVISED BY FCD
KM      REMEASURED LENGTH AT 3400 (FROM PREVIOUS 2000)
KM      EXISTING CHANNEL, 2750 FT LONG, SLOPE=0.001; 6:1 SIDE SLOPES
RS      3    FLOW      -1
RC 0.035   0.035   0.035    2750   0.001
RX      0      10      20      45      75     100     110     120
RY     11      10      10       6       6      10      10      11
KK  255A
KM      RUNOFF HYDROGRAPH FROM SUB-BASIN 255A (NEW BY FCD)
BA .5968
LG    .20     .22    3.88     .29   12.00
UI    91.    359.    542.    814.   1029.    707.    492.    268.    147.     86.
UI    28.     28.     28.      0.      0.      0.      0.      0.      0.      0.
UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
KK D7OUT
KM      RETURN DIVERT TO 255
DR D7OUT
KK CP255
KM      ADD HYDROGRAPHS AT CP255
HC      2
* ZW  A=RID INFLOW1 B=FCD C=FLOW E=5MIN F=CP255
* ************************************************************
* TO DIVERT SOME FLOW AT CP255 THRU SUB-BASIN 2712 IN A MANNER THAT
* UP-TO-940cfs PEAK FLOW WILL GO TO THE CHANNEL FROM CP255 TO CP2711.
* 940 cfs IS 50-YR FLOW IN THE CHANNEL. FCD, 2/13/1996
* KK  D255
* KM      DIVERT FROM CP255 TO SR271
* DT DI271
* DI      0     940    1160
* DQ      0       0     220
* ********************************************************
KK  R255
* KO      1
KM      ROUTE FLOW ALONG INDIAN SCHOOL BYPASS AND A PATH SOUTHEAST TO
KM      2712 (around the circle)
KM     ASSUME CHANNEL UNLINED, D= 5FT , V<3.93 FT/SEC
KM      B=40', 4:1 side slope
KM     The length is 1350 ft, which is the half of 2700 ft from
KM     previous study (2/21/96, FCD)
RS      2    FLOW      -1
RC 0.035   0.035   0.035    1350  0.0015
* B=45, T=85 ft after running flowmaster
* RX     18      19      20      40      85     105     106     107
* RY     10      10      10       5       5      10      10      10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX     18      19      20      40      82     102     103     104
RY     10      10      10       5       5      10      10      10
* B=100, T=140 ft
* RX     18      19      20      40     140     160     161     162
* RY     10      10      10       5       5      10      10      10
* Above water will go to 2712
* ******************************
* 2/21/1996, FCD
KK R2712
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```
KO     1
KM       ROUTE FLOW INTO 2712
KM     ASSUME CHANNEL UNLINED, D=5 FT, V<3.93 FT/SEC
KM       40FT BOTTOM WIDTH, 4:1 SIDE SLOPES, LENGTH = 1500 FT
* the length is reduced, so use NSTPS=1
RS     1    FLOW      -1
* the length is reduced because the new basin of 18 AC-FT is put at the
* end of the reach. The length of the basin is L=514+60 ft, so 1500-574=926
* the bottom width is assumed to be L/2
RC 0.035   0.035   0.035     926  0.0015
* the length is reduced because the new basin of 17 AC-FT is put at the
* end of the reach. The length of the basin is 502 ft, so 1500-502=998
* the bottom width is assumed to be L/2=251ft
* RC 0.035   0.035   0.035     998  0.0015
* the length is reduced because the new basin of 16 AC-FT is put at the
* end of the reach. The length of the basin is 485 ft, so 1500-468=1015
* the bottom width is assumed to be L/2
* RC 0.035   0.035   0.035    1015  0.0015
* the length is reduced because the new basin of 15 AC-FT is put at the
* end of the reach. The length of the basin is 468 ft, so 1500-468=1032
* the bottom width is assumed to be L/2 = 234
* RC 0.035   0.035   0.035    1032  0.0015
* the length is reduced because the new basin of 10 AC-FT is put at the
* end of the reach. The length of the basin is 375 ft, so 1500-375=1125
* the width is assumed to be L/2 = 187.5'
* RC 0.035   0.035   0.035    1125  0.0015
* the length is reduced because the new basin of 20 AC-FT is put at the
* end of the reach. The length of the basin is 547 ft, so 1500-547=953
* the width is assumed to be L/2 = 273'
* RC 0.035   0.035   0.035     953  0.0015
* RS     2    FLOW      -1
* the length is reduced because the new basin of 53 AC-FT is put at the
* end of the reach. The length of the basin is 800 ft, so 1500-800=700'
* RC 0.035   0.035   0.035     700  0.0015
* RC 0.035   0.035   0.035    1500  0.0015
* B=45, T=85 ft
* RX    18      19      20      40      85     105     106     107
* RY    10      10      10       5       5      10      10      10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX    18      19      20      40      82     102     103     104
RY    10      10      10       5       5      10      10      10
* B=100, T=140 ft
* RX    18      19      20      40     140     160     161     162
* RY    10      10      10       5       5      10      10      10
* ************
KK  2712
* KO     1
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 2712
BA   .46
LG   .35     .25    4.30     .39       2
UI   117     397     618     973     667     425     181     102      34      26
UI     0       0       0       0       0       0       0       0       0       0
KK CP271
* KO     1       1
KM COMBINE THREE FLOWS
HC     3
* KKDSR271
* KO     1
* KM       DIVERT FLOW TO CHECK HOW MUCH STORAGE IS NEEDED AT THE BASINS
* DTDSR271
* DI     0     500    1000    1500    2000
* DQ     0     220     220     220     220
KK SR271
KO     1
* KO     2       2 (2/14/96)
KM       STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
KM       THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
KM       OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
KM       STAGE/STORAGE BASED ON 1014'
RS     1    STOR      0
* newest rating curve after 18 AC-FT basin is included
SV     0    4.43    14.9    56.4
SE  1007  1008.1    1010    1014
* newest rating curve after 17 AC-FT basin is included
* SV     0    4.26   14.43   55.24
* SE  1007  1008.1    1010    1014
* newest rating curve after 16 AC-FT basin is included
* SV     0     4.1    13.9    53.8
* SE  1007  1008.1    1010    1014
* newest rating curve after 15 AC-FT basin is included
* SV     0    3.85    13.3    52.3
* SE  1007  1008.1    1010    1014
* newest rating curve after 10 AC-FT basin is included
* SV     0     2.8    10.4      45
* SE  1007  1008.1    1010    1014
* newest rating curve after 20 AC-FT basin is included
* SV     0     4.9    16.2      60
* SE  1007  1008.1    1010    1014
* newest rating curve after 53 AC-FT basin is included
```

```
* SV      0     12.9     38.4    113.4
* SE  1007  1008.1     1010     1014
* new rating curve, because when EL=1008.1, MCDOT basin can hold water
* (the bottom is 1007)
* SV      0    0.963     4.81    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE  1007  1008.1     1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* SV      0     4.68    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE1008.1     1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* B=18
* SQ      0       29      150      338      587      893     1258     1680
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=19'
* SQ      0       31      158      357      618      940     1322     1763
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=20'
SQ      0       33      167      375      650      987     1386     1847
SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=21'
* SQ      0       34      175      394      681     1034     1451     1931
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=22'
* SQ      0     35.9      183      412      713     1081     1515     2015
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=23'
* SQ      0      255     1729     1884     2045     2100     2155     2212     2269
* B=24'
* SQ      0      266     1800     1960     2127     2184     2242     2301     2360
* B=25'
* SQ      0      277     1871     2037     2210     2269     2329     2389     2451
* SV      0     9.16       24     27.5       31     34.5    39.39
* B=33 ft
* SQ      0      618     1604     1634     1664     1693     1724
* B=73 ft
* SQ      0     1369     3537     3601     3666     3731     3797
* SE1008.1     1010     1012   1012.5     1013   1013.5     1014
KK  R271
KO     1
KM  ROUTE CP271 TO THE MERGING POINT OF TWO CHANNELS
* RS      1     FLOW       -1
* use Mukingum-Cunge, since outflow is greater than the inflow
RD
RC 0.015   0.015   0.015     675  0.0015
* The new depth = 5ft, new bottom width = 18 ft, new side slope = 1:1
* RX     10       11       12    17.00     35.0       40       41       42
* RY     10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 19 ft, new side slope = 1:1
* RX     10       11       12    17.00     36.0       41       42       43
* RY     10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 20 ft, new side slope = 1:1
RX     10       11       12    17.00     37.0       42       43       44
RY     10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 21 ft, new side slope = 1:1
* RX     10       11       12    17.00     38.0       43       44       45
* RY     10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 22 ft, new side slope = 1:1
* RX     10       11       12    17.00     39.0       44       45       46
* RY     10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 23 ft, new side slope = 1:1
* RX     10       11       12    17.00     40.0       45       46       47
* RY     10       10       10      5.0      5.0       10       10       10
* * The new depth = 5ft, new bottom width = 24 ft, new side slope = 1:1
* RX     10       11       12    17.00     41.0       46       47       48
* RY     10       10       10      5.0      5.0       10       10       10
* * The new depth = 5ft, new bottom width = 25 ft, new side slope = 1:1
* RX     10       11       12    17.00     42.0       47       48       49
* RY     10       10       10      5.0      5.0       10       10       10
* the new depth = 6ft, new bottom width = 73 ft, new side slope = 1:1
* RX     10       11       12    17.00     90.0       95       96       97
* RY     11       11       10      5.0      5.0       10       11       11
KKMERGE
* KO     1
KM      COMBINED Q ALONG INDIAN SCH.RD. INTO OVERCHUTE
HC      2
KKR271_1
KO     1
KM  ROUTE THE MERGING POINT OF TWO CHANNELS TO LITCH, 3/8/96, FCD
* RS      1     FLOW       -1
* RC 0.015   0.015   0.015     625  0.0015
* * RX     10       11       12    17.00    103.0      108      109      110
* * RY     11       11       11      5.0      5.0       11       11       11
* RX     10       11       12       12       42       42       43       44
* RY     10       10       10      5.0      5.0       10       10       10
* above routing gave a higher outflow peak than the inflow peak, not
* reasonable, the following will use Muskingum-Cunge Method
* RD    625  0.0015    0.015     TRAP       30        0
RD
RC 0.015   0.015   0.015     625  0.0015
RX     10       11       12       12       42       42       43       44
RY     10       10       10      5.0      5.0       10       10       10
```

```
KK   270
KM BASIN 270
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN** REVISED BY FCD
KM  L=        .7  Lca=        .3   S=   10.5  Kn= .030  LAG=  16.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .30
LG   .16      .22    3.58      .38   18.00
UI  103.     326.     570.     635.     379.     174.      80.      26.      19.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK LITCH
* KO      1
HC      2
* ZW  A=RID INFLOW2 B=FCD C=FLOW E=5MIN F=LITCH
ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    90         257
                .
                .
   103          .------->   DI256
   101        D257
                .
                .
   106          .        2711
                .          .
                .          .
   112          .          .        254A
                .          .           V
                .          .           V
   119          .          .      R254A1
                .          .           .
                .          .           .
   126          .     CP2711............
                .          V
                .          V
   128          .      R2711
                .          .
                .          .
   136          .          .           .<-------    DI256
   134          .          .        D257
                .          .           V
                .          .           V
   137          .          .        R257
                .          .           .
                .          .           .
   143          .          .           .         256
                .          .           .           .
                .          .           .           .
   153          .          .           .           .        SUB6
                .          .           .           .           .
                .          .           .           .           .
   162          .          .           .           .           .        SUB7
                .          .           .           .           .           .
                .          .           .           .           .           .
   174          .          .           .           .           .           .------->   D7OUT
   172          .          .           .           .           .          D7
                .          .           .           .           .           .
                .          .           .           .           .           .
```

```
177            .            .      CP256..................................
               .            .          V
               .            .          V
180            .            .       R256
               .            .          .
               .            .          .
188            .            .          .          271A
               .            .          .             .
               .            .          .             .
199            .            .     CP271A.............
               .            .          V
               .            .          V
202            .            .     SR271A
               .            .          V
               .            .          V
209            .            .      R271A
               .            .          .
               .            .          .
217            .            .          .          255A
               .            .          .             .
               .            .          .             .
226            .            .          .             .           .<-------   D7OUT
224            .            .          .             .       D7OUT
               .            .          .             .           .
               .            .          .             .           .
227            .            .          .         CP255............
               .            .          .             V
               .            .          .             V
230            .            .          .          R255
               .            .          .             V
               .            .          .             V
241            .            .          .         R2712
               .            .          .             .
               .            .          .             .
250            .            .          .             .        2712
               .            .          .             .           .
               .            .          .             .           .
256            .            .      CP271......................
               .            .          V
               .            .          V
259            .            .      SR271
               .            .          V
               .            .          V
270            .            .       R271
               .            .          .
               .            .          .
277            .       MERGE ............
               .            V
               .            V
280            .       R271_1
               .            .
               .            .
287            .            .        270
               .            .          .
               .            .          .
297            .        LITCH............

          **************
          *            *
259 KK    *     SR271  *
```

*   *
****

260 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
STAGE/STORAGE BASED ON 1014'

HYDROGRAPH ROUTING DATA

265 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

266 SV	STORAGE	.0	4.4	14.9	56.4				
267 SE	ELEVATION	1007.00	1008.10	1010.00	1014.00				
268 SQ	DISCHARGE	0.	33.	167.	375.	650.	987.	1386.	1847.
269 SE	ELEVATION	1007.40	1008.00	1009.00	1010.00	1011.00	1012.00	1013.00	1014.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.61	4.03	4.43	9.39	14.90	25.27	35.65	46.03	56.40
OUTFLOW	.00	.00	33.00	46.40	167.00	375.00	650.00	987.00	1386.00	1847.00
ELEVATION	1007.00	1007.40	1008.00	1008.10	1009.00	1010.00	1011.00	1012.00	1013.00	1014.00

****

TRANSPOSITION AREA 0.0 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1118.	12.50		326.	85.	82.	82.
		(INCHES)	1.526	1.599	1.599	1.599
		(AC-FT)	162.	169.	169.	169.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
39.	12.50	14.	5.	5.	5.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1012.33	12.50	1009.48	1007.93	1007.90	1007.90

CUMULATIVE AREA = 1.99 SQ MI

****

TRANSPOSITION AREA 10.0 SQ MI

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1099.	12.50		321.	84.	81.	81.
		(INCHES)	1.504	1.576	1.576	1.576
		(AC-FT)	159.	167.	167.	167.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
39.	12.50	14.	5.	5.	5.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1012.28	12.50	1009.47	1007.93	1007.89	1007.89

CUMULATIVE AREA = 1.99 SQ MI

****

INTERPOLATED HYDROGRAPH AT SR271

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1102.	12.50		322.	84.	81.	81.
		(INCHES)	1.508	1.580	1.580	1.580
		(AC-FT)	160.	167.	167.	167.

CUMULATIVE AREA = 1.99 SQ MI

****

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

TIME OF MAX STAGE	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE
+	HYDROGRAPH AT	257	217.	13.42	62.	16.	15.	.34	
+	DIVERSION TO	DI256	119.	13.42	23.	6.	6.	.34	
+	HYDROGRAPH AT	D257	99.	13.42	39.	10.	9.	.34	
+	HYDROGRAPH AT	2711	234.	12.00	18.	5.	5.	.11	
+	HYDROGRAPH AT	254A	443.	12.08	40.	11.	11.	.22	
+	ROUTED TO	R254A1	309.	12.33	40.	11.	11.	.22	
+	2 COMBINED AT	CP2711	399.	12.08	57.	16.	16.	.33	
+	ROUTED TO	R2711	393.	12.17	57.	16.	16.	.33	
+	HYDROGRAPH AT	D257	119.	13.42	23.	6.	6.	.34	
+	ROUTED TO	R257	104.	14.08	23.	6.	6.	.34	
+	HYDROGRAPH AT	256	326.	13.00	72.	18.	17.	.43	
+	HYDROGRAPH AT	SUB6	188.	12.17	20.	6.	5.	.10	
+	HYDROGRAPH AT	SUB7	429.	12.17	37.	9.	9.	.24	
+	DIVERSION TO	D7OUT	214.	12.17	18.	5.	5.	.24	
+	HYDROGRAPH AT	D7	214.	12.17	18.	5.	5.	.24	
+	4 COMBINED AT	CP256	493.	12.25	133.	34.	33.	.77	
+	ROUTED TO	R256	445.	12.42	132.	34.	33.	.77	
+	HYDROGRAPH AT	271A	95.	13.33	25.	6.	6.	.16	
+	2 COMBINED AT	CP271A	481.	12.42	157.	40.	39.	.93	
+	ROUTED TO	SR271A	475.	12.42	157.	40.	39.	.93	
+	ROUTED TO	R271A	418.	12.75	156.	40.	39.	.93	
+	HYDROGRAPH AT	255A	957.	12.25	96.	26.	25.	.60	

+	HYDROGRAPH AT	D7OUT	214.	12.17	18.	5.	5.	.24
+	2 COMBINED AT	CP255	1160.	12.17	114.	31.	30.	.60
+	ROUTED TO	R255	1141.	12.25	114.	31.	30.	.60
+	ROUTED TO	R2712	1117.	12.33	114.	31.	30.	.60
+	HYDROGRAPH AT	2712	739.	12.17	56.	14.	14.	.46
+	3 COMBINED AT	CP271	1724.	12.25	324.	85.	82.	1.99
+	ROUTED TO	SR271	1102.	12.50	322.	84.	81.	1.99
+	ROUTED TO	R271	1098.	12.58	322.	84.	81.	1.99
+	2 COMBINED AT	MERGE	1372.	12.50	378.	101.	97.	2.32
+	ROUTED TO	R271_1	1364.	12.50	377.	101.	97.	2.32
+	HYDROGRAPH AT	270	560.	12.08	49.	14.	13.	.30
+	2 COMBINED AT	LITCH	1440.	12.42	425.	114.	110.	2.62

1

7.2 HEC-1 Input File and Selected Results for Alternative Two

```
ID
ID
ID       FILENAME: RIDALT2.DAT
ID       Flood Control District of Maricopa County
ID       April, 1996
ID
ID       GENERAL:
ID       *****************************************************************
ID       This HEC-1 model is obtained by modifying ridalt1.dat.
ID       It is for a 100-year and 24-hour event. The modifications include
ID       (1) the concrete channel (R2711) is removed from ridalt1.dat;
ID       (2) water from cp2711 is routed as sheet-flow into the detention
ID       basin system (the sheet-flow path is called R2711, a wide channel);
ID       (3) the added detention basin is enlarged; and
ID       (4) the outlet channel (R271) width is increased.
ID       The modifications were requested by Mr. Don Rerick in Project
ID       Management Branch of Planning and Project Management Division.
ID       The modifications are made such that (1) the peak discharge at the
ID       overchute is equal to or less than that in the previous
ID       hydrologic analysisl, and (2) the water surface elevation for
ID       the detention basin system is equal to or less than that in the
ID       previous hydrologic analysis.
ID       *****************************************************************
ID
ID
ID       NOTES:
ID       *****************************************************************
ID       (1) The channel capacity is computed by using Manning's equation
ID       (a computer program called FlowMaster is used)
ID       (2) The outflow-elevation relationship for the detention basin
ID       system is computed by applying Manning's equation to the outlet
ID       channel (R271).
ID       (3) Ridalt2.dat is Alternative Two. There are two more alternatives
ID       which are Alternative One (ridalt1.dat) and Alternative
ID       Three (ridalt3.dat).
ID       *****************************************************************
ID
ID
ID
*DIAGRAM
IT     5 01JAN94     0001      300
IO     5
IN    15
JD  4.03      .001
PC  .000      .002      .005      .008      .011      .014      .017      .020      .023      .026
PC  .029      .032      .035      .038      .041      .044      .048      .052      .056      .060
PC  .064      .068      .072      .076      .080      .085      .090      .095      .100      .105
PC  .110      .115      .120      .126      .133      .140      .147      .155      .163      .172
PC  .181      .191      .203      .218      .236      .257      .283      .387      .663      .707
PC  .735      .758      .776      .791      .804      .815      .825      .834      .842      .849
PC  .856      .863      .869      .875      .881      .887      .893      .898      .903      .908
PC  .913      .918      .922      .926      .930      .934      .938      .942      .946      .950
PC  .953      .956      .959      .962      .965      .968      .971      .974      .977      .980
PC  .983      .986      .989      .992      .995      .998      1.00     1.000     1.000     1.000
JD  3.99        10
JD  3.83        50
JD  3.76       100
JD  3.70       200
KK   257
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 257
BA   .34
LG   .50       .00      5.82       .24       .00
UI   12.       12.       12.       12.       27.       40.       46.       55.       59.       65.
UI   69.       74.       80.       88.       93.      106.      127.      144.      156.      136.
UI  122.      111.      102.       96.       89.       81.       74.       69.       62.       57.
UI   53.       45.       34.       27.       21.       21.       20.       20.       17.       12.
UI   12.       12.       12.        5.        4.        4.        4.        4.        4.        4.
UI    4.        4.        4.        4.        4.        4.        4.        0.        0.        0.
UI    0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
KK  D257
KM       DIVERT FROM CP257 TO CP256
DT DI256
DI     0        56      1308
DQ     0         0       922
KK  D257
KM       RETURN DIVERT AT CP257
DR DI256
KK  R257
KM       ROUTE DIVERT FROM CP257 TO CP256
RS    12                  -1         0
RC  .035      .035      .075      2680     .0018
RX  1000      1001      1002      1010      1540      1858      1859      1860
RY1025.5      1025      1025      1024      1024      1025      1025    1025.5
KK   256
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 256
```

```
BA   .43
LG   .50      .00     5.84      .30      .00
UI   20.      20.      20.      47.      71.      86.      98.     108.     119.     132.
UI  147.     165.     205.     244.     244.     206.     182.     165.     150.     133.
UI  120.     107.      96.      83.      64.      47.      35.      34.      32.      27.
UI   20.      20.      19.       6.       6.       6.       6.       6.       6.       6.
UI    6.       6.       6.       6.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB6
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=      1.1  Lca=       .6   S=    19.0  Kn= .030  LAG=  20.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .10
LG   .17      .20     6.00      .16    20.00
UI   21.      75.     114.     189.     162.     109.      65.      30.      17.       5.
UI    5.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB7
KM BASIN SUB7
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=      1.0  Lca=       .5   S=    21.0  Kn= .030  LAG=  19.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .24
LG   .19      .19     6.80      .20     3.00
UI   55.     192.     294.     483.     362.     238.     117.      60.      28.      13.
UI   13.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK    D7
KM DIVERT D7 TO CP255
DT D7OUT
DI     0      250
DQ     0      125
KK CP256
KM       ADD HYDROGRAPHS AT CP256
HC     4
* KK  D256
* KM  ALL FLOWS GO SOUTH TO CP271A
* DTDI271A
* DI      0       98     1231     8218
* DQ      0       98     1231     4308
* KK  D256
* KM       RETURN DIVERT AT CP256
* DRDI271A
KK  R256
* KO     1
KM       ROUTE FLOW FROM CP256 TO CP271A  ** REVISED CHANNEL
KM       ASSUMED CHANNEL UNLINED, D= 5FT, V=3.5 FT/SEC
KM       3100 FEET, SLOPE 0.0014, 30FT BOTTOM WIDTH, 2:1 SIDE SLOPES
RS     3    FLOW      -1
RC 0.035   0.035   0.035     3100  0.0014
RX     0       5      10       20      50      60      65      70
RY    11      11      10        5       5      10      11      11
KK 271A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 271A
BA   .16
LG   .50      .00     4.93      .39      .00
UI    6.       6.       6.       6.      16.      21.      24.      28.      30.      33.
UI   35.      38.      42.      45.      50.      59.      70.      78.      68.      60.
UI   55.      50.      47.      43.      39.      36.      33.      30.      28.      24.
UI   19.      16.      10.      10.      10.      10.       9.       6.       6.       6.
UI    6.       2.       2.       2.       2.       2.       2.       2.       2.       2.
UI    2.       2.       2.       2.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KKCP271A
KM       ADD HYDROGRAPHS AT CP271A
HC     2
KKSR271A
* KO     1
KM       STORAGE ROUTE FLOW AT CP271A
RS     1    STOR
SV     0     .06    0.97    1.51
SE017.99    1018  1018.3  1018.4
SQ             7     247     460     604
SE017.99    1018  1018.3  1018.4  1018.5
KK R271A
* KO     1
KM       ROUTE FLOW FROM CP271A TO DETENTION BASIN AT CP271 **REVISED BY FCD
KM       REMEASURED LENGTH AT 3400 (FROM PREVIOUS 2000)
KM       EXISTING CHANNEL, 2750 FT LONG, SLOPE=0.001; 6:1 SIDE SLOPES
RS     3    FLOW      -1
RC 0.035   0.035   0.035     2750   0.001
RX     0      10      20       45      75     100     110     120
RY    11      10      10        6       6      10      10      11
KK  2711
KM  NEW SUBBASIN, PART OF THE PREVIOUS 271 NORTH OF INDIAN SCHOOL BYPASS
BA  0.11
LG   0.2    0.25      4.3    0.39       20
UI    93     288      306     118       33      11       0       0       0       0
UI     0       0        0       0        0       0       0       0       0       0
```

```
KK  254A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 254A
BA   .22
LG   .12      .19     5.82      .21    20.00
UI   79.    248.     444.     456.     271.     115.      56.      15.      14.       0.
UI    0.      0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.      0.       0.       0.       0.       0.       0.       0.       0.       0.
KKR254A1
KM       ROUTE FLOW FROM CP254A TO CP270A
KM       FROM CP254A TO THE PROPOSED INDIAN SCHOOL BYPASS
RS       2               -1
RC  0.05     0.05     0.05     2100   0.0025
RX  1000     1001     1002     1180     1310     1398     1399     1400
RY  1050     1017     1017     1016     1016     1017     1017     1050
KKCP2711
* 2/21/96, change "HC    3" to "HC    2". Flow from CP255A will not be
* combined here.
HC       2
* The following was modified on 2/21/1996 at FCD.
* KK R2711  REVISED CHANNEL
* KM       ROUTE FLOW FROM CP2711 TO MERGING POINT
* RS     1     FLOW       -1
* * RC 0.014    0.014    0.014     1650  0.0008
* RC 0.015    0.015    0.015    1025  0.0015
* * B=6
* RX      0        5       15       20       26       31       41       46
* RY     10       10       10        5        5       10       10       10
* * B=10
* * RX      0        5       15       20       30       35       45       50
* * RY     10       10       10        5        5       10       10       10
* ***************************************************************
KK R2711 (to the basins)
KO       1
* sheet flow from cp2711 to the basins, 4/2/96
RS       1     FLOW       -1
RC 0.035    0.035    0.035      600   0.0015
RX      18       19       20       40      440      460      461      462
RY      10       10       10        5        5       10       10       10
* ***************************************************************
KK  255A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 255A (NEW BY FCD)
BA .5968
LG   .20      .22     3.88      .29    12.00
UI   91.    359.     542.     814.    1029.     707.     492.     268.     147.      86.
UI   28.     28.      28.       0.       0.       0.       0.       0.       0.       0.
UI    0.      0.       0.       0.       0.       0.       0.       0.       0.       0.
KK D7OUT
KM       RETURN DIVERT TO 255
DR D7OUT
KK CP255
KM       ADD HYDROGRAPHS AT CP255
HC       2
* ZW  A=RID INFLOW1 B=FCD C=FLOW E=5MIN F=CP255
* ************************************************************
* TO DIVERT SOME FLOW AT CP255 THRU SUB-BASIN 2712 IN A MANNER THAT
* UP-TO-940cfs PEAK FLOW WILL GO TO THE CHANNEL FROM CP255 TO CP2711.
* 940 cfs IS 50-YR FLOW IN THE CHANNEL. FCD, 2/13/1996
* KK  D255
* KM       DIVERT FROM CP255 TO SR271
* DT DI271
* DI      0      940     1160
* DQ      0        0      220
* *******************************************************
KK  R255
* KO      1
KM       ROUTE FLOW ALONG INDIAN SCHOOL BYPASS AND A PATH SOUTHEAST TO
KM       2712 (around the circle)
KM      ASSUME CHANNEL UNLINED, D= 5FT , V<3.93 FT/SEC
KM       B=40', 4:1 side slope
KM      The length is 1350 ft, which is the half of 2700 ft from
KM      previous study (2/21/96, FCD)
RS      2     FLOW       -1
RC 0.035    0.035    0.035     1350   0.0015
* B=45, T=85 ft after running flowmaster
* RX     18       19       20       40       85      105      106      107
* RY     10       10       10        5        5       10       10       10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX      18       19       20       40       82      102      103      104
RY      10       10       10        5        5       10       10       10
* B=100, T=140 ft
* RX     18       19       20       40      140      160      161      162
* RY     10       10       10        5        5       10       10       10
* Above water will go to 2712
* ******************************
* 2/21/1996, FCD
KK R2712
* KO      1
KM       ROUTE FLOW INTO 2712
KM      ASSUME CHANNEL UNLINED, D=5 FT, V<4 FT/SEC
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KM      40FT BOTTOM WIDTH, 4:1 SIDE SLOPES, LENGTH = 1500 FT
* the length is reduced, so use NSTPS=1
RS     1     FLOW      -1
* the length is reduced because the new basin of 27 AC-FT is put at the
* end of the reach. The length of the basin is L=639.7+60 ft, so 1500-L=800
* the bottom width is assumed to be L/2
RC 0.035    0.035   0.035      800  0.0015
* the length is reduced because the new basin of 26 AC-FT is put at the
* end of the reach. The length of the basin is L=627+60 ft, so 1500-L=813
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      813  0.0015
* the length is reduced because the new basin of 25 AC-FT is put at the
* end of the reach. The length of the basin is L=614+60 ft, so 1500-L=826
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      826  0.0015
* the length is reduced because the new basin of 23 AC-FT is put at the
* end of the reach. The length of the basin is L=587+60 ft, so 1500-L=853
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      853  0.0015
* the length is reduced because the new basin of 22 AC-FT is put at the
* end of the reach. The length of the basin is L=573+60 ft, so 1500-L=867
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      867  0.0015
* the length is reduced because the new basin of 20 AC-FT is put at the
* end of the reach. The length of the basin is L=544+60 ft, so 1500-604=896
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      896  0.0015
* the length is reduced because the new basin of 19 AC-FT is put at the
* end of the reach. The length of the basin is L=529+60 ft, so 1500-589=911
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      911  0.0015
* the length is reduced because the new basin of 18 AC-FT is put at the
* end of the reach. The length of the basin is L=514+60 ft, so 1500-574=926
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      926  0.0015
* the length is reduced because the new basin of 17 AC-FT is put at the
* end of the reach. The length of the basin is 502 ft, so 1500-502=998
* the bottom width is assumed to be L/2=251ft
* RC 0.035    0.035    0.035      998  0.0015
* the length is reduced because the new basin of 16 AC-FT is put at the
* end of the reach. The length of the basin is 485 ft, so 1500-468=1015
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035     1015  0.0015
* the length is reduced because the new basin of 15 AC-FT is put at the
* end of the reach. The length of the basin is 468 ft, so 1500-468=1032
* the bottom width is assumed to be L/2 = 234
* RC 0.035    0.035    0.035     1032  0.0015
* the length is reduced because the new basin of 10 AC-FT is put at the
* end of the reach. The length of the basin is 375 ft, so 1500-375=1125
* the width is assumed to be L/2 = 187.5'
* RC 0.035    0.035    0.035     1125  0.0015
* the length is reduced because the new basin of 20 AC-FT is put at the
* end of the reach. The length of the basin is 547 ft, so 1500-547=953
* the width is assumed to be L/2 = 273'
* RC 0.035    0.035    0.035      953  0.0015
* RS     2     FLOW      -1
* the length is reduced because the new basin of 53 AC-FT is put at the
* end of the reach. The length of the basin is 800 ft, so 1500-800=700'
* RC 0.035    0.035    0.035      700  0.0015
* RC 0.035    0.035    0.035     1500  0.0015
* B=45, T=85 ft
* RX    18       19       20       40       85      105      106      107
* RY    10       10       10        5        5       10       10       10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX    18       19       20       40       82      102      103      104
RY    10       10       10        5        5       10       10       10
* B=100, T=140 ft
* RX    18       19       20       40      140      160      161      162
* RY    10       10       10        5        5       10       10       10
* ************
KK  2712
* KO     1
KM      RUNOFF HYDROGRAPH FROM SUB-BASIN 2712
BA   .46
LG   .35      .25    4.30      .39        2
UI   117      397     618      973      667      425      181      102       34       26
UI     0        0       0        0        0        0        0        0        0        0
KK CP271
* KO     1        1
KM COMBINE FOUR FLOWS
HC     4
* KKDSR271
* KO     1
* KM      DIVERT FLOW TO CHECK HOW MUCH STORAGE IS NEEDED AT THE BASINS
* DTDSR271
* DI     0      500     1000     1500     2000
* DQ     0      220      220      220      220
KK SR271
KO     1
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* KO      2        2 (2/14/96)
KM      STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
KM      THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
KM      OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
KM      STAGE/STORAGE BASED ON 1014'
RS     1     STOR        0
* newest rating curve after 27 AC-FT basin is included
SV      0     6.3     20.13    69.34
SE  1007  1008.1      1010     1014
* newest rating curve after 26 AC-FT basin is included
* SV      0     6.10    19.60     67.9
* SE  1007  1008.1      1010     1014
* newest rating curve after 25 AC-FT basin is included
* SV      0     5.88    18.97     66.5
* SE  1007  1008.1      1010     1014
* newest rating curve after 23 AC-FT basin is included
* SV      0     5.46     17.8       64
* SE  1007  1008.1      1010     1014
* newest rating curve after 22 AC-FT basin is included
* SV      0   5.252  17.221 62.1547
* SE  1007  1008.1      1010     1014
* newest rating curve after 20 AC-FT basin is included
* SV      0     4.84     16.1    59.27
* SE  1007  1008.1      1010     1014
* newest rating curve after 19 AC-FT basin is included
* SV      0     4.63     15.5    57.83
* SE  1007  1008.1      1010     1014
* newest rating curve after 18 AC-FT basin is included
* SV      0     4.43     14.9     56.4
* SE  1007  1008.1      1010     1014
* newest rating curve after 17 AC-FT basin is included
* SV      0     4.26    14.43    55.24
* SE  1007  1008.1      1010     1014
* newest rating curve after 16 AC-FT basin is included
* SV      0      4.1     13.9     53.8
* SE  1007  1008.1      1010     1014
* newest rating curve after 15 AC-FT basin is included
* SV      0     3.85     13.3     52.3
* SE  1007  1008.1      1010     1014
* newest rating curve after 10 AC-FT basin is included
* SV      0      2.8     10.4       45
* SE  1007  1008.1      1010     1014
* newest rating curve after 20 AC-FT basin is included
* SV      0      4.9     16.2       60
* SE  1007  1008.1      1010     1014
* newest rating curve after 53 AC-FT basin is included
* SV      0     12.9     38.4    113.4
* SE  1007  1008.1      1010     1014
* new rating curve, because when EL=1008.1, MCDOT basin can hold water
* (the bottom is 1007)
* SV      0   0.963     4.81    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE  1007  1008.1      1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* SV      0    4.68    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE1008.1     1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* B=18
* SQ      0      29      150      338      587      893     1258     1680
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=19'
* SQ      0      31      158      357      618      940     1322     1763
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=20'
* SQ      0      33      167      375      650      987     1386     1847
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=21'
* SQ      0      34      175      394      681     1034     1451     1931
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=22'
* SQ      0    35.9      183      412      713     1081     1515     2015
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=24'
* SQ      0      39      200      450      776     1176     1645     2184
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=25'
SQ      0      41      208      468      808     1223     1710     2269
SE1007.4     1008     1009     1010     1011     1012     1013     1014
* B=26'
* SQ      0      42      215      482      832     1259     1759     2333
* SE1007.4     1008     1009     1010     1011     1012     1013     1014
KK  R271
KO     1
KM  ROUTE CP271 TO THE MERGING POINT OF TWO CHANNELS
* RS     1    FLOW      -1
* use Mukingum-Cunge, since outflow is greater than the inflow
RD
RC 0.015   0.015   0.015     675  0.0015
* The new depth = 5ft, new bottom width = 18 ft, new side slope = 1:1
* RX    10      11      12   17.00    35.0      40      41      42
* RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 19 ft, new side slope = 1:1
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* RX    10       11       12   17.00     36.0       41       42       43
* RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 20 ft, new side slope = 1:1
* RX    10       11       12   17.00     37.0       42       43       44
* RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 21 ft, new side slope = 1:1
* RX    10       11       12   17.00     38.0       43       44       45
* RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 22 ft, new side slope = 1:1
* RX    10       11       12   17.00     39.0       44       45       46
* RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 23 ft, new side slope = 1:1
* RX    10       11       12   17.00     40.0       45       46       47
* RY    10       10       10     5.0      5.0       10       10       10
* * The new depth = 5ft, new bottom width = 24 ft, new side slope = 1:1
* RX    10       11       12   17.00     41.0       46       47       48
* RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 25 ft, new side slope = 1:1
RX    10       11       12   17.00     42.0       47       48       49
RY    10       10       10     5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 26 ft, new side slope = 1:1
* RX    10       11       12   17.00     43.0       48       49       50
* RY    10       10       10     5.0      5.0       10       10       10
* KKMERGE
* KO     1
* KM      COMBINED Q ALONG INDIAN SCH.RD. INTO OVERCHUTE
* HC     2
KKR271_1
KO     1
KM  ROUTE THE MERGING POINT OF TWO CHANNELS TO LITCH, 3/8/96, FCD
* RS     1     FLOW       -1
* RC 0.015   0.015   0.015     625  0.0015
* * RX    10       11       12   17.00   103.0      108      109      110
* * RY    11       11       11     5.0      5.0       11       11       11
* RX    10       11       12      12       42       42       43       44
* RY    10       10       10     5.0      5.0       10       10       10
* above routing gave a higher outflow peak than the inflow peak, not
* reasonable, the following will use Muskingum-Cunge Method
* RD   625  0.0015    0.015    TRAP       30         0
RD
RC 0.015   0.015   0.015     625  0.0015
RX    10       11       12      12       42       42       43       44
RY    10       10       10     5.0      5.0       10       10       10
KK   270
KM BASIN 270
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN** REVISED BY FCD
KM  L=       .7  Lca=       .3   S=   10.5  Kn= .030  LAG=  16.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .30
LG   .16      .22     3.58      .38    18.00
UI  103.     326.     570.     635.     379.     174.      80.      26.      19.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK LITCH
* KO     1
HC     2
* ZW  A=RID INFLOW2 B=FCD C=FLOW E=5MIN F=LITCH
ZZ
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                    SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    92          257
                 .
                 .
   105           .------->    DI256
   103        D257
                 .
                 .
   110           .             .<-------    DI256
   108           .          D257
                 .             V
                 .             V
   111           .          R257
                 .             .
                 .             .
   117           .             .         256
                 .             .            .
                 .             .            .
   127           .             .            .          SUB6
                 .             .            .             .
                 .             .            .             .
   136           .             .            .             .          SUB7
                 .             .            .             .             .
                 .             .            .             .             .
   148           .             .            .             .             .------->    D7OUT
   146           .             .            .             .            D7
```

```
                  .           .           .           .           .
                  .           .           .           .           .
 151              .        CP256...................................
                  .           V
                  .           V
 154              .         R256
                  .           .
                  .           .
 162              .           .        271A
                  .           .           .
                  .           .           .
 173              .       CP271A............
                  .           V
                  .           V
 176              .       SR271A
                  .           V
                  .           V
 183              .        R271A
                  .           .
                  .           .
 191              .           .         2711
                  .           .           .
                  .           .           .
 197              .           .           .        254A
                  .           .           .           V
                  .           .           .           V
 204              .           .           .     R254A1
                  .           .           .           .
                  .           .           .           .
 211              .           .      CP2711............
                  .           .           V
                  .           .           V
 213              .           .       R2711
                  .           .           .
                  .           .           .
 219              .           .           .        255A
                  .           .           .           .
                  .           .           .           .
 228              .           .           .           .           .<-------    D7OUT
 226              .           .           .           .      D7OUT
                  .           .           .           .           .
                  .           .           .           .           .
 229              .           .           .       CP255............
                  .           .           .           V
                  .           .           .           V
 232              .           .           .        R255
                  .           .           .           V
                  .           .           .           V
 243              .           .           .       R2712
                  .           .           .           .
                  .           .           .           .
 251              .           .           .           .        2712
                  .           .           .           .           .
                  .           .           .           .           .
 257              .        CP271...................................
                  .           V
                  .           V
 260              .        SR271
                  .           V
                  .           V
 271              .         R271
                  .           V
                  .           V
 278              .       R271_1
                  .           .
                  .           .
 285              .           .          270
                  .           .           .
                  .           .           .
 295              .        LITCH...........

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

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            *            *
 260 KK     *    SR271   *
            *            *
            **************

 261 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           1  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE
                                  STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
                                  THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
                                  OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
                                  STAGE/STORAGE BASED ON 1014'
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                 HYDROGRAPH ROUTING DATA

  266 RS              STORAGE ROUTING
                             NSTPS           1  NUMBER OF SUBREACHES
                              ITYP        STOR  TYPE OF INITIAL CONDITION
                            RSVRIC         .00  INITIAL CONDITION
                                 X         .00 WORKING R AND D COEFFICIENT

  267 SV                STORAGE         .0        6.3       20.1       69.3

  268 SE              ELEVATION    1007.00    1008.10    1010.00    1014.00

  269 SQ              DISCHARGE         0.        41.       208.       468.       808.      1223.      1710.      2269.

  270 SE              ELEVATION    1007.40    1008.00    1009.00    1010.00    1011.00    1012.00    1013.00    1014.00
                                                                      ***

                                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                  STORAGE        .00       2.29       5.73       6.30      12.85      20.13      32.43      44.73      57.04
69.34
                  OUTFLOW        .00        .00      41.00      57.70     208.00     468.00     808.00    1223.00    1710.00
2269.00
                ELEVATION    1007.00    1007.40    1008.00    1008.10    1009.00    1010.00    1011.00    1012.00    1013.00
1014.00


*****************************************************************************************************************
                                                          HYDROGRAPH AT     SR271
                                                     TRANSPOSITION AREA       .0 SQ MI


  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR        72-HR      24.92-HR
+    (CFS)       (HR)
                           (CFS)
+     1396.     12.50                       383.        102.          98.          98.
                         (INCHES)          1.535       1.630        1.630        1.630
                          (AC-FT)           190.        201.         201.         201.

 PEAK STORAGE    TIME                              MAXIMUM AVERAGE STORAGE
                                            6-HR        24-HR        72-HR      24.92-HR
+   (AC-FT)      (HR)
          49.   12.50                        18.          6.           6.           6.

  PEAK STAGE     TIME                               MAXIMUM AVERAGE STAGE
                                            6-HR        24-HR        72-HR      24.92-HR
+    (FEET)      (HR)
      1012.36   12.50                    1009.40     1007.94      1007.90      1007.90

                         CUMULATIVE AREA =      2.32 SQ MI


*****************************************************************************************************************
                                                          HYDROGRAPH AT     SR271
                                                     TRANSPOSITION AREA     10.0 SQ MI

  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR        72-HR      24.92-HR
+    (CFS)       (HR)
                           (CFS)
+     1372.     12.50                       377.        100.          96.          96.
                         (INCHES)          1.513       1.607        1.607        1.607
                          (AC-FT)           187.        199.         199.         199.

 PEAK STORAGE    TIME                              MAXIMUM AVERAGE STORAGE
                                            6-HR        24-HR        72-HR      24.92-HR
+   (AC-FT)      (HR)
          49.   12.50                        17.          6.           6.           6.

  PEAK STAGE     TIME                               MAXIMUM AVERAGE STAGE
                                            6-HR        24-HR        72-HR      24.92-HR
+    (FEET)      (HR)
      1012.31   12.50                    1009.38     1007.93      1007.90      1007.90

                         CUMULATIVE AREA =      2.32 SQ MI

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

                                                    INTERPOLATED HYDROGRAPH AT     SR271


  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR        72-HR      24.92-HR
```

+	(CFS)	(HR)				
			(CFS)			
+	1376.	12.50		378.	100.	97.	97.
			(INCHES)	1.517	1.611	1.611	1.611
			(AC-FT)	187.	199.	199.	199.

CUMULATIVE AREA = 2.32 SQ MI

****

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

TIME OF MAX STAGE	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE
+	HYDROGRAPH AT	257	217.	13.42	62.	16.	15.	.34	
+	DIVERSION TO	DI256	119.	13.42	23.	6.	6.	.34	
+	HYDROGRAPH AT	D257	99.	13.42	39.	10.	9.	.34	
+	HYDROGRAPH AT	D257	119.	13.42	23.	6.	6.	.34	
+	ROUTED TO	R257	104.	14.08	23.	6.	6.	.34	
+	HYDROGRAPH AT	256	326.	13.00	72.	18.	17.	.43	
+	HYDROGRAPH AT	SUB6	188.	12.17	20.	6.	5.	.10	
+	HYDROGRAPH AT	SUB7	429.	12.17	37.	9.	9.	.24	
+	DIVERSION TO	D7OUT	214.	12.17	18.	5.	5.	.24	
+	HYDROGRAPH AT	D7	214.	12.17	18.	5.	5.	.24	
+	4 COMBINED AT	CP256	493.	12.25	133.	34.	33.	.77	
+	ROUTED TO	R256	445.	12.42	132.	34.	33.	.77	
+	HYDROGRAPH AT	271A	95.	13.33	25.	6.	6.	.16	
+	2 COMBINED AT	CP271A	481.	12.42	157.	40.	39.	.93	
+	ROUTED TO	SR271A	475.	12.42	157.	40.	39.	.93	
+	ROUTED TO	R271A	418.	12.75	156.	40.	39.	.93	
+	HYDROGRAPH AT	2711	234.	12.00	18.	5.	5.	.11	
+	HYDROGRAPH AT	254A	443.	12.08	40.	11.	11.	.22	
+	ROUTED TO	R254A1	309.	12.33	40.	11.	11.	.22	
+	2 COMBINED AT	CP2711	399.	12.08	57.	16.	16.	.33	
+	ROUTED TO	R2711	365.	12.17	57.	16.	16.	.33	
+	HYDROGRAPH AT	255A	957.	12.25	96.	26.	25.	.60	
+	HYDROGRAPH AT	D7OUT	214.	12.17	18.	5.	5.	.24	

	2 COMBINED AT							
+		CP255	1160.	12.17	114.	31.	30.	.60
	ROUTED TO							
+		R255	1141.	12.25	114.	31.	30.	.60
	ROUTED TO							
+		R2712	1123.	12.33	114.	31.	30.	.60
	HYDROGRAPH AT							
+		2712	739.	12.17	56.	14.	14.	.46
	4 COMBINED AT							
+		CP271	2106.	12.25	381.	102.	98.	2.32
	ROUTED TO							
+		SR271	1376.	12.50	378.	100.	97.	2.32
	ROUTED TO							
+		R271	1370.	12.58	378.	100.	97.	2.32
	ROUTED TO							
+		R271_1	1367.	12.58	378.	100.	97.	2.32
	HYDROGRAPH AT							
+		270	560.	12.08	49.	14.	13.	.30
	2 COMBINED AT							
+		LITCH	1417.	12.50	424.	114.	110.	2.62

7.3 HEC-1 Input File and Selected Results for Alternative Three

```
ID
ID
ID      FILENAME: RIDALT3.DAT
ID      Flood Control District of Maricopa County
ID      April, 1996
ID
ID      GENERAL:
ID      *****************************************************************
ID      This HEC-1 model is obtained by modifying ridalt2.dat
ID      It is for a 100-year and 24-hour event. The modification is that
ID      flow from cp2711 is routed into the detention basin system through
ID      a concrete channel. The modification was requested by Mr. Don Rerick
ID      in Project Management Branch of Planning and Project Management
ID      Division.
ID      The modifications are made such that (1) the peak discharge at the
ID      overchute is equal to or less than that in the previous
ID      hydrologic analysisl, and (2) the water surface elevation for
ID      the detention basin system is equal to or less than that in the
ID      previous hydrologic analysis.
ID      *****************************************************************
ID
ID
ID      NOTES:
ID      *****************************************************************
ID      (1) The channel capacity is computed by using Manning's equation
ID      (a computer program called FlowMaster is used)
ID      (2) The outflow-elevation relationship for the detention basin
ID      system is computed by applying Manning's equation to the outlet
ID      channel (R271).
ID      (3) Ridalt3.dat is Alternative Three. There are two more alternatives
ID      which are Alternative One (ridalt1.dat) and Alternative Two
ID      (ridalt3.dat).
ID      *****************************************************************
ID
ID
*DIAGRAM
IT     5 01JAN94     0001      300
IO     5
IN    15
JD  4.03     .001
PC  .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
PC  .029     .032     .035     .038     .041     .044     .048     .052     .056     .060
PC  .064     .068     .072     .076     .080     .085     .090     .095     .100     .105
PC  .110     .115     .120     .126     .133     .140     .147     .155     .163     .172
PC  .181     .191     .203     .218     .236     .257     .283     .387     .663     .707
PC  .735     .758     .776     .791     .804     .815     .825     .834     .842     .849
PC  .856     .863     .869     .875     .881     .887     .893     .898     .903     .908
PC  .913     .918     .922     .926     .930     .934     .938     .942     .946     .950
PC  .953     .956     .959     .962     .965     .968     .971     .974     .977     .980
PC  .983     .986     .989     .992     .995     .998     1.00    1.000    1.000    1.000
JD  3.99       10
JD  3.83       50
JD  3.76      100
JD  3.70      200
KK   257
KM      RUNOFF HYDROGRAPH FROM SUB-BASIN 257
BA   .34
LG   .50      .00     5.82      .24      .00
UI   12.      12.      12.      12.      27.      40.      46.      55.      59.      65.
UI   69.      74.      80.      88.      93.     106.     127.     144.     156.     136.
UI  122.     111.     102.      96.      89.      81.      74.      69.      62.      57.
UI   53.      45.      34.      27.      21.      21.      20.      20.      17.      12.
UI   12.      12.      12.       5.       4.       4.       4.       4.       4.       4.
UI    4.       4.       4.       4.       4.       4.       4.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  D257
KM      DIVERT FROM CP257 TO CP256
DT DI256
DI     0       56     1308
DQ     0        0      922
KK  D257
KM      RETURN DIVERT AT CP257
DR DI256
KK  R257
KM      ROUTE DIVERT FROM CP257 TO CP256
RS    12               -1        0
RC  .035     .035     .075     2680    .0018
RX  1000     1001     1002     1010     1540     1858     1859     1860
RY1025.5     1025     1025     1024     1024     1025     1025   1025.5
KK   256
KM      RUNOFF HYDROGRAPH FROM SUB-BASIN 256
BA   .43
LG   .50      .00     5.84      .30      .00
UI   20.      20.      20.      47.      71.      86.      98.     108.     119.     132.
UI  147.     165.     205.     244.     244.     206.     182.     165.     150.     133.
```

```
UI  120.     107.      96.      83.      64.      47.      35.      34.      32.      27.
UI   20.      20.      19.       6.       6.       6.       6.       6.       6.       6.
UI    6.       6.       6.       6.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB6
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=       1.1  Lca=        .6   S=   19.0  Kn= .030  LAG=  20.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .10
LG   .17      .20     6.00      .16    20.00
UI   21.      75.     114.     189.     162.     109.      65.      30.      17.       5.
UI    5.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK  SUB7
KM BASIN SUB7
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=       1.0  Lca=        .5   S=   21.0  Kn= .030  LAG=  19.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .24
LG   .19      .19     6.80      .20     3.00
UI   55.     192.     294.     483.     362.     238.     117.      60.      28.      13.
UI   13.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK    D7
KM DIVERT D7 TO CP255
DT D7OUT
DI     0      250
DQ     0      125
KK CP256
KO     1
KM       ADD HYDROGRAPHS AT CP256
HC     4
* KK  D256
* KM  ALL FLOWS GO SOUTH TO CP271A
* DTDI271A
* DI      0       98     1231     8218
* DQ      0       98     1231     4308
* KK  D256
* KM       RETURN DIVERT AT CP256
* DRDI271A
KK  R256
* KO      1
KM       ROUTE FLOW FROM CP256 TO CP271A  ** REVISED CHANNEL
KM       ASSUMED CHANNEL UNLINED, D= 5FT, V=3.5 FT/SEC
KM       3100 FEET, SLOPE 0.0014, 30FT BOTTOM WIDTH, 2:1 SIDE SLOPES
RS     3     FLOW       -1
RC 0.035    0.035    0.035     3100   0.0014
RX     0        5       10       20       50       60       65       70
RY    11       11       10        5        5       10       11       11
KK 271A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 271A
BA   .16
LG   .50      .00     4.93      .39      .00
UI    6.       6.       6.       6.      16.      21.      24.      28.      30.      33.
UI   35.      38.      42.      45.      50.      59.      70.      78.      68.      60.
UI   55.      50.      47.      43.      39.      36.      33.      30.      28.      24.
UI   19.      16.      10.      10.      10.      10.       9.       6.       6.       6.
UI    6.       2.       2.       2.       2.       2.       2.       2.       2.       2.
UI    2.       2.       2.       2.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KKCP271A
KM       ADD HYDROGRAPHS AT CP271A
HC     2
KKSR271A
* KO      1
KM       STORAGE ROUTE FLOW AT CP271A
RS     1     STOR
SV     0      .06     0.97     1.51
SE017.99     1018   1018.3   1018.4
SQ              7      247      460      604
SE017.99     1018   1018.3   1018.4   1018.5
KK R271A
* KO      1
KM       ROUTE FLOW FROM CP271A TO DETENTION BASIN AT CP271 **REVISED BY FCD
KM       REMEASURED LENGTH AT 3400 (FROM PREVIOUS 2000)
KM       EXISTING CHANNEL, 2750 FT LONG, SLOPE=0.001; 6:1 SIDE SLOPES
RS     3     FLOW       -1
RC 0.035    0.035    0.035     2750    0.001
RX     0       10       20       45       75      100      110      120
RY    11       10       10        6        6       10       10       11
KK  2711
KM  NEW SUBBASIN, PART OF THE PREVIOUS 271 NORTH OF INDIAN SCHOOL BYPASS
BA  0.11
LG   0.2     0.25      4.3     0.39       20
UI    93      288      306      118       33       11        0        0        0        0
UI     0        0        0        0        0        0        0        0        0        0
KK  254A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 254A
BA   .22
```

```
LG   .12      .19     5.82      .21    20.00
UI   79.     248.     444.     456.     271.     115.      56.      15.      14.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KKR254A1
KM       ROUTE FLOW FROM CP254A TO CP270A
KM       FROM CP254A TO THE PROPOSED INDIAN SCHOOL BYPASS
RS      2              -1
RC  0.05     0.05     0.05     2100  0.0025
RX  1000     1001     1002     1180     1310     1398     1399     1400
RY  1050     1017     1017     1016     1016     1017     1017     1050
KKCP2711
* 2/21/96, change "HC    3" to "HC    2". Flow from CP255A will not be
* combined here.
HC      2
* The following was modified on 2/21/1996 at FCD.
* KK R2711  REVISED CHANNEL
* KM       ROUTE FLOW FROM CP2711 TO MERGING POINT
* RS      1    FLOW      -1
* * RC 0.014    0.014    0.014     1650  0.0008
* RC 0.015    0.015    0.015    1025  0.0015
* * B=6
* RX      0        5       15       20       26       31       41       46
* RY     10       10       10        5        5       10       10       10
* * B=10
* * RX      0        5       15       20       30       35       45       50
* * RY     10       10       10        5        5       10       10       10
* *************************************************************
KK R2711 (to the detention basin system)
* B=9, Side slope=1:1, depth=3 ft, T=15 ft, S0=0.005
KO      1
* flow from cp2711 to the basin system in a concrete channel, 4/15/96
RS      1    FLOW      -1
RC 0.015    0.015    0.015      600  0.0050
RX      0        5       17       20       29       32       45       50
RY      8        8        8        5        5        8        8        8
* *************************************************************
KK  255A
KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 255A (NEW BY FCD)
BA .5968
LG   .20      .22     3.88      .29    12.00
UI   91.     359.     542.     814.    1029.     707.     492.     268.     147.      86.
UI   28.      28.      28.       0.       0.       0.       0.       0.       0.       0.
UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
KK D7OUT
KM       RETURN DIVERT TO 255
DR D7OUT
KK CP255
KM       ADD HYDROGRAPHS AT CP255
HC      2
* ZW  A=RID INFLOW1 B=FCD C=FLOW E=5MIN F=CP255
* *********************************************************
* TO DIVERT SOME FLOW AT CP255 THRU SUB-BASIN 2712 IN A MANNER THAT
* UP-TO-940cfs PEAK FLOW WILL GO TO THE CHANNEL FROM CP255 TO CP2711.
* 940 cfs IS 50-YR FLOW IN THE CHANNEL. FCD, 2/13/1996
* KK  D255
* KM       DIVERT FROM CP255 TO SR271
* DT DI271
* DI      0      940     1160
* DQ      0        0      220
* *******************************************************
KK  R255
* KO      1
KM       ROUTE FLOW ALONG INDIAN SCHOOL BYPASS AND A PATH SOUTHEAST TO
KM       2712 (around the circle)
KM      ASSUME CHANNEL UNLINED, D= 5FT , V<3.93 FT/SEC
KM       B=40', 4:1 side slope
KM      The length is 1350 ft, which is the half of 2700 ft from
KM      previous study (2/21/96, FCD)
RS      2    FLOW      -1
RC 0.035   0.035    0.035     1350  0.0015
* B=45, T=85 ft after running flowmaster
* RX     18       19       20       40       85      105      106      107
* RY     10       10       10        5        5       10       10       10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX     18       19       20       40       82      102      103      104
RY     10       10       10        5        5       10       10       10
* B=100, T=140 ft
* RX     18       19       20       40      140      160      161      162
* RY     10       10       10        5        5       10       10       10
* Above water will go to 2712
* ******************************
* 2/21/1996, FCD
KK R2712
KO      1
KM       ROUTE FLOW INTO 2712
KM      ASSUME CHANNEL UNLINED, D=5 FT, V<3.93 FT/SEC
KM      40FT BOTTOM WIDTH, 4:1 SIDE SLOPES, LENGTH = 1500 FT
* the length is reduced, so use NSTPS=1
```

```
RS      1     FLOW       -1
* the length is reduced because the new basin of 27 AC-FT is put at the
* end of the reach. The length of the basin is L=639.7+60 ft, so 1500-L=800
* the bottom width is assumed to be L/2
RC 0.035    0.035    0.035      800  0.0015
* the length is reduced because the new basin of 26 AC-FT is put at the
* end of the reach. The length of the basin is L=627+60 ft, so 1500-L=813
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      813  0.0015
* the length is reduced because the new basin of 25 AC-FT is put at the
* end of the reach. The length of the basin is L=614+60 ft, so 1500-L=826
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      826  0.0015
* the length is reduced because the new basin of 23 AC-FT is put at the
* end of the reach. The length of the basin is L=587+60 ft, so 1500-L=853
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      853  0.0015
* the length is reduced because the new basin of 22 AC-FT is put at the
* end of the reach. The length of the basin is L=573+60 ft, so 1500-L=867
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      867  0.0015
* the length is reduced because the new basin of 20 AC-FT is put at the
* end of the reach. The length of the basin is L=544+60 ft, so 1500-604=896
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      896  0.0015
* the length is reduced because the new basin of 19 AC-FT is put at the
* end of the reach. The length of the basin is L=529+60 ft, so 1500-589=911
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      911  0.0015
* the length is reduced because the new basin of 18 AC-FT is put at the
* end of the reach. The length of the basin is L=514+60 ft, so 1500-574=926
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035      926  0.0015
* the length is reduced because the new basin of 17 AC-FT is put at the
* end of the reach. The length of the basin is 502 ft, so 1500-502=998
* the bottom width is assumed to be L/2=251ft
* RC 0.035    0.035    0.035      998  0.0015
* the length is reduced because the new basin of 16 AC-FT is put at the
* end of the reach. The length of the basin is 485 ft, so 1500-468=1015
* the bottom width is assumed to be L/2
* RC 0.035    0.035    0.035     1015  0.0015
* the length is reduced because the new basin of 15 AC-FT is put at the
* end of the reach. The length of the basin is 468 ft, so 1500-468=1032
* the bottom width is assumed to be L/2 = 234
* RC 0.035    0.035    0.035     1032  0.0015
* the length is reduced because the new basin of 10 AC-FT is put at the
* end of the reach. The length of the basin is 375 ft, so 1500-375=1125
* the width is assumed to be L/2 = 187.5'
* RC 0.035    0.035    0.035     1125  0.0015
* the length is reduced because the new basin of 20 AC-FT is put at the
* end of the reach. The length of the basin is 547 ft, so 1500-547=953
* the width is assumed to be L/2 = 273'
* RC 0.035    0.035    0.035      953  0.0015
* RS      2     FLOW       -1
* the length is reduced because the new basin of 53 AC-FT is put at the
* end of the reach. The length of the basin is 800 ft, so 1500-800=700'
* RC 0.035    0.035    0.035      700  0.0015
* RC 0.035    0.035    0.035     1500  0.0015
* B=45, T=85 ft
* RX    18       19       20       40       85      105      106      107
* RY    10       10       10        5        5       10       10       10
* B=42, T=82 ft after running flowmaster using computer Q=1200
RX    18       19       20       40       82      102      103      104
RY    10       10       10        5        5       10       10       10
* B=100, T=140 ft
* RX    18       19       20       40      140      160      161      162
* RY    10       10       10        5        5       10       10       10
* ************
KK  2712
* KO      1
KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 2712
BA    .46
LG    .35      .25    4.30      .39        2
UI   117      397      618      973      667      425      181      102       34       26
UI     0        0        0        0        0        0        0        0        0        0
KK CP271
* KO      1         1
KM COMBINE FOUR FLOWS
HC      4
* KKDSR271
* KO      1
* KM        DIVERT FLOW TO CHECK HOW MUCH STORAGE IS NEEDED AT THE BASINS
* DTDSR271
* DI      0      500     1000     1500     2000
* DQ      0      220      220      220      220
KK SR271
KO      1
* KO      2         2 (2/14/96)
KM        STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
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KM      THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
KM      OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
KM      STAGE/STORAGE BASED ON 1014'
RS      1     STOR        0
* newest rating curve after 27 AC-FT basin is included
SV      0     6.3     20.13    69.34
SE  1007   1008.1      1010     1014
* newest rating curve after 26 AC-FT basin is included
* SV     0      6.10    19.60     67.9
* SE  1007   1008.1     1010     1014
* newest rating curve after 25 AC-FT basin is included
* SV     0      5.88    18.97     66.5
* SE  1007   1008.1     1010     1014
* newest rating curve after 23 AC-FT basin is included
* SV     0      5.46    17.8       64
* SE  1007   1008.1     1010     1014
* newest rating curve after 22 AC-FT basin is included
* SV     0     5.252   17.221 62.1547
* SE  1007   1008.1     1010     1014
* newest rating curve after 20 AC-FT basin is included
* SV     0      4.84    16.1    59.27
* SE  1007   1008.1     1010     1014
* newest rating curve after 19 AC-FT basin is included
* SV     0      4.63    15.5    57.83
* SE  1007   1008.1     1010     1014
* newest rating curve after 18 AC-FT basin is included
* SV     0      4.43    14.9     56.4
* SE  1007   1008.1     1010     1014
* newest rating curve after 17 AC-FT basin is included
* SV     0      4.26    14.43   55.24
* SE  1007   1008.1     1010     1014
* newest rating curve after 16 AC-FT basin is included
* SV     0       4.1    13.9     53.8
* SE  1007   1008.1     1010     1014
* newest rating curve after 15 AC-FT basin is included
* SV     0      3.85    13.3     52.3
* SE  1007   1008.1     1010     1014
* newest rating curve after 10 AC-FT basin is included
* SV     0       2.8    10.4       45
* SE  1007   1008.1     1010     1014
* newest rating curve after 20 AC-FT basin is included
* SV     0       4.9    16.2       60
* SE  1007   1008.1     1010     1014
* newest rating curve after 53 AC-FT basin is included
* SV     0      12.9    38.4    113.4
* SE  1007   1008.1     1010     1014
* new rating curve, because when EL=1008.1, MCDOT basin can hold water
* (the bottom is 1007)
* SV     0     0.963     4.81    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE  1007    1008.1     1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* SV     0      4.68    29.42    33.71    41.18    45.74     50.3    54.86    59.42
* SE1008.1      1010     1014   1014.3   1014.6   1014.7   1014.8   1014.9     1015
* B=18
* SQ     0        29      150      338      587      893     1258     1680
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=19'
* SQ     0        31      158      357      618      940     1322     1763
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=20'
* SQ     0        33      167      375      650      987     1386     1847
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=21'
* SQ     0        34      175      394      681     1034     1451     1931
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=22'
* SQ     0      35.9      183      412      713     1081     1515     2015
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=24'
* SQ     0        39      200      450      776     1176     1645     2184
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=25'
SQ      0       41      208      468      808     1223     1710     2269
SE1007.4      1008     1009     1010     1011     1012     1013     1014
* B=26'
* SQ     0        42      215      482      832     1259     1759     2333
* SE1007.4      1008     1009     1010     1011     1012     1013     1014
KK  R271
KO     1
KM  ROUTE CP271 TO THE MERGING POINT OF TWO CHANNELS
* RS     1     FLOW       -1
* use Mukingum-Cunge, since outflow is greater than the inflow
RD
RC 0.015   0.015   0.015     675  0.0015
* The new depth = 5ft, new bottom width = 18 ft, new side slope = 1:1
* RX    10       11       12    17.00     35.0       40       41       42
* RY    10       10       10      5.0      5.0       10       10       10
* The new depth = 5ft, new bottom width = 19 ft, new side slope = 1:1
* RX    10       11       12    17.00     36.0       41       42       43
* RY    10       10       10      5.0      5.0       10       10       10
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* The new depth = 5ft, new bottom width = 20 ft, new side slope = 1:1
* RX    10      11      12   17.00    37.0      42      43      44
* RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 21 ft, new side slope = 1:1
* RX    10      11      12   17.00    38.0      43      44      45
* RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 22 ft, new side slope = 1:1
* RX    10      11      12   17.00    39.0      44      45      46
* RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 23 ft, new side slope = 1:1
* RX    10      11      12   17.00    40.0      45      46      47
* RY    10      10      10     5.0     5.0      10      10      10
* * The new depth = 5ft, new bottom width = 24 ft, new side slope = 1:1
* RX    10      11      12   17.00    41.0      46      47      48
* RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 25 ft, new side slope = 1:1
RX    10      11      12   17.00    42.0      47      48      49
RY    10      10      10     5.0     5.0      10      10      10
* The new depth = 5ft, new bottom width = 26 ft, new side slope = 1:1
* RX    10      11      12   17.00    43.0      48      49      50
* RY    10      10      10     5.0     5.0      10      10      10
* KKMERGE
* KO     1
* KM      COMBINED Q ALONG INDIAN SCH.RD. INTO OVERCHUTE
* HC     2
KKR271_1
KO     1
KM  ROUTE THE MERGING POINT OF TWO CHANNELS TO LITCH, 3/8/96, FCD
* RS     1    FLOW      -1
* RC 0.015   0.015   0.015     625  0.0015
* * RX    10      11      12   17.00   103.0     108     109     110
* * RY    11      11      11     5.0     5.0      11      11      11
* RX    10      11      12      12      42      42      43      44
* RY    10      10      10     5.0     5.0      10      10      10
* above routing gave a higher outflow peak than the inflow peak, not
* reasonable, the following will use Muskingum-Cunge Method
* RD   625  0.0015   0.015    TRAP      30       0
RD
RC 0.015   0.015   0.015     625  0.0015
RX    10      11      12      12      42      42      43      44
RY    10      10      10     5.0     5.0      10      10      10
KK   270
KM BASIN 270
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN** REVISED BY FCD
KM  L=       .7  Lca=       .3    S=   10.5  Kn= .030  LAG=  16.0
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   .30
LG   .16     .22    3.58     .38   18.00
UI  103.    326.    570.    635.    379.    174.     80.     26.     19.      0.
UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
KK LITCH
* KO     1
HC     2
* ZW  A=RID INFLOW2 B=FCD C=FLOW E=5MIN F=LITCH
ZZ
```

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

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

   92          257
                .
                .
  105           .------->   DI256
  103         D257
                .
                .
  110           .            .<-------   DI256
  108           .         D257
                .            V
                .            V
  111           .         R257
                .            .
                .            .
  117           .            .           256
                .            .            .
                .            .            .
  127           .            .            .          SUB6
                .            .            .            .
                .            .            .            .
  136           .            .            .            .          SUB7
                .            .            .            .            .
                .            .            .            .            .
  148           .            .            .            .            .------->   D7OUT
  146           .            .            .            .          D7
```

```
                .           .           .           .           .
                .           .           .           .           .
 151            .       CP256....................................
                .           V
                .           V
 155            .        R256
                .           .
                .           .
 163            .           .        271A
                .           .           .
                .           .           .
 174            .      CP271A............
                .           V
                .           V
 177            .      SR271A
                .           V
                .           V
 184            .       R271A
                .           .
                .           .
 192            .           .        2711
                .           .           .
                .           .           .
 198            .           .           .        254A
                .           .           .           V
                .           .           .           V
 205            .           .           .      R254A1
                .           .           .           .
                .           .           .           .
 212            .           .      CP2711............
                .           .           V
                .           .           V
 214            .           .       R2711
                .           .           .
                .           .           .
 220            .           .           .        255A
                .           .           .           .
                .           .           .           .
 229            .           .           .           .           .<-------   D7OUT
 227            .           .           .           .       D7OUT
                .           .           .           .           .
                .           .           .           .           .
 230            .           .           .       CP255............
                .           .           .           V
                .           .           .           V
 233            .           .           .        R255
                .           .           .           V
                .           .           .           V
 244            .           .           .       R2712
                .           .           .           .
                .           .           .           .
 253            .           .           .           .        2712
                .           .           .           .           .
                .           .           .           .           .
 259            .       CP271....................................
                .           V
                .           V
 262            .       SR271
                .           V
                .           V
 273            .        R271
                .           V
                .           V
 280            .      R271_1
                .           .
                .           .
 287            .           .         270
                .           .           .
                .           .           .
 297            .       LITCH............
(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


             **************
             *            *
 262 KK      *   SR271    *
             *            *
             **************

 263 KO           OUTPUT CONTROL VARIABLES
                        IPRNT           1  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTE CP271 BEHIND ROOSEVELT CANAL
                              THIS INCLUDES THE TWO EXISTING STORAGE BASINS, THE ADDITIONAL STORAGE
                              OF 14.7 CUFT OF THE PROPOSED BASIN AND FLOODPLAIN PONDING
                              STAGE/STORAGE BASED ON 1014'
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HYDROGRAPH ROUTING DATA

```
268 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       STOR  TYPE OF INITIAL CONDITION
                    RSVRIC        .00  INITIAL CONDITION
                         X        .00 WORKING R AND D COEFFICIENT
```

269 SV	STORAGE	.0	6.3	20.1	69.3				
270 SE	ELEVATION	1007.00	1008.10	1010.00	1014.00				
271 SQ	DISCHARGE	0.	41.	208.	468.	808.	1223.	1710.	2269.
272 SE	ELEVATION	1007.40	1008.00	1009.00	1010.00	1011.00	1012.00	1013.00	1014.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.29	5.73	6.30	12.85	20.13	32.43	44.73	57.04	69.34
OUTFLOW	.00	.00	41.00	57.70	208.00	468.00	808.00	1223.00	1710.00	2269.00
ELEVATION	1007.00	1007.40	1008.00	1008.10	1009.00	1010.00	1011.00	1012.00	1013.00	1014.00

****

HYDROGRAPH AT SR271
TRANSPOSITION AREA 0.0 SQ MI

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```
  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR        72-HR      24.92-HR
+   (CFS)        (HR)
                              (CFS)
+    1416.      12.50                  382.        102.          98.           98.
                            (INCHES)  1.535       1.630        1.630         1.630
                             (AC-FT)   190.        201.         201.          201.

 PEAK STORAGE    TIME                       MAXIMUM AVERAGE STORAGE
                                       6-HR       24-HR        72-HR      24.92-HR
+  (AC-FT)       (HR)
        50.     12.50                   18.          6.           6.            6.

  PEAK STAGE     TIME                        MAXIMUM AVERAGE STAGE
                                       6-HR       24-HR        72-HR      24.92-HR
+   (FEET)       (HR)
   1012.40      12.50               1009.40     1007.94      1007.91       1007.91

                          CUMULATIVE AREA =     2.32 SQ MI
```

****

HYDROGRAPH AT SR271
TRANSPOSITION AREA 10.0 SQ MI

****

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  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR        72-HR      24.92-HR
+   (CFS)        (HR)
                              (CFS)
+    1392.      12.50                  377.        100.          96.           96.
                            (INCHES)  1.513       1.607        1.607         1.607
                             (AC-FT)   187.        199.         199.          199.

 PEAK STORAGE    TIME                       MAXIMUM AVERAGE STORAGE
                                       6-HR       24-HR        72-HR      24.92-HR
+  (AC-FT)       (HR)
        49.     12.50                   17.          6.           6.            6.

  PEAK STAGE     TIME                        MAXIMUM AVERAGE STAGE
                                       6-HR       24-HR        72-HR      24.92-HR
+   (FEET)       (HR)
   1012.35      12.50               1009.38     1007.94      1007.90       1007.90

                          CUMULATIVE AREA =     2.32 SQ MI
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INTERPOLATED HYDROGRAPH AT SR271

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1396.	12.50		378.	100.	97.	97.
			(INCHES)	1.516	1.611	1.611	1.611
			(AC-FT)	187.	199.	199.	199.

CUMULATIVE AREA = 2.32 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
+	HYDROGRAPH AT	257	217.	13.42	62.	16.	15.	.34		
+	DIVERSION TO	DI256	119.	13.42	23.	6.	6.	.34		
+	HYDROGRAPH AT	D257	99.	13.42	39.	10.	9.	.34		
+	HYDROGRAPH AT	D257	119.	13.42	23.	6.	6.	.34		
+	ROUTED TO	R257	104.	14.08	23.	6.	6.	.34		
+	HYDROGRAPH AT	256	326.	13.00	72.	18.	17.	.43		
+	HYDROGRAPH AT	SUB6	188.	12.17	20.	6.	5.	.10		
+	HYDROGRAPH AT	SUB7	429.	12.17	37.	9.	9.	.24		
+	DIVERSION TO	D7OUT	214.	12.17	18.	5.	5.	.24		
+	HYDROGRAPH AT	D7	214.	12.17	18.	5.	5.	.24		
+	4 COMBINED AT	CP256	493.	12.25	133.	34.	33.	.77		
+	ROUTED TO	R256	445.	12.42	132.	34.	33.	.77		
+	HYDROGRAPH AT	271A	95.	13.33	25.	6.	6.	.16		
+	2 COMBINED AT	CP271A	481.	12.42	157.	40.	39.	.93		
+	ROUTED TO	SR271A	475.	12.42	157.	40.	39.	.93		
+	ROUTED TO	R271A	418.	12.75	156.	40.	39.	.93		
+	HYDROGRAPH AT	2711	234.	12.00	18.	5.	5.	.11		
+	HYDROGRAPH AT	254A	443.	12.08	40.	11.	11.	.22		
+	ROUTED TO	R254A1	309.	12.33	40.	11.	11.	.22		
+	2 COMBINED AT	CP2711	399.	12.08	57.	16.	16.	.33		
+	ROUTED TO	R2711	396.	12.08	57.	16.	16.	.33		
+	HYDROGRAPH AT	255A	957.	12.25	96.	26.	25.	.60		

+	HYDROGRAPH AT	D7OUT	214.	12.17	18.	5.	5.	.24
+	2 COMBINED AT	CP255	1160.	12.17	114.	31.	30.	.60
+	ROUTED TO	R255	1141.	12.25	114.	31.	30.	.60
+	ROUTED TO	R2712	1123.	12.33	114.	31.	30.	.60
+	HYDROGRAPH AT	2712	739.	12.17	56.	14.	14.	.46
+	4 COMBINED AT	CP271	2091.	12.25	380.	102.	98.	2.32
+	ROUTED TO	SR271	1396.	12.50	378.	100.	97.	2.32
+	ROUTED TO	R271	1385.	12.50	378.	100.	97.	2.32
+	ROUTED TO	R271_1	1378.	12.58	378.	100.	97.	2.32
+	HYDROGRAPH AT	270	560.	12.08	49.	14.	13.	.30
+	2 COMBINED AT	LITCH	1441.	12.50	424.	114.	110.	2.62

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